



# Publications & Presentations 2016

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## Journal Articles

Ahmed A, Rudser KD, **Kunin-Batson AS**, Delaney KA, Whitley CB, Shapiro EG. Mucopolysaccharidosis (MPS) physical symptom score: development, reliability, and validity. *JIMD Rep.* 2016;26:61-8. PMC4864710.

**OBJECTIVES:** We quantified medical signs and symptoms to construct the Physical Symptom Score (PSS) for use in research to assess somatic disease burden in mucopolysaccharidoses (MPS) to track disease and monitor treatments. We examined scoring reliability, its concurrent validity with other measures, and relationship to age in MPS type I. **METHODS:** Fifty-four patients with MPS I (36 with Hurler syndrome treated with hematopoietic cell transplant and 18 with attenuated MPS I treated with enzyme replacement therapy), ages 5 to 18 years, were seen longitudinally over 5 years. The summation of frequency and severity of signs of specific organ involvement, surgeries, and hydrocephalus drawn from medical histories comprise the PSS. We examined relationship to age and to daily living skills (DLS) from the Vineland Adaptive Behavior Scale and physical quality of life from the Child Health Questionnaire (CHQ) for each group. **RESULTS:** The PSS was associated with age in both groups, indicating increase in disease burden over time. The PSS was significantly negatively associated with DLS ( $r = -0.48$ ) and CHQ ( $r = -0.55$ ) in the attenuated MPS I but not in the Hurler group. **CONCLUSIONS:** The association of somatic disease burden with physical quality of life and ability to carry out daily living skills suggests that the PSS will be useful in the measurement of disease and treatment effects in the attenuated MPS I group. Earlier treatment with transplant and differing parental expectations are possible explanations for its lack of association with other outcomes necessitating an adaptation for Hurler syndrome in the future.

Ahmed A, Shapiro EG, Rudser KD, **Kunin-Batson AS**, King K, Whitley CB. Association of somatic burden of disease with age and neuropsychological measures in attenuated mucopolysaccharidosis types I, II and VI. *Mol Genet Metab Rep.* 2016 Jun;7:27-31. PMC4832083.

**INTRODUCTION:** The mucopolysaccharidoses (MPSs) are a group of rare genetic lysosomal disorders with progressive multisystem involvement. An MPS-specific physical symptom scale was developed and introduced a Physical Symptom Score (PSS) to quantify the somatic disease burden across MPS I, II and VI. **HYPOTHESIS:** Somatic burden of disease in patients with attenuated MPS I, II and VI as measured by the PSS will be positively associated with age and negatively associated with neuropsychological functions [i.e. full-scale intelligence quotient (FSIQ) and attention]. **MATERIALS AND METHODS:** Forty-eight patients with attenuated MPS I ( $n = 24$ ), II ( $n = 14$ ), and VI ( $n = 10$ ) aged 6 to 32 years on enzyme replacement therapy who were enrolled in "Longitudinal Studies of Brain Structure and Functions in MPS Disorders" across seven centers. Somatic disease burden was measured by the PSS. Neuropsychological functions were measured by the Wechsler Abbreviated Scale of Intelligence (WASI) and Test of Variables of Attention (TOVA). **RESULTS:** PSS was positively associated with age in attenuated MPS I ( $P < 0.001$ ), MPS II ( $P < 0.01$ ) and MPS VI ( $P < 0.05$ ). There was a negative association of PSS with FSIQ in attenuated MPS I ( $P < 0.001$ ) and in MPS VI ( $P < 0.001$ ) but not with MPS II. Although attention scores were below average in all groups, a significant negative association between PSS, and one measure of sustained attention (TOVA d prime) was found only in MPS VI. **CONCLUSIONS:** Physical Symptom Score increased with age in attenuated MPS I, II and VI, reflecting progressive somatic burden of disease despite treatment with enzyme replacement therapy. Furthermore, the association of increased somatic disease burden with decreased neurocognitive ability suggests that both measures reflect disease severity and are not independent.

Allison MA, Aragaki AK, Ray RM, **Margolis KL**, Beresford SA, Kuller L, O'Sullivan MJ, Wassertheil-Smoller S, Van Horn L. A randomized trial of a low-fat diet intervention on blood pressure and hypertension: Tertiary analysis of the WHI dietary modification trial. *Am J Hypertens.* 2016 Aug;29(8):959-68. PMC4941590.

**Alpern JD**, Bahr NC, **Vazquez-Benitez G**, Boulware DR, **Sellman JS**, Sarosi GA. Diagnostic delay and antibiotic overuse in acute pulmonary blastomycosis. *Open Forum Infect Dis.* 2016 Apr;3(2):ofw078.

PMC4943562.

The diagnosis of blastomycosis is often delayed. We identified 28 cases of pulmonary blastomycosis in a retrospective chart review. Most patients received multiple antibiotic courses before being diagnosed, and the sputum KOH smear was rarely used. Diagnostic delay can be decreased with higher suspicion for pulmonary blastomycosis and early use of the sputum KOH smear.

**Alpern JD**, Davey CS, Song J. Perceived barriers to success for resident physicians interested in immigrant and refugee health. *BMC Med Educ.* 2016 Jul 15;16:178. PMC4946089.

**BACKGROUND:** Cross-cultural care is recognized by the ACGME as an important aspect of US residency training. Resident physicians' preparedness to deliver cross-cultural care has been well studied, while preparedness to provide care specifically to immigrant and refugee populations has not been. **METHODS:** We administered a survey in October 2013 to 199 residents in Internal Medicine, Pediatrics, and Medicine/Pediatrics at the University of Minnesota, assessing perceived knowledge, attitudes, and experience with immigrant and refugee patients. **RESULTS:** Eighty-three of 199 residents enrolled in Internal Medicine, Pediatrics and Medicine/Pediatrics programs at the University of Minnesota completed the survey (42%). Most (n = 68, 82%) enjoyed caring for immigrants and refugees. 54 (65%) planned to care for this population after residency, though 45 (54%) were not comfortable with their knowledge regarding immigrant and refugee health. Specific challenges were language (n = 81, 98%), cultural barriers (n = 76, 92%), time constraints (n = 60, 72%), and limited knowledge of tropical medicine (n = 57, 69%). 67 (82%) wanted more training in refugee and immigrant health. **CONCLUSIONS:** The majority of residents enjoyed caring for immigrant and refugee patients and planned to continue after residency. Despite favorable attitudes, residents identified many barriers to providing good care. Some involved cultural and language barriers, while others were structural. Finally, most respondents felt they needed more education, did not feel comfortable with their knowledge, and wanted more training during residency. These data suggest that residency programs should consider increasing training in these specific areas of concern.

**Alpern JD**, Dunlop SJ, Dolan BJ, **Stauffer WM**, Boulware DR. Personal protection measures against mosquitoes, ticks, and other arthropods [review article]. *Med Clin North Am.* 2016 Mar;100(2):303-16.

Arthropod-associated diseases are a major cause of morbidity among travelers. Obtaining a detailed travel itinerary and understanding traveler-specific and destination-specific risk factors can help mitigate the risk of vector-borne diseases. DEET, picaridin, PMD, and IR3535 are insect repellents that offer sufficient protection against arthropod bites. IR3535 does not provide adequate protection against Anopheles mosquitoes and should be avoided in malaria-endemic regions. General protective measures, such as bite avoidance, protective clothing, insecticide-treated bed nets, and insecticide-treated clothing, should be recommended, especially in malaria-endemic areas. Spatial repellents may prevent nuisance biting but have not been shown to prevent vector-borne disease.

**Alpern JD**, Song J, **Stauffer WM**. Essential medicines in the United States--why access is diminishing. *N Engl J Med.* 2016 May 19;374(20):1904-7.

**Alpern JD**, Song J, **Stauffer WM**. Access to essential medicines in the United States [editorial]. *N Engl J Med.* 2016 Sep 1;375(9):904. [Comment on: *N Engl J Med.* 2016 Sep 1;375(9):903. *N Engl J Med.* 2016 May 19;374(20):1904-7.]

**Anderson JP**, Parikh JR, Shenfeld DK, Ivanov V, Marks C, Church BW, Laramie JM, Mardekian J, Piper BA, Willke RJ, Rublee DA. Reverse engineering and evaluation of prediction models for progression to type 2 diabetes: an application of machine learning using electronic health records. *J Diabetes Sci Technol.* 2016 Jan;10(1):6-18. PMC4738229.

**BACKGROUND:** Application of novel machine learning approaches to electronic health record (EHR) data could provide valuable insights into disease processes. We utilized this approach to build predictive models for progression to prediabetes and type 2 diabetes (T2D). **METHODS:** Using a novel analytical platform (Reverse Engineering and Forward Simulation [REFS]), we built prediction model ensembles for

progression to prediabetes or T2D from an aggregated EHR data sample. REFS relies on a Bayesian scoring algorithm to explore a wide model space and outputs a distribution of risk estimates from an ensemble of prediction models. We retrospectively followed 24,331 adults for transitions to prediabetes or T2D, 2007-2012. Accuracy of prediction models was assessed using an area under the curve (AUC) statistic and validated in an independent data set. RESULTS: Our primary ensemble of models accurately predicted progression to T2D (AUC = 0.76) and was validated out of sample (AUC = 0.78). Models of progression to T2D consisted primarily of established risk factors (blood glucose, blood pressure, triglycerides, hypertension, lipid disorders, socioeconomic factors), whereas models of progression to prediabetes included novel factors (high-density lipoprotein, alanine aminotransferase, C-reactive protein, body temperature; AUC = 0.70). CONCLUSIONS: We constructed accurate prediction models from EHR data using a hypothesis-free machine learning approach. Identification of established risk factors for T2D serves as proof of concept for this analytical approach, while novel factors selected by REFS represent emerging areas of T2D research. This methodology has potentially valuable downstream applications to personalized medicine and clinical research.

Appelhans BM, French SA, Pagoto SL, **Sherwood NE**. Managing temptation in obesity treatment: a neurobehavioral model of intervention strategies [review article]. *Appetite*. 2016 Jan 1;96:268-79. PMC4684710.

Weight loss outcomes in lifestyle interventions for obesity are primarily a function of sustained adherence to a reduced-energy diet, and most lapses in diet adherence are precipitated by temptation from palatable food. The high nonresponse and relapse rates of lifestyle interventions suggest that current temptation management approaches may be insufficient for most participants. In this conceptual review, we discuss three neurobehavioral processes (attentional bias, temporal discounting, and the cold-hot empathy gap) that emerge during temptation and contribute to lapses in diet adherence. Characterizing the neurobehavioral profile of temptation highlights an important distinction between temptation resistance strategies aimed at overcoming temptation while it is experienced and temptation prevention strategies that seek to avoid or minimize exposure to tempting stimuli. Many temptation resistance and temptation prevention strategies heavily rely on executive functions mediated by prefrontal systems that are prone to disruption by common occurrences such as stress, insufficient sleep, and even exposure to tempting stimuli. In contrast, commitment strategies are a set of devices that enable individuals to manage temptation by constraining their future choices, without placing heavy demands on executive functions. These concepts are synthesized in a conceptual model that categorizes temptation management approaches based on their intended effects on reward processing and degree of reliance on executive functions. We conclude by discussing the implications of our model for strengthening temptation management approaches in future lifestyle interventions, tailoring these approaches based on key individual difference variables and suggesting high-priority topics for future research.

Aroda VR, Rosenstock J, Wysham C, Unger J, Bellido D, Gonzalez-Galvez G, Takami A, Guo H, Niemoeller E, Souhami E, **Bergenstal RM**, LixiLan-L Trial Investigators. Efficacy and safety of LixiLan, a titratable fixed-ratio combination of insulin glargine plus lixisenatide in type 2 diabetes inadequately controlled on basal insulin and metformin: The LixiLan-L randomized trial. *Diabetes Care*. 2016 Nov;39(11):1972-80.

OBJECTIVE: This study was conducted to demonstrate the efficacy and safety of LixiLan (iGlarLixi), a novel, titratable, fixed-ratio combination of insulin glargine (iGlar) (100 units) and lixisenatide, compared with iGlar in patients with type 2 diabetes inadequately controlled on basal insulin with or without up to two oral glucose-lowering agents. RESEARCH DESIGN AND METHODS: After a 6-week run-in when iGlar was introduced and/or further titrated and oral antidiabetic drugs other than metformin were stopped, 736 basal insulin-treated patients (mean diabetes duration 12 years, BMI 31 kg/m<sup>2</sup>) were randomized 1:1 to open-label, once-daily iGlarLixi or iGlar, both titrated to fasting plasma glucose <100 mg/dL (<5.6 mmol/mol) up to a maximum dose of 60 units/day. The primary outcome was change in HbA1c levels at 30 weeks. RESULTS: HbA1c decreased from 8.5% (69 mmol/mol) to 8.1% (65 mmol/mol) during the run-in period. After randomization, iGlarLixi showed greater reductions in HbA1c from baseline compared with iGlar (-1.1% vs. -0.6%, P < 0.0001), reaching a mean final HbA1c of 6.9% (52 mmol/mol) compared with 7.5% (58 mmol/mol) for iGlar. HbA1c <7.0% (53 mmol/mol) was achieved

in 55% of iGlarLixi patients compared with 30% on iGlar. Mean body weight decreased by 0.7 kg with iGlarLixi and increased by 0.7 kg with iGlar (1.4 kg difference,  $P < 0.0001$ ). Documented symptomatic hypoglycemia ( $\leq 70$  mg/dL) was comparable between groups. Mild gastrointestinal adverse effects were very low but more frequent with iGlarLixi. **CONCLUSIONS:** Compared with iGlar, a substantially higher proportion of iGlarLixi-treated patients achieved glycemic targets with a beneficial effect on body weight, no additional risk of hypoglycemia, and low levels of gastrointestinal adverse effects in inadequately controlled, basal insulin-treated, long-standing type 2 diabetes.

**Asche SE, O'Connor PJ, Dehmer SP, Green BB, Bergdall AR, Maciosek MV, Nyboer RA, Pawloski PA, Sperl-Hillen JM, Trower NK, Margolis KL.** Patient characteristics associated with greater blood pressure control in a randomized trial of home blood pressure telemonitoring and pharmacist management. *J Am Soc Hypertens.* 2016 Nov;10(11):873-80. PMC5107124.

This paper reports subgroup analysis of a successful cluster-randomized trial to identify attributes of hypertensive patients who benefited more or less from an intervention combining blood pressure (BP) telemonitoring and pharmacist management. The end point was BP  $< 140/90$  mm Hg at 6-month follow-up. Fourteen baseline patient characteristics were selected a priori as subgroup variables. Among the 351 trial participants, 44% were female, 84% non-Hispanic white, mean age was 60.9 years, and mean BP was 149/86 mm Hg. The overall adjusted odds ratio for BP control in the intervention versus usual care group was 3.64 ( $P < .001$ ). The effect of the intervention was significantly larger in patients who were younger (interaction  $P = .02$ ), did not have diabetes ( $P = .005$ ), had high baseline diastolic BP ( $P = .02$ ), added salt less than daily in food preparation ( $P = .007$ ), and took 0-2 (rather than 3-6) antihypertensive medication classes at baseline ( $P = .02$ ). These findings may help prioritize patients for whom the intervention is most effective.

Benzo R, Vickers K, Novotny PJ, Tucker S, Hoult J, **Neuenfeldt PJ**, Connett J, Lorig K, **McEvoy CE.** Health coaching and chronic obstructive pulmonary disease rehospitalization: A randomized study. *Am J Respir Crit Care Med.* 2016 Sep 15;194(6):672-80. PMC5027231. Project: A09-101 CARE COPD. [Comment in: *Am J Respir Crit Care Med.* 2016 Sep 15;194(6):647-9.]

**RATIONALE:** Hospital readmission for chronic obstructive pulmonary disease (COPD) has attracted attention owing to the burden on patients and the health care system. There is a knowledge gap on approaches to reducing COPD readmissions. **OBJECTIVES:** To determine the effect of comprehensive health coaching on the rate of COPD readmissions. **METHODS:** A total of 215 patients hospitalized for a COPD exacerbation were randomized at hospital discharge to receive either (1) motivational interviewing-based health coaching plus a written action plan for exacerbations (the use of antibiotics and oral steroids) and brief exercise advice or (2) usual care. **MEASUREMENTS AND MAIN RESULTS:** We evaluated the rate of COPD-related hospitalizations during 1 year of follow-up. The absolute risk reductions of COPD-related rehospitalization in the health coaching group were 7.5% ( $P = 0.01$ ), 11.0% ( $P = 0.02$ ), 11.6% ( $P = 0.03$ ), 11.4% ( $P = 0.05$ ), and 5.4% ( $P = 0.24$ ) at 1, 3, 6, 9, and 12 months, respectively, compared with the control group. The odds ratios for COPD hospitalization in the intervention arm compared with the control arm were 0.09 (95% confidence interval [CI], 0.01-0.77) at 1 month post-discharge, 0.37 (95% CI, 0.15-0.91) at 3 months post-discharge, 0.43 (95% CI, 0.20-0.94) at 6 months post-discharge, and 0.60 (95% CI, 0.30-1.20) at 1 year post-discharge. The missing value rate for the primary outcome was 0.4% (one patient). Disease-specific quality of life improved significantly in the health coaching group compared with the control group at 6 and 12 months, based on the Chronic Respiratory Disease Questionnaire emotional score (emotion and mastery domains) and physical score (dyspnea and fatigue domains) ( $P < 0.05$ ). There were no differences between groups in measured physical activity at any time point. **CONCLUSIONS:** Health coaching may represent a feasible and possibly effective intervention designed to reduce COPD readmissions.

**Bergental RM, Garg S, Weinzimer SA, Buckingham BA, Bode BW, Tamborlane WV, Kaufman FR.** Safety of a hybrid closed-loop insulin delivery system in patients with type 1 diabetes [editorial]. *JAMA.* 2016 Oct 4;316(13):1407-8. [Comment on: *N Engl J Med.* 2013 Jul 18;369(3):224-32. *Diabetes Technol Ther.* 2016 May;18(5):288-91. *J Diabetes Sci Technol.* 2016 May 3;10(3):714-23.]

Closed-loop artificial pancreas technology uses a control algorithm to automatically adjust insulin delivery based on subcutaneous sensor data to improve diabetes management. Currently available systems stop insulin in response to existing or predicted low sensor glucose values, whereas hybrid closed-loop systems combine user-delivered premeal boluses with automatic interprandial insulin delivery. This study investigated the safety of a hybrid closed-loop system in patients with type 1 diabetes.

**Bergenstal RM**, Lunt H, Franek E, Travert F, Mou J, Qu Y, Antalis CJ, Hartman ML, Rosilio M, Jacober SJ, Bastyr EJ 3rd, Imagine 3 Trial Investigators. Randomized, double-blind clinical trial comparing basal insulin peglispro and insulin glargine, in combination with prandial insulin lispro, in patients with type 1 diabetes: IMAGINE 3. *Diabetes Obes Metab*. 2016 Nov;18(11):1081-8. PMC5096008.

**AIMS:** To compare the efficacy and safety of basal insulin peglispro (BIL), which has a flat pharmacokinetic and pharmacodynamic profile and a long duration of action, with insulin glargine (GL) in patients with type 1 diabetes. **MATERIALS AND METHODS:** In this phase III, 52-week, blinded study, we randomized 1114 adults with type 1 diabetes in a 3:2 distribution to receive either BIL (n = 664) or GL (n = 450) at bedtime, with preprandial insulin lispro, using intensive insulin management. The primary objective was to compare glycated hemoglobin (HbA1c) in the groups at 52 weeks with a non-inferiority margin of 0.4%. **RESULTS:** At 52 weeks, mean (standard error) HbA1c was 7.38 (0.03)% with BIL and 7.61 (0.04)% with GL {difference -0.22% [95% confidence interval (CI) -0.32, -0.12]; p < 0.001}. At 52 weeks, more BIL-treated patients reached HbA1c <7% (35% vs 26%; p < 0.001), the nocturnal hypoglycemia rate was 47% lower (p < 0.001) and the total hypoglycemia rate was 11% higher (p = 0.002) than in GL-treated patients, and there was no difference in severe hypoglycemia rate. Patients receiving BIL lost weight, while those receiving GL gained weight [difference -1.8 kg (95% CI -2.3, -1.3); p < 0.001]. Treatment with BIL compared with GL at 52 weeks was associated with greater increases from baseline in levels of serum triglyceride [difference 0.19 mmol/l (95% CI 0.11, 0.26); p < 0.001] and alanine aminotransferase (ALT) levels [difference 6.5 IU/l (95% CI 4.1, 8.9), p < 0.001] and more frequent injection site reactions. **CONCLUSIONS:** In patients with type 1 diabetes, treatment with BIL compared with GL for 52 weeks resulted in a lower HbA1c, more patients with HbA1c levels <7%, and reduced nocturnal hypoglycemia but more total hypoglycemia and injection site reactions and higher triglyceride and ALT levels.

Biglan KM, Shoulson I, Kiebertz K, Oakes D, Kayson E, Shinaman MA, Zhao H, Romer M, Young A, Hersch S, Penney J, Marder K, Paulsen J, Quaid K, Siemers E, Tanner C, Mallonee W, Suter G, Dubinsky R, Gray C, **Nance MA**, Bundlie S, Radtke D, Kostyk S, Baic C, Caress J, Walker F, Hunt V, O'Neill C, Chouinard S, Factor S, Greenamyre T, Wood-Siverio C, Corey-Bloom J, Song D, Peavy G, Moskowitz C, Wesson M, Samii A, Bird T, Lipe H, Blindauer K, Marshall F, Zimmerman C, Goldstein J, Rosas D, Novak P, Caviness J, Adler C, Duffy A, Wheelock V, Tempkin T, Richman D, Seeberger L, Albin R, Chou KL, Racette B, Perlmutter JS, Perlman S, Bordelon Y, Martin W, Wieler M, Leavitt B, Raymond L, Decolongon J, Clarke L, Jankovic J, Hunter C, Hauser RA, Sanchez-Ramos J, Furtado S, Suchowersky O, Klimek ML, Guttman M, Sethna R, Feigin A, Cox M, Shannon B, Percy A, Dure L, Harrison M, Johnson W, Higgins D, Molho E, Nickerson C, Evans S, Hobson D, Singer C, Galvez-Jimenez N, Shannon K, Comella C, Ross C, Saint-Hilaire MH, Testa C, Rosenblatt A, Hogarth P, Weiner W, Como P, Kumar R, Cotto C, Stout J, Brocht A, Watts A, Eberly S, Weaver C, Foroud T, Gusella J, MacDonald M, Myers R, Fahn S, Shults C, Huntington Study Group PHAROS Investigators. Clinical-genetic associations in the Prospective Huntington at Risk Observational Study (PHAROS): Implications for clinical trials. *JAMA Neurol*. 2016 Jan;73(1):102-10.

**IMPORTANCE:** Identifying measures that are associated with the cytosine-adenine-guanine (CAG) expansion in individuals before diagnosis of Huntington disease (HD) has implications for designing clinical trials. **OBJECTIVE:** To identify the earliest features associated with the motor diagnosis of HD in the Prospective Huntington at Risk Observational Study (PHAROS). **DESIGN, SETTING, AND PARTICIPANTS:** A prospective, multicenter, longitudinal cohort study was conducted at 43 US and Canadian Huntington Study Group research sites from July 9, 1999 through December 17, 2009. Participants included 983 unaffected adults at risk for HD who had chosen to remain unaware of their mutation status. Baseline comparability between CAG expansion ( $\geq 37$  repeats) and nonexpansion ( $< 37$  repeats) groups was assessed. All participants and investigators were blinded to individual CAG analysis.

A repeated-measures analysis adjusting for age and sex was used to assess the divergence of the linear trend between the expanded and nonexpanded groups. Data were analyzed from April 27, 2010 to September 3, 2013. EXPOSURE: HD mutation status in individuals with CAG expansion vs without CAG expansion. MAIN OUTCOMES AND MEASURES: Unified Huntington's Disease Rating Scale motor (score range, 0-124; higher scores indicate greater impairment), cognitive (symbol digits modality is the total number of correct responses in 90 seconds; lower scores indicate greater impairment), behavioral (score range, 0-176; higher scores indicate greater behavioral symptoms), and functional (Total Functional Capacity score range, 0-13; lower scores indicate reduced functional ability) domains were assessed at baseline and every 9 months up to 10 years. RESULTS: Among the 983 research participants at risk for HD in the longitudinal cohort, 345 (35.1%) carried the CAG expansion, and 638 (64.9%) did not. The mean (SD) duration of follow-up was 5.8 (3.0) years. At baseline, participants with expansions had more impaired motor (3.0 [4.2] vs 1.9 [2.8];  $P < .001$ ), cognitive ( $P < .05$  for all measures except Verbal Fluency,  $P = .52$ ) and behavioral domain scores (9.4 [11.4] vs 6.5 [8.5];  $P < .001$ ) but not significantly different measures of functional capacity (12.9 [0.3] vs 13.0 [0.2];  $P = .23$ ). With findings reported as mean slope (95% CI), in the longitudinal analyses, participants with CAG expansions showed significant worsening in motor (0.84 [0.73 to 0.95] vs 0.03 [-0.05 to 0.11]), cognitive (-0.54 [-0.67 to -0.40] vs 0.22 [0.12 to 0.32]), and functional (-0.08 [-0.09 to -0.06] vs -0.01 [-0.02 to 0]) measures compared with those without expansion ( $P < .001$  for all); behavioral domain scores did not diverge significantly between groups. CONCLUSIONS AND RELEVANCE: Using these prospectively accrued clinical data, relatively large treatment effects would be required to mount a randomized, placebo-controlled clinical trial involving premanifest HD individuals who carry the CAG expansion.

**Boffeli TJ, Mahoney KJ.** Intraoperative simulated weight-bearing lateral foot imaging: the clinical utility and ability to predict sagittal plane position of the first ray in Lapidus fusion. *J Foot Ankle Surg.* 2016 Nov-Dec;55(6):1158-63.

The sagittal plane relationship of the first to second ray is a primary determinant of proper alignment in Lapidus midfoot fusion as assessed both clinically and on postoperative weightbearing lateral radiographs. The traditional approach to intraoperative fluoroscopic imaging allows accurate assessment of fixation placement and intermetatarsal angle correction but only a crude evaluation of final sagittal plane alignment. Surgeons have used various methods in an attempt to load the foot during lateral imaging. This had led to inconsistent results and the potential for poor outcome. Skepticism exists regarding the ability of simulated weightbearing fluoroscopy to predict the final outcome, and evidence is lacking to support this practice. A prospective investigation was performed to assess the correlation of the first to second ray sagittal plane alignment, as demonstrated on intraoperative simulated weight-bearing lateral foot imaging studies and the 10-week postoperative lateral weight-bearing radiograph. A consistent simulated weight-bearing technique was used prospectively with 50 consecutive cases of Lapidus midfoot fusion, with the goal of achieving parallel sagittal plane alignment of the first and second metatarsals with no divergence. Although 47 cases had no divergence and three had divergence with mild first ray elevatus, all 50 cases demonstrated a direct correlation between the intraoperative simulated and postoperative full weight-bearing images. In conclusion, we believe the findings from our intraoperative imaging technique are a reliable predictor of first ray sagittal plane alignment in Lapidus midfoot fusion.

**Boffeli TJ, Smith SR, Abben KW.** Complete fifth ray amputation with peroneal tendon transfer to the cuboid: a review of consecutive cases involving lateral column neuropathic foot ulceration and osteomyelitis. *J Foot Ankle Surg.* 2016 Nov-Dec;55(6):1148-57.

Nonhealing wounds along the fifth metatarsal associated with neuropathy and bone deformity frequently become complicated with osteomyelitis. Our surgical technique for complete fifth ray amputation with peroneal tendon transfer has been previously published. The present study evaluated the outcomes regarding success with initial healing and intermediate-term limb survival after this procedure, which is intended to resolve infection, remove bone deformity, heal and prevent recurrence of lateral column wounds, and maintain functional stability of the foot. An institutional review board-approved retrospective review of 21 consecutive cases was performed on patients who had undergone complete fifth ray amputation from August 2006 to September 2015. Comorbid conditions were assessed in relation to outcome. The typical stage 1 procedure involved complete fifth toe and metatarsal amputation, antibiotic

bead placement, and preliminary wound closure. The stage 2 procedure was performed 2 weeks later and involved removal of the antibiotic beads, biopsy and remodeling of the cuboid, and peroneus longus tendon transfer to the cuboid. All cases involved ulceration along the fifth metatarsal. Of the 21 patients, 10 (47.6%) had undergone previous partial fifth ray amputation with recurrent ulceration at the residual metatarsal stump. Osteomyelitis of the fifth metatarsal was confirmed by bone culture and/or positive pathologic findings for osteomyelitis in 19 of 21 cases (90.5%). A total of 15 patients (71.4%) were completely healed at 10 weeks, and 10 patients (47.6%) required subsequent surgery, including four below-the-knee amputations and one Symes amputation. The average follow-up period was 37.0 (range 2.9 to 105) months. Despite the 10 patients (47.6%) requiring revision surgery, the limb salvage rate was 76.2% (16 of 21) at an average follow-up period of >3 years in this high-risk patient population.

**Boffeli TJ, Thompson JC, Tabatt JA.** Two-pin fixation of proximal interphalangeal joint fusion for hammertoe correction. *J Foot Ankle Surg.* 2016 May-Jun;55(3):480-7.

Single-pin external Kirschner wire (K-wire) fixation has traditionally been a mainstay in proximal interphalangeal joint fusion for central hammertoe repair. Concerns over cosmesis, inconvenience, pin tract infection, hardware failure, nonunion, and early hardware removal have led to the development of implantable internal fixation devices. Although numerous implantable devices are now available and represent viable options for hammertoe repair, they are costly and often pose a challenge if removal becomes necessary. An alternative fixation option not typically used is a two-pin K-wire fixation technique. The perceived advantage of obtaining two points of fixation compared with one across the fusion site is improved stability against the rotational and bending forces, thus decreasing the potential for pin-related complications. A retrospective assessment of 91 consecutive hammertoe repairs consisting of proximal interphalangeal joint fusion with two-pin fixation in 60 patients was performed. The K-wires were removed at 6 weeks postoperatively, and the overall postoperative follow-up duration was 28.56 (range 1.40 to 86.83) months. Of the 91 digits, 89 (98%) did not encounter a complication postoperatively, and two (2.20%) had sustained loosened or broken hardware. No postoperative infection was encountered. The low incidence of complications observed supports the two-pin K-wire fixation technique as a low-cost and viable construct for proximal interphalangeal joint fusion hammertoe repair.

**Boffeli TJ, Thompson JC, Waverly BJ, Pfannenstien RR, Mahoney KJ.** Incidence and clinical significance of heterotopic ossification after partial ray resection. *J Foot Ankle Surg.* 2016 Jul-Aug;55(4):714-9.

Heterotopic bone growth is a common finding after partial foot amputation that can predispose to recurrent wounds, osteomyelitis, and reamputation. Heterotopic ossification is the formation of excessive mature lamellar bone in the soft tissues adjacent to bone that is exacerbated by trauma or surgical intervention. The relevance of heterotopic ossification depends on its anatomic location. Its occurrence as a sequela of partial foot amputation can lead to prominence on the plantar aspect of the foot that can predispose the patient to recurrent neuropathic ulceration or preclude appropriate wound healing. Reulceration puts the high-risk patient who has already undergone local amputation at greater risk of recurrent infection and further amputation. The present study aimed to assess the incidence and risk factors for heterotopic ossification to further evaluate its role in partial foot amputation. A retrospective analysis of 72 consecutive patients who had undergone partial metatarsal resection was performed, with 90% of the cohort having peripheral neuropathy and 88% diabetes mellitus. Our findings revealed a heterotopic ossification incidence of 75% diagnosed radiographically. The initial onset of heterotopic ossification was not appreciated >10 weeks postoperatively. Ten patients (18.5%) exhibited heterotopic ossification-associated ulceration. The incidence of heterotopic ossification was 30% less in patients with peripheral vascular disease. These results indicate that heterotopic ossification is a common sequela of partial ray resection in an already high-risk patient population. The perioperative use of pharmacologic or radiation prophylaxis in an attempt to minimize amputation-related morbidity should be considered.

**Boffeli TJ, Waverly BJ.** Medial and lateral plantar artery angiosome rotational flaps for transmetatarsal and lisfranc amputation in patients with compromised plantar tissue. *J Foot Ankle Surg.* 2016 Mar-Apr;55(2):351-61.

Traditional incision techniques for midfoot amputation might not provide immediate soft tissue coverage of the underlying metatarsal and tarsal bones in the presence of a large plantar soft tissue defect. Patients undergoing transmetatarsal and Lisfranc amputation frequently have compromised plantar tissue in association with neuropathic ulcers, forefoot gangrene, and infection, necessitating wide resection as a part of the amputation procedure. Open amputation will routinely be performed under these circumstances, although secondary healing could be compromised owing to residual bone exposure. Alternatively, the surgeon might elect to perform a more proximal lower extremity amputation, which will allow better soft tissue coverage but compromises function of the lower extremity. A third option for this challenging situation is to modify the plantar flap incision design to incorporate a medial or lateral plantar artery angiosome-based rotational flap, which will provide immediate coverage of the forefoot and midfoot soft tissue defects without excessive shortening of the bone structure. A plantar medial soft tissue defect is treated with the lateral plantar artery angiosome flap, and a plantar lateral defect is treated with the medial plantar artery angiosome flap. Medial and lateral flaps can be combined to cover a central plantar wound defect. Incorporating large rotational flaps requires knowledge of the applicable angiosome anatomy and specific modifications to incision planning and dissection techniques to ensure adequate soft tissue coverage and preservation of the blood supply to the flap. A series of 4 cases with an average follow-up duration of 5.75 years is presented to demonstrate our patient selection criteria, flap design principles, dissection pearls, and surgical staging protocol.

**Boffeli TJ, Waverly BJ.** Angle and base of gait long leg axial and intraoperative simulated weightbearing long leg axial imaging to capture true frontal plane tibia to calcaneus alignment in valgus and varus deformities of the rear foot and ankle. *J Foot Ankle Surg.* 2016 Sep-Oct;55(5):1043-51.

The long leg axial view is primarily used to evaluate the frontal plane alignment of the calcaneus in relation to the long axis of the tibia when standing. This view allows both angular measurement and assessment for the apex of varus and valgus deformity of the rearfoot and ankle with clinical utility in the preoperative, intraoperative, and postoperative settings. The frontal plane alignment of the calcaneus to the long axis of the tibia is rarely fixed in the varus or valgus position because of the inherent flexibility of the foot and ankle, which makes patient positioning critical to obtain accurate and reproducible images. Inconsistent patient positioning and imaging techniques are commonly encountered with the long leg axial view for a variety of reasons, including the lack of a standardized or validated protocol. This angle and base of gait imaging protocol involves positioning the patient to align the tibia with the long axis of the foot, which is represented by the second metatarsal. Non-weight-bearing long leg axial imaging is commonly performed intraoperatively, which requires a modified patient positioning technique to capture simulated weight-bearing long leg axial images. A case series is presented to demonstrate our angle and base of gait long leg axial and intraoperative simulated weight-bearing long leg axial imaging protocols that can be applied throughout all phases of patient care for various foot and ankle conditions.

**Bohm KC, Hill BW, Braman JP, Ly TV, Van Heest AE.** Orthopedic residency: are duty hours predictive of performance? *J Surg Educ.* 2016 Mar-Apr;73(2):281-5.

**OBJECTIVE:** This study examines the relationship between self-recorded resident work hours and Orthopedic In-training Examination (OITE) scores, resident clinical performance, and American Board of Orthopedic Surgery pass rates. The hypothesis of this study is that increasing duty hours would have a positive correlation with clinical and OITE performance. **DESIGN:** Total duty hours and recorded operating room hours from a single orthopedic residency program were extracted from 2006 to 2012. During the same time span, OITE scores, resident clinical scores from the E-Valuation system, and American Board of Orthopedic Surgery pass rates were collected. The correlation between the variables was assessed using the Pearson correlation coefficient's precision statistic. **SETTING:** A large public tertiary academic center in the upper Midwestern United States. **PARTICIPANTS:** A total of 82 orthopedic surgery residents over 7 years. **RESULTS:** A total of 82 residents were matriculated between 2006 and 2012. The average weekly recorded duty hours were as follows: postgraduate year 2 (PGY2) = 60 hours/week (Standard Deviation (SD) +/- 4), PGY3 = 59 hours/week (SD +/- 5), PGY4 = 51 hours/week (SD +/- 4), PGY5 = 49 hours/week (SD +/- 3). There was significant variability in the average number of hours worked among residents (range: 2128-3753h/y) for the full academic year. The OITE scores and the work hours were found to be independent of each other ( $\rho = 0.017$ ,  $p = 0.825$ ), and no correlation

was found between OITE scores and the resident E-value scores ( $\rho = 0.071$ ,  $p = 0.34$ ). Residents spent 36% to 48% of their time in the operating room. Second year residents logging more hours scored higher on faculty evaluation of overall competency ( $\rho = 0.31$ ,  $p = 0.035$ ). Faculty assessment of technical skills had a positive correlation with operating room duty hours for PGY5 class ( $\rho = 0.346$ ,  $p = 0.025$ ).  
CONCLUSIONS: A large variation in duty hours exists between resident-logged duty hours. No correlation exists between in-training scores and duty hours. There is a positive correlation between senior resident operating room hours and technical skill scores.

Bondonno NP, Lewis JR, Prince RL, Lim WH, Wong G, **Schousboe JT**, Woodman RJ, Kiel DP, Bondonno CP, Ward NC, Croft KD, Hodgson JM. Fruit intake and abdominal aortic calcification in elderly women: a prospective cohort study. *Nutrients*. 2016 Mar 10;8(3):159. PMC4808887.

Cardiovascular disease (CVD) is the leading cause of death worldwide. There is a consistent inverse relationship between fruit intake with CVD events and mortality in cross-sectional and prospective observational studies, but the relationship of fruit intake with measurements of atherosclerosis in humans is less clear. Nutritional effects on abdominal aortic calcification (AAC), a marker for subclinical intimal and medial atherosclerotic vascular disease, have not been studied previously. The aim of this study was to examine the cross-sectional relationship of total and individual fruit (apple, pear, orange and other citrus, and banana) intake with AAC, scored between 0 and 24. The current study assessed baseline data for a cohort of 1052 women older than 70 years who completed a food frequency questionnaire assessing fruit intake and underwent AAC measurement using dual energy X-ray absorptiometry. AAC scores were significantly negatively correlated with total fruit and apple intakes ( $p < 0.05$ ) but not with pear, orange or banana intakes ( $p > 0.25$ ). In multivariable-adjusted logistic regression, each standard deviation (SD; 50 g/day) increase in apple intake was associated with a 24% lower odds of having severe AAC (AAC score  $>5$ ) (odds ratio OR): 0.76 (0.62, 0.93),  $p = 0.009$ . Total and other individual fruit intake were not associated with increased odds of having severe AAC. Apple but not total or other fruit intake is independently negatively associated with AAC in older women.

Braden A, Flatt SW, Boutelle KN, Strong D, **Sherwood NE**, Rock CL. Emotional eating is associated with weight loss success among adults enrolled in a weight loss program. *J Behav Med*. 2016 Aug;39(4):727-32. PMC5300743.

To examine associations between decreased emotional eating and weight loss success and whether participation in a behavioral weight loss intervention was associated with a greater reduction in emotional eating over time compared to usual care. Secondary data analysis of a randomized controlled trial conducted at two university medical centers with 227 overweight adults with diabetes. Logistic and standard regression analyses examined associations between emotional eating change and weight loss success (i.e., weight loss of  $\geq 7\%$  of body weight and decrease in BMI). After 6 months of intervention, decreased emotional eating was associated with greater odds of weight loss success ( $p = .05$ ). The odds of weight loss success for subjects with decreased emotional eating at 12 months were 1.70 times higher than for subjects with increased emotional eating. No differences in change in emotional eating were found between subjects in the behavioral weight loss intervention and usual care. Strategies to reduce emotional eating may be useful to promote greater weight loss among overweight adults with diabetes.

Bradley CJ, Grossman DC, Hubbard RA, Ortega AN, Curry SJ, **Pronk NP**, participant and speaker at the NIH Pathways to Prevention Workshop. Integrated interventions for improving total worker health: a panel report from the National Institutes of Health Pathways to Prevention workshop: total worker health-what's work got to do with it? *Ann Intern Med*. 2016 Aug 16;165(4):279-83.

This National Institutes of Health (NIH) Pathways to Prevention workshop was cosponsored by the NIH Office of Disease Prevention; National Heart, Lung, and Blood Institute; and National Institute for Occupational Safety and Health of the Centers for Disease Control and Prevention. A multidisciplinary working group developed the agenda, and an evidence-based practice center prepared an evidence report through a contract with the Agency for Healthcare Research and Quality. During the 1.5-day workshop, experts discussed the body of evidence and participants commented during open discussions. After weighing the data from the evidence report, expert presentations, and public comments, an

unbiased, independent panel prepared a draft report that identified research gaps and future research priorities. The report was posted on the NIH Office of Disease Prevention Web site for 5 weeks for public comment. This article highlights 8 recommendations critical for advancing the science of integrated interventions to improve the total health of workers.

Brockmeyer M, **Tompkins MA**, Kohn DM, Lorbach O. SLAP lesions: a treatment algorithm. *Knee Surg Sports Traumatol Arthrosc.* 2016 Feb;24(2):447-55.

Tears of the superior labrum involving the biceps anchor are a common entity, especially in athletes, and may highly impair shoulder function. If conservative treatment fails, successful arthroscopic repair of symptomatic SLAP lesions has been described in the literature, particularly for young athletes. However, the results in throwing athletes are less successful, with a significant amount of patients who do not regain their pre-injury level of performance. The clinical results of SLAP repairs in middle-aged and older patients are mixed, with worse results and higher revision rates compared to younger patients. In this population, tenotomy or tenodesis of the biceps tendon is a viable alternative to SLAP repairs in order to improve clinical outcomes. The present article introduces a treatment algorithm for SLAP lesions based upon the recent literature as well as the authors' clinical experience. The type of lesion, age of the patient, concomitant lesions, and functional requirements, as well as sport activity level of the patient, need to be considered. Moreover, normal variations and degenerative changes in the SLAP complex have to be distinguished from "true" SLAP lesions in order to improve results and avoid overtreatment. The suggestion for a treatment algorithm includes: type I: conservative treatment or arthroscopic debridement, type II: SLAP repair or biceps tenotomy/tenodesis, type III: resection of the instable bucket-handle tear, type IV: SLAP repair (biceps tenotomy/tenodesis if >50% of biceps tendon is affected), type V: Bankart repair and SLAP repair, type VI: resection of the flap and SLAP repair, and type VII: refixation of the anterosuperior labrum and SLAP repair.

Campo RA, **Leniek KL**, Gaylord-Scott N, Faurot KR, Smith S, Asher G, Porterfield D, Gaylord SA. Weathering the seasons of cancer survivorship: mind-body therapy use and reported reasons and outcomes by stages of cancer survivorship. *Support Care Cancer.* 2016 Sep;24(9):3783-91. PMC4967379.

**PURPOSE:** Mind-body therapies (MBTs), a subset of complementary and alternative medicine (CAM), are used by cancer survivors to manage symptoms related to their cancer experience. MBT use may differ by cancer survivorship stage (i.e., acute, short-term, long-term) because each stage presents varying intensities of medical activities, associated emotions, and treatment effects. We examined the relationship between MBT use and survivorship stage (acute <1 year; short-term 1 to 5 years; long-term >5 years since diagnosis) using the CAM supplement of the 2012 National Health Interview Survey. We also examined reported reasons for and outcomes of MBT use and frequency of MBT types. **METHODS:** The sample included cancer survivors (N = 3076) and non-cancer controls (N = 31,387). Logistic regression tested the relationship of MBT use and survivorship stage. Weighted percentages were calculated by survivorship stage for reported reasons and outcomes of use and frequency of MBT types. **RESULTS:** MBT use varied by cancer survivorship stage (p = 0.02): acute (8.3%), short-term (15.4%), long-term (11.7%) survivorship and non-cancer controls (13.2%). In the adjusted model, short-term survivors had 35% greater odds of MBT use than did controls (95% CI 1.00, 1.83). Reasons for and outcomes of MBT use varied among the survivorship stages, with more acute survivors reporting medical-related reasons and more short-term survivors reporting to manage symptoms. **CONCLUSIONS:** MBT may fulfill different symptom management needs at varying stages of survivorship. These findings can help inform supportive care services of survivors' use of MBT for symptom burden at each stage and the allocation of these services.

Carhart ED, **Stuck LH**, **Salzman JG**. Achieving a safe endotracheal tube cuff pressure in the prehospital setting: is it time to revise the standard cuff inflation practice? *Prehosp Emerg Care.* 2016 Mar-Apr;20(2):273-7.

Numerous studies have reported unsafe endotracheal tube (ETT) cuff pressures (CP) in the prehospital environment. The purpose of this study was to identify an optimal cuff inflation volume (CIV) to achieve a

safe CP (20-30 cmH<sub>2</sub>O). This observational study utilized 30 recently harvested ovine tracheae, which were warmed from refrigeration in a water bath at 85 degrees F prior to testing. Each trachea was intubated with five different ETT sizes (6.0-8.0 mm), and each size tube was tested with six cuff inflation volumes (5-10 cc). The order of ETT size for each trachea and CIV for each size ETT was randomly pre-assigned. Data were descriptively summarized and categorized before mixed-effects logistic regression was used to determine optimal CIV. Only 113 CP measurements (12.6%, N = 900) were within the optimal range (M = 54.75 cmH<sub>2</sub>O, SD = 38.52), all of which resulted from a CIV 6 or 7 cc (61% and 39%, respectively). CIVs of 5 cc (n = 150) resulted in underinflation (<20 cmH<sub>2</sub>O) in all instances, while CIVs of 8, 9, or 10 cc (n = 150 each) resulted in overinflation (>30 cmH<sub>2</sub>O) in all instances, regardless of ETT size. The odds of achieving a safe CP were greater with CIV of 6 cc for tube sizes 6.0 (OR = 15.9, 95% CI = 3.85-65.58, p < 0.01) and 6.5 mm (OR = 3.16, 95% CI = 1.06-9.39, p = 0.039); however, there was no significant difference in the odds of achieving a safe CP between CIV of 6 and 7 cc for tube sizes 7.0, 7.5, or 8.0 mm. Neither trachea circumference (M = 7.11cm, SD = 0.40), nor tissue temperature (M = 81.32 degrees F, SD = 0.93) were found to be significant predictors of CP (p = 0.20 and 0.81, respectively). Our study showed a high frequency of CP measurements outside of the desired norms. The CIV range of 6-7 cc resulted in the highest likelihood of achieving the desired cuff pressure range, while cuffs inflated with 8-10 cc resulted in dangerously high CPs in all instances. In the absence of a more ideal solution, the results of this study suggest that narrowing the recommended CIV from 5-10 cc to 6-7 cc might be a reasonable target for any tube size.

Carlin CS, Flottesmesch TJ, Solberg LI, Werner AM. System transformation in Patient-Centered Medical Home (PCMH): variable impact on chronically ill patients' utilization. *J Am Board Fam Med.* 2016 Jul-Aug;29(4):482-95. Project: A09-159 Medical Home.

**BACKGROUND:** Research connecting patient-centered medical homes (PCMHs) with improved quality and reduced utilization is inconsistent, possibly because individual domains of change and the stage of change are not incorporated in the research design. The objective of this study was to examine the association between stage and domain of change and patterns of health care utilization. **METHODS:** This was a cross-sectional observational study that included 87 Minnesota clinics certified as medical homes. Patients included those receiving management for diabetes or cardiovascular disease with insurance coverage by payers participating in the study. PCMH transformation stage was defined by practice systems in place, with measurements summarized in five domains. Health care utilization was measured by total utilization, frequency of outpatient visits and prescriptions, and occurrence of inpatient and emergency department visits. **RESULTS:** PCMH transformation was associated with few changes in utilization, but there were important differences by the underlying domains of change. We demonstrate meaningful differences in the impact of PCMH transformation by diagnosis cohort and comorbidity status of the patient. **CONCLUSIONS:** Because the association of health care utilization with PCMH transformation varied by transformation domain and patient diagnosis, practice leaders need to be supported by research incorporating detailed measures of PCMH transformation.

Carlozzi NE, Downing NR, McCormack MK, Schilling SG, Perlmutter JS, Hahn EA, Lai JS, Frank S, Quaid KA, Paulsen JS, Cella D, Goodnight SM, Miner JA, Nance MA. New measures to capture end-of-life concerns in Huntington disease: Meaning and Purpose and Concern with Death and Dying from HDQLIFE (a patient-reported outcomes measurement system). *Qual Life Res.* 2016 Oct;25(10):2403-15. PMC5011453.

**PURPOSE:** Huntington disease (HD) is an incurable terminal disease. Thus, end-of-life (EOL) concerns are common in these individuals. A quantitative measure of EOL concerns in HD would enable a better understanding of how these concerns impact health-related quality of life. Therefore, we developed new measures of EOL for use in HD. **METHODS:** An EOL item pool of 45 items was field tested in 507 individuals with prodromal or manifest HD. Exploratory and confirmatory factor analyses (EFA and CFA, respectively) were conducted to establish unidimensional item pools. Item response theory (IRT) and differential item functioning analyses were applied to the identified unidimensional item pools to select the final items. **RESULTS:** EFA and CFA supported two separate unidimensional sets of items: Concern with Death and Dying (16 items) and Meaning and Purpose (14 items). IRT and DIF supported the retention of 12 Concern with Death and Dying items and 4 Meaning and Purpose items. IRT data supported the

development of both a computer adaptive test (CAT) and a 6-item, static short form for Concern with Death and Dying. **CONCLUSION:** The HDQLIFE Concern with Death and Dying CAT and corresponding 6-item short form and the 4-item calibrated HDQLIFE Meaning and Purpose scale demonstrate excellent psychometric properties. These new measures have the potential to provide clinically meaningful information about end-of-life preferences and concerns to clinicians and researchers working with individuals with HD. In addition, these measures may also be relevant and useful for other terminal conditions.

Carlozzi NE, Schilling SG, Lai JS, Paulsen JS, Hahn EA, Perlmutter JS, Ross CA, Downing NR, Kratz AL, McCormack MK, **Nance MA**, Quaid KA, Stout JC, Gershon RC, Ready RE, Miner JA, Barton SK, Perlman SL, Rao SM, Frank S, Shoulson I, Marin H, Geschwind MD, Dayalu P, Goodnight SM, Cella D. HDQLIFE: development and assessment of health-related quality of life in Huntington disease (HD). *Qual Life Res.* 2016 Oct;25(10):2441-55.

**PURPOSE:** Huntington disease (HD) is a chronic, debilitating genetic disease that affects physical, emotional, cognitive, and social health. Existing patient-reported outcomes (PROs) of health-related quality of life (HRQOL) used in HD are not comprehensive, nor do they adequately account for clinically meaningful changes in function. While new PROs examining HRQOL (i.e., Neuro-QoL-Quality of Life in Neurological Disorders and PROMIS-Patient-Reported Outcomes Measurement Information System) offer solutions to many of these shortcomings, they do not include HD-specific content, nor have they been validated in HD. HDQLIFE addresses this by validating 12 PROMIS/Neuro-QoL domains in individuals with HD and by using established PROMIS methodology to develop new, HD-specific content. **METHODS:** New item pools were developed using cognitive debriefing with individuals with HD and expert, literacy, and translatability reviews. Existing item banks and new item pools were field tested in 536 individuals with prodromal, early-, or late-stage HD. **RESULTS:** Moderate to strong relationships between Neuro-QoL/PROMIS measures and generic self-report measures of HRQOL, and moderate relationships between Neuro-QoL/PROMIS and clinician-rated measures of similar constructs supported the validity of Neuro-QoL/PROMIS in individuals with HD. Exploratory and confirmatory factor analysis, item response theory, and differential item functioning analyses were utilized to develop new item banks for Chorea, Speech Difficulties, Swallowing Difficulties, and Concern with Death and Dying, with corresponding six-item short forms. A four-item short form was developed for Meaning and Purpose. **CONCLUSIONS:** HDQLIFE encompasses both validated Neuro-QoL/PROMIS measures as well as five new scales in order to provide a comprehensive assessment of HRQOL in HD.

Carlozzi NE, Schilling SG, Lai JS, Perlmutter JS, **Nance MA**, Waljee JF, Miner JA, Barton SK, Goodnight SM, Dayalu P. HDQLIFE: the development of two new computer adaptive tests for use in Huntington disease, speech difficulties, and swallowing difficulties. *Qual Life Res.* 2016 Oct;25(10):2417-27. PMC5011441.

**PURPOSE:** Huntington disease (HD) is an autosomal dominant neurodegenerative disease that results in several progressive symptoms, including bulbar dysfunction (i.e., speech and swallowing difficulties). Although difficulties in speech and swallowing in HD have a negative impact on health-related quality of life, no patient-reported outcome measure exists to capture these difficulties that are specific to HD. Thus, we developed a new patient-reported outcome measure for use in the Huntington Disease Health-Related Quality of Life (HDQLIFE) Measurement System that focused on the impact that difficulties with speech and swallowing have on HRQOL in HD. **METHODS:** Five hundred and seven individuals with prodromal and/or manifest HD completed 47 newly developed items examining speech and swallowing difficulties. Unidimensional item pools were identified using exploratory factor analysis and confirmatory factor analysis (EFA and CFA, respectively). Item response theory (IRT) was used to calibrate the final measures. **RESULTS:** EFA and CFA identified two separate unidimensional sets of items: Speech Difficulties (27 items) and Swallowing Difficulties (16 items). Items were calibrated separately for these two measures and resulted in item banks that can be administered as computer adaptive tests (CATs) and/or 6-item, static short forms. Reliability of both of these measures was supported through high correlations between the simulated CAT scores and the full item bank. **CONCLUSIONS:** CATs and 6-item calibrated short forms were developed for HDQLIFE Speech Difficulties and HDQLIFE Swallowing Difficulties. These measures both demonstrate excellent psychometric properties and may have clinical

utility in other populations where speech and swallowing difficulties are prevalent.

**Carter J.** Meaningful use. *J Palliat Med.* 2016 Aug;19(8):895.

Carvalho JO, Long JD, Westervelt HJ, Smith MM, Bruce JM, Kim JI, Mills JA, Paulsen JS, **Nance MA**, PREDICT-HD Investigators and Coordinators of the Huntington Study Group. The impact of oculomotor functioning on neuropsychological performance in Huntington disease. *J Clin Exp Neuropsychol.* 2016;38(2):217-26.

Huntington disease (HD) is a neurodegenerative condition with prominent motor (including oculomotor), cognitive, and psychiatric effects. While neuropsychological deficits are present in HD, motor impairments may impact performance on neuropsychological measures, especially those requiring a speeded response, as has been demonstrated in multiple sclerosis and schizophrenia. The current study is the first to explore associations between oculomotor functions and neuropsychological performance in HD. Participants with impaired oculomotor functioning performed worse than those with normal oculomotor functioning on cognitive tasks requiring oculomotor involvement, particularly on psychomotor speed tasks, controlling for covariates. Consideration of oculomotor dysfunction on neuropsychological performance is critical, particularly for populations with motor deficits.

Cauley JA, Lui LY, Paudel ML, Taylor BC, Cawthon PM, Hillier TA, **Schousboe JT**, McCulloch CE, Ensrud KE. Impact of radiographic vertebral fractures on inpatient healthcare utilization in older women. *Bone.* 2016 Jul;88:165-9. PMC4899246.

**BACKGROUND:** Vertebral fractures (VFX) are the most common osteoporotic fracture and are associated with higher risk of impaired function, additional fractures and death. The purpose of this analysis was to test the hypotheses that VFX are also associated with greater inpatient healthcare utilization. **METHODS:** We studied 4709 Caucasian women enrolled in the Study of Osteoporotic Fractures (SOF) and merged SOF cohort data with Medicare claims or Kaiser encounter data. To be included in this analysis, women had to be enrolled in Medicare Fee for Service or Kaiser as of 1/1/1991 and have radiographic information on VFX status at SOF Visit 3 (1991-92). VFX status was assessed using quantitative morphometry on lateral thoracic and lumbar spine radiographs. Prevalent VFX were defined as any height ratio greater than three standard deviations below normal. Women were considered to have a clinical VFX if they reported a new diagnosis of VFX and a clinical radiographic report that confirmed that a VFX was present. Any hospitalization and the number of annualized days of hospitalization were identified through inpatient claims or encounter data. Specific hospitalizations for five major common reasons for hospitalizations were also examined. **RESULTS:** Over 5 years, 2632 (55.9%) women were hospitalized. In multivariate adjusted models, women with a prevalent radiographic VFX were 21% (95% CI, 2-44%) more likely to be hospitalized for any reason. This association was independent of a number of risk factors, including smoking. The annualized rate of inpatient days was, however, similar, 1.67 and 1.48 among women with and without a VFX, respectively,  $p=0.49$ . Women with an incident clinical VFX were more likely to be hospitalized, including women without evidence of a prevalent radiographic VFX (odds ratio (OR)=5.33; 95% confidence interval (CI)=1.81-15.71) and women with a prevalent radiographic VFX (OR=2.13; 95% CI, 1.05-4.33). Women with a VFX were more likely to be hospitalized specifically for hip fracture or chronic obstructive pulmonary disease (COPD) but not stroke, myocardial infarction or congestive heart failure. The association with COPD was attenuated to non-significance after adjusting for smoking. **CONCLUSION:** Our results extend the potential public health impact of radiographic and clinical VFX to include an increased risk of any hospitalization.

Cawthon PM, **Schousboe JT**, Harrison SL, Ensrud KE, Black D, Cauley JA, Cummings SR, LeBlanc ES, Laughlin GA, Nielson CM, Broughton A, Kado DM, Hoffman AR, Jamal SA, Barrett-Connor E, Orwoll ES, Osteoporotic Fractures in Men (MrOS) Study Research Group. Sex hormones, sex hormone binding globulin, and vertebral fractures in older men. *Bone.* 2016 Mar;84:271-8. PMC4755786.

The association between sex hormones and sex hormone binding globin (SHBG) with vertebral fractures in men is not well studied. In these analyses, we determined whether sex hormones and SHBG were associated with greater likelihood of vertebral fractures in a prospective cohort study of community-

dwelling older men. We included data from participants in MrOS who had been randomly selected for hormone measurement (N=1463, including 1054 with follow-up data 4.6 years later). Major outcomes included prevalent vertebral fracture (semi-quantitative grade  $\geq 2$ , N=140, 9.6%) and new or worsening vertebral fracture (change in SQ grade  $\geq 1$ , N=55, 5.2%). Odds ratios per SD decrease in sex hormones and per SD increase in SHBG were estimated with logistic regression adjusted for potentially confounding factors, including age, bone mineral density, and other sex hormones. Higher SHBG was associated with a greater likelihood of prevalent vertebral fractures (OR: 1.38 per SD increase, 95% CI: 1.11, 1.72). Total estradiol analyzed as a continuous variable was not associated with prevalent vertebral fractures (OR per SD decrease: 0.86, 95% CI: 0.68 to 1.10). Men with total estradiol values  $\leq 17$  pg/ml had a borderline higher likelihood of prevalent fracture than men with higher values (OR: 1.46, 95% CI: 0.99, 2.16). There was no association between total testosterone and prevalent fracture. In longitudinal analyses, SHBG (OR: 1.42 per SD increase, 95% CI: 1.03, 1.95) was associated with new or worsening vertebral fracture, but there was no association with total estradiol or total testosterone. In conclusion, higher SHBG (but not testosterone or estradiol) is an independent risk factor for vertebral fractures in older men.

Chan TM, Grock A, **Paddock MT**, Kulasegaram K, Yarris LM, Lin M. Examining reliability and validity of an online score (ALiEM AIR) for rating free open access medical education resources. *Ann Emerg Med.* 2016 Dec;68(6):729-35.

**STUDY OBJECTIVE:** Since 2014, Academic Life in Emergency Medicine (ALiEM) has used the Approved Instructional Resources (AIR) score to critically appraise online content. The primary goals of this study are to determine the interrater reliability (IRR) of the ALiEM AIR rating score and determine its correlation with expert educator gestalt. We also determine the minimum number of educator-raters needed to achieve acceptable reliability. **METHODS:** Eight educators each rated 83 online educational posts with the ALiEM AIR scale. Items include accuracy, usage of evidence-based medicine, referencing, utility, and the Best Evidence in Emergency Medicine rating score. A generalizability study was conducted to determine IRR and rating variance contributions of facets such as rater, blogs, posts, and topic. A randomized selection of 40 blog posts previously rated through ALiEM AIR was then rated again by a blinded group of expert medical educators according to their gestalt. Their gestalt impression was subsequently correlated with the ALiEM AIR score. **RESULTS:** The IRR for the ALiEM AIR rating scale was 0.81 during the 6-month pilot period. Decision studies showed that at least nine raters were required to achieve this reliability. Spearman correlations between mean AIR score and the mean expert gestalt ratings were 0.40 for recommendation for learners and 0.35 for their colleagues. **CONCLUSION:** The ALiEM AIR scale is a moderately to highly reliable 5-question tool when used by medical educators for rating online resources. The score displays a fair correlation with expert educator gestalt in regard to the quality of the resources. The score displays a fair correlation with educator gestalt.

**Chmielewski TL**, George SZ, Tillman SM, Moser MW, Lentz TA, Indelicato PA, Trumble TN, Shuster JJ, Cicuttini FM, Leeuwenburgh C. Low- versus high-intensity plyometric exercise during rehabilitation after anterior cruciate ligament reconstruction. *Am J Sports Med.* 2016 Mar;44(3):609-17.

**BACKGROUND:** Plyometric exercise is used during rehabilitation after anterior cruciate ligament (ACL) reconstruction to facilitate the return to sports participation. However, clinical outcomes have not been examined, and high loads on the lower extremity could be detrimental to knee articular cartilage. **PURPOSE:** To compare the immediate effect of low- and high-intensity plyometric exercise during rehabilitation after ACL reconstruction on knee function, articular cartilage metabolism, and other clinically relevant measures. **STUDY DESIGN:** Randomized controlled trial; Level of evidence, 2. **METHODS:** Twenty-four patients who underwent unilateral ACL reconstruction (mean 14.3 weeks after surgery; range 12.1-17.7 weeks) were assigned to 8 weeks (16 visits) of low- or high-intensity plyometric exercise consisting of running, jumping, and agility activities. Groups were distinguished by the expected magnitude of vertical ground-reaction forces. Testing was conducted before and after the intervention. Primary outcomes were self-reported knee function (International Knee Documentation Committee [IKDC] subjective knee form) and a biomarker of articular cartilage degradation (urine concentrations of crosslinked C-telopeptide fragments of type II collagen [uCTX-II]). Secondary outcomes included additional biomarkers of articular cartilage metabolism (urinary concentrations of the neopeptide of type II collagen cleavage at the C-terminal three-quarter-length fragment [uC2C], serum concentrations of the C-

terminal propeptide of newly formed type II collagen [sCPII]) and inflammation (tumor necrosis factor- $\alpha$ ), functional performance (maximal vertical jump and single-legged hop), knee impairments (anterior knee laxity, average knee pain intensity, normalized quadriceps strength, quadriceps symmetry index), and psychosocial status (kinesiophobia, knee activity self-efficacy, pain catastrophizing). The change in each measure was compared between groups. Values before and after the intervention were compared with the groups combined. RESULTS: The groups did not significantly differ in the change of any primary or secondary outcome measure. Of interest, sCPII concentrations tended to change in opposite directions (mean  $\pm$  SD: low-intensity group, 28.7  $\pm$  185.5 ng/mL; high-intensity group, -200.6  $\pm$  255.0 ng/mL;  $P = .097$ ; Cohen  $d = 1.03$ ). Across groups, significant changes after the intervention were increased the IKDC score, vertical jump height, normalized quadriceps strength, quadriceps symmetry index, and knee activity self-efficacy and decreased average knee pain intensity. CONCLUSION: No significant differences were detected between the low- and high-intensity plyometric exercise groups. Across both groups, plyometric exercise induced positive changes in knee function, knee impairments, and psychosocial status that would support the return to sports participation after ACL reconstruction. The effect of plyometric exercise intensity on articular cartilage requires further evaluation.

Chubak J, Ziebell R, Greenlee RT, Honda S, Hornbrook MC, Epstein M, Nekhlyudov L, **Pawloski PA**, Ritzwoller DP, Ghai NR, Feigelson HS, Clancy HA, Doria-Rose VP, Kushi LH. The Cancer Research Network: a platform for epidemiologic and health services research on cancer prevention, care, and outcomes in large, stable populations. *Cancer Causes Control*. 2016 Nov;27(11):1315-23. Project: A16-526 CRN Infrastructure.

PURPOSE: The ability to collect data on patients for long periods prior to, during, and after a cancer diagnosis is critical for studies of cancer etiology, prevention, treatment, outcomes, and costs. We describe such data capacities within the Cancer Research Network (CRN), a cooperative agreement between the National Cancer Institute (NCI) and organized health care systems across the United States. METHODS: Data were extracted from each CRN site's virtual data warehouse using a centrally written and locally executed program. We computed the percent of patients continuously enrolled  $\geq 1$ ,  $\geq 5$ , and  $\geq 10$  years before cancer diagnosis in 2012-2015 (year varied by CRN site). To describe retention after diagnosis, we computed the cumulative percentages enrolled, deceased, and disenrolled each year after the diagnosis for patients diagnosed in 2000. RESULTS: Approximately 8 million people were enrolled in 10 CRN health plans on December 31, 2014 or 2015 (year varied by CRN site). Among more than 30,000 recent cancer diagnoses, 70% were enrolled for  $\geq 5$  years and 56% for  $\geq 10$  years before diagnosis. Among 25,274 cancers diagnosed in 2000, 28% were still enrolled in 2010, 45% had died, and 27% had disenrolled from CRN health systems. CONCLUSIONS: Health plan enrollment before cancer diagnosis was generally long in the CRN, and the proportion of patients lost to follow-up after diagnosis was low. With long enrollment histories among cancer patients pre-diagnosis and low post-diagnosis disenrollment, the CRN provides an excellent platform for epidemiologic and health services research on cancer incidence, outcomes, and costs.

Clements MA, Foster NC, Maahs DM, Schatz DA, **Olson BA**, Tsalikian E, Lee JM, Burt-Solorzano CM, Tamborlane WV, Chen V, Miller KM, Beck RW, T1D Exchange Clinic Network. Hemoglobin A1c (HbA1c) changes over time among adolescent and young adult participants in the T1D exchange clinic registry. *Pediatr Diabetes*. 2016 Aug;17(5):327-36.

OBJECTIVE: Hemoglobin A1c (HbA1c) levels among individuals with type 1 diabetes (T1D) influence the longitudinal risk for diabetes-related complications. Few studies have examined HbA1c trends across time in children, adolescents, and young adults with T1D. This study examines changes in glycemic control across the specific transition periods of pre-adolescence-to-adolescence and adolescence-to-young adulthood, and the demographic and clinical factors associated with these changes. RESEARCH DESIGN AND METHODS: Available HbA1c lab results for up to 10 years were collected from medical records at 67 T1D Exchange clinics. Two retrospective cohorts were evaluated: the pre-adolescent-to-adolescent cohort consisting of 85,016 HbA1c measurements from 6574 participants collected when the participants were 8-18 years old and the adolescent-to-young adult cohort, 2200 participants who were 16-26 years old at the time of 17,279 HbA1c measurements. RESULTS: HbA1c in the 8-18 cohort increased over time after age 10 years until ages 16-17, followed by a plateau. HbA1c levels in the 16-26

cohort remained steady from 16-18 and then gradually declined. For both cohorts, race/ethnicity, income, health insurance, and pump use were all significant in explaining individual variations in age-centered HbA1c ( $p < 0.001$ ). For the 8-18 cohort, insulin pump use, age of onset, and health insurance were significant in predicting individual HbA1c trajectory. **CONCLUSIONS:** Glycemic control among patients 8-18 years old worsens over time through age 16. Elevated HbA1c levels observed in 18-year-olds begin a steady improvement into early adulthood. Focused interventions to prevent deterioration in glucose control in pre-adolescence, adolescence, and early adulthood are needed.

Cohen DJ, Balasubramanian BA, Gordon L, Marino M, Ono S, **Solberg LI**, Crabtree BF, Stange KC, Davis M, Miller WL, Damschroder LJ, McConnell KJ, Creswell J. A national evaluation of a dissemination and implementation initiative to enhance primary care practice capacity and improve cardiovascular disease care: the ESCALATES study protocol. *Implement Sci.* 2016 Jun 29;11(1):86. PMC4928346.

**BACKGROUND:** The Agency for Healthcare Research and Quality (AHRQ) launched the EvidenceNOW Initiative to rapidly disseminate and implement evidence-based cardiovascular disease (CVD) preventive care in smaller primary care practices. AHRQ funded eight grantees (seven regional Cooperatives and one independent national evaluation) to participate in EvidenceNOW. The national evaluation examines quality-improvement efforts and outcomes for more than 1500 small primary care practices (restricted to those with fewer than 10 physicians per clinic). Examples of external support include practice facilitation, expert consultation, performance feedback, and educational materials and activities. This paper describes the study protocol for the EvidenceNOW national evaluation, which is called Evaluating System Change to Advance Learning and Take Evidence to Scale (ESCALATES). **METHODS:** This prospective observational study will examine the portfolio of EvidenceNOW Cooperatives using both qualitative and quantitative data. Qualitative data include: online implementation diaries, observation and interviews at Cooperatives and practices, and systematic assessment of context from the perspective of Cooperative team members. Quantitative data include: practice-level performance on clinical quality measures (aspirin prescribing, blood pressure and cholesterol control, and smoking cessation; ABCS) collected by Cooperatives from electronic health records (EHRs); practice and practice member surveys to assess practice capacity and other organizational and structural characteristics; and systematic tracking of intervention delivery. Quantitative, qualitative, and mixed-methods analyses will be conducted to examine how Cooperatives organize to provide external support to practices, compare effectiveness of the dissemination and implementation approaches they implement, and examine how regional variations and other organization and contextual factors influence implementation and effectiveness. **DISCUSSION:** ESCALATES is a national evaluation of an ambitious large-scale dissemination and implementation effort focused on transforming smaller primary care practices. Insights will help inform the design of national health care practice extension systems aimed at supporting practice transformation efforts in the United States.

Cohen EV, Hagestuen R, Gonzalez-Ramos G, Cohen HW, Bassich C, Book E, Bradley KP, Carter JH, Di Minno M, **Gardner J**, Giroux M, Gonzalez MJ, **Holten S**, Joseph R, Kornegay DD, Simpson PA, Tomaino CM, **Vandendorfer RP**, **Walde-Douglas M**, **Wichmann RL**, Morgan JC. Interprofessional education increases knowledge, promotes team building, and changes practice in the care of Parkinson's disease. *Parkinsonism Relat Disord.* 2016 Jan;22:21-7.

**OBJECTIVE:** Examine outcomes for the National Parkinson Foundation (NPF) Allied Team Training for Parkinson (ATTP), an interprofessional education (IPE) program in Parkinson's disease (PD) and team-based care for medicine, nursing, occupational, physical and music therapies, physician assistant, social work and speech-language pathology disciplines. **BACKGROUND:** Healthcare professionals need education in evidence-based PD practices and working effectively in teams. Few evidence-based models of IPE in PD exist. **METHODS:** Knowledge about PD, team-based care, the role of other disciplines and attitudes towards healthcare teams were measured before and after a protocol-driven training program. Knowledge, attitudes and practice changes were again measured at 6 months post-training. Trainee results were compared to results of controls. **RESULTS:** Twenty-six NPF-ATTP trainings were held across the United States (2003-2013). Compared to control participants ( $n = 100$ ), trainees ( $n = 1468$ ) showed statistically significant post-test improvement in all major outcomes, including self-perceived ( $p < 0.001$ ) and objective knowledge ( $p < 0.001$ ), Understanding Role of Other Disciplines ( $p < 0.001$ ),

Attitudes Toward Health Care Teams Scale ( $p < 0.001$ ), and the Attitudes Toward Value of Teams ( $p < 0.001$ ) subscale. Despite some decline, significant improvements were largely sustained at 6-month post-training. Qualitative analyses confirmed post-training practice changes. **CONCLUSIONS:** The NPF-ATTP model IPE program showed sustained positive gains in knowledge of PD, team strategies and role of other disciplines, team attitudes, and important practice improvements. Further research should examine longer-term outcomes, objectively measure practice changes and mediators, and determine impact on patient outcomes.

**Cole JB, Moore JC, Nystrom PC, Orozco BS, Stellpflug SJ, Kornas RL, Fryza BJ, Steinberg LW, O'Brien-Lambert A, Bache-Wiig P, Engebretsen KM, Ho JD.** A prospective study of ketamine versus haloperidol for severe prehospital agitation. *Clin Toxicol (Phila)*. 2016 Aug;54(7):556-62. [Comment in: *Clin Toxicol (Phila)*. 2016 Aug;54(7):545-6.]

**CONTEXT:** Ketamine is an emerging drug for the treatment of acute undifferentiated agitation in the prehospital environment; however, no prospective comparative studies have evaluated its effectiveness or safety in this clinical setting. **OBJECTIVE:** We hypothesized that 5 mg/kg of intramuscular ketamine would be superior to 10 mg of intramuscular haloperidol for severe prehospital agitation, with time to adequate sedation as the primary outcome measure. **METHODS:** This was a prospective open-label study of all patients in an urban EMS system requiring chemical sedation for severe acute undifferentiated agitation who were subsequently transported to the EMS system's primary emergency department. All paramedics were trained in the Altered Mental Status Scale and prospectively recorded agitation scores on all patients. Two 6-month periods in which either ketamine or haloperidol was the first-line therapy for severe agitation were prospectively compared primarily for time to adequate sedation. Secondary outcomes included laboratory data and adverse medication events. **RESULTS:** 146 subjects were enrolled; 64 received ketamine and 82 received haloperidol. Median time to adequate sedation for the ketamine group was 5 minutes (range 0.4-23) vs. 17 minutes (range 2-84) in the haloperidol group (difference 12 minutes, 95% CI 9-15). Complications occurred in 49% (27/55) of patients receiving ketamine vs. 5% (4/82) in the haloperidol group. Complications specific to the ketamine group included hypersalivation (21/56, 38%), emergence reaction (5/52, 10%), vomiting (5/57, 9%), and laryngospasm (3/55, 5%). Intubation was also significantly higher in the ketamine group; 39% of patients receiving ketamine were intubated vs. 4% of patients receiving haloperidol. **CONCLUSIONS:** Ketamine is superior to haloperidol in terms of time to adequate sedation for severe prehospital acute undifferentiated agitation but is associated with more complications and a higher intubation rate.

**Cole JB, Stellpflug SJ, Smith SW.** Refractory hypotension and "ventricular fibrillation" with large U waves after overdose. *JAMA Intern Med*. 2016 Jul 1;176(7):1007-9.

Coleman KJ, Haneuse S, Johnson E, Bogart A, Fisher D, **O'Connor PJ, Sherwood NE, Sidney S, Theis MK, Anau J, Schroeder EB, O'Brien R, Arterburn DE.** Long-term microvascular disease outcomes in patients with type 2 diabetes after bariatric surgery: evidence for the legacy effect of surgery. *Diabetes Care*. 2016 Aug;39(8):1400-7. PMC4955928.

**OBJECTIVE:** To identify and quantify any legacy effect of bariatric surgery on risk of incident microvascular disease in patients with type 2 diabetes. **RESEARCH DESIGN AND METHODS:** We conducted a retrospective observational cohort study ( $n = 4,683$ ; 40% racial/ethnic minority) of patients with type 2 diabetes who underwent bariatric surgery from 2001 through 2011. The primary outcome measure was incident microvascular disease defined as a composite indicator of the first occurrence of retinopathy, neuropathy, and/or nephropathy. The Cox proportional hazards framework was used to investigate the associations between type 2 diabetes remission/relapse status and time to microvascular disease. **RESULTS:** Covariate-adjusted analyses showed that patients who experienced type 2 diabetes remission had a 29% lower risk of incident microvascular disease compared with patients who never remitted (hazard ratio [HR] 0.71 [95% CI 0.60, 0.85]). Among patients who experienced a relapse after remission, the length of time spent in remission was inversely related to the risk of incident microvascular disease; for every additional year of time spent in remission prior to relapse, the risk of microvascular disease was reduced by 19% (HR 0.81 [95% CI 0.67, 0.99]) compared with patients who never remitted. **CONCLUSIONS:** Our results indicate that remission of type 2 diabetes after bariatric surgery confers

benefits for risk of incident microvascular disease even if patients eventually experience a relapse of their type 2 diabetes. This provides support for a legacy effect of bariatric surgery, where even a transient period of surgically induced type 2 diabetes remission is associated with lower long-term microvascular disease risk.

Conley LJ, Bush TJ, Darragh TM, Palefsky JM, Unger ER, Patel P, Steinau M, Kojic EM, **Martin HL**, Overton ET, Cu-Uvin S, Hammer J, Henry K, Wood K, Brooks JT. Incidence and predictors of abnormal anal cytology findings among HIV-infected adults receiving contemporary antiretroviral therapy. *J Infect Dis.* 2016 Feb 1;213(3):351-60.

**BACKGROUND:** Anal cancer rates are higher for human immunodeficiency virus (HIV)-infected adults than for uninfected adults. Limited published data exist characterizing the incidence of precursor lesions detected by anal cytology. **METHODS:** The Study to Understand the Natural History of HIV/AIDS in the Era of Effective Therapy was a prospective cohort of 700 HIV-infected participants in 4 US cities. At baseline and annually thereafter, each participant completed a behavioral questionnaire, and healthcare professionals collected anorectal swabs for cytologic examination and human papillomavirus (HPV) detection and genotyping. **RESULTS:** Among 243 participants with negative baseline results of anal cytology, 37% developed abnormal cytology findings (incidence rate, 13.9 cases/100 person-years of follow-up; 95% confidence interval [CI], 11.3-16.9) over a median follow-up duration of 2.1 years. Rates among men having sex with men, among women, and among men having sex with women were 17.9 cases/person-years of follow-up (95% CI, 13.9-22.7), 9.4 cases/person-years of follow-up (95% CI, 5.6-14.9), and 8.9 cases/person-years of follow-up (95% CI, 4.8-15.6), respectively. In multivariable analysis, the number of persistent high-risk HPV types (adjusted hazard ratio [aHR], 1.17; 95% CI, 1.01-1.36), persistent high-risk HPV types except 16 or 18 (aHR, 2.46; 95% CI, 1.31-4.60), and persistent types 16 or 18 (aHR, 3.90; 95% CI, 1.78-8.54) remained associated with incident abnormalities. **CONCLUSIONS:** The incidence of abnormal anal cytology findings was high and more likely to develop among persons with persistent high-risk HPV.

**Cooper JM**, member of the Mars (Multicenter ACL Revision Study) Group. Meniscal and articular cartilage predictors of clinical outcome after revision anterior cruciate ligament reconstruction. *Am J Sports Med.* 2016 Jul;44(7):1671-9.

**BACKGROUND:** Revision anterior cruciate ligament (ACL) reconstruction has been documented to have worse outcomes compared with primary ACL reconstructions. **PURPOSE/HYPOTHESIS:** The purpose of this study was to determine if the prevalence, location, and/or degree of meniscal and chondral damage noted at the time of revision ACL reconstruction predicts activity level, sports function, and osteoarthritis symptoms at 2-year follow-up. The hypothesis was that meniscal loss and high-grade chondral damage noted at the time of revision ACL reconstruction will result in lower activity levels, decreased sports participation, more pain, more stiffness, and more functional limitation 2 years after revision surgery. **STUDY DESIGN:** Cohort study; Level of evidence, 2. **METHODS:** Between 2006 and 2011, a total of 1205 patients who underwent revision ACL reconstruction by 83 surgeons at 52 hospitals were accumulated for study of the relationship of meniscal and articular cartilage damage to outcome. Baseline demographic and intraoperative data, including the International Knee Documentation Committee (IKDC) subjective knee evaluation, Knee injury and Osteoarthritis Outcome Score (KOOS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Marx activity score, were collected initially and at 2-year follow-up to test the hypothesis. Regression analysis was used to control for age, sex, body mass index, smoking status, activity level, baseline outcome scores, revision number, time since last ACL reconstruction, incidence of having a previous ACL reconstruction on the contralateral knee, previous and current meniscal and articular cartilage injury, graft choice, and surgeon years of experience to assess the meniscal and articular cartilage risk factors for clinical outcomes 2 years after revision ACL reconstruction. **RESULTS:** At 2-year follow-up, 82% (989/1205) of the patients returned their questionnaires. It was found that previous meniscal injury and current articular cartilage damage were associated with the poorest outcomes, with prior lateral meniscectomy and current grade 3 to 4 trochlear articular cartilage changes having the worst outcome scores. Activity levels at 2 years were not affected by meniscal or articular cartilage pathologic changes. **CONCLUSION:** Prior lateral meniscectomy and current grade 3 to 4 changes of the trochlea were associated with worse outcomes in terms of decreased

sports participation, more pain, more stiffness, and more functional limitation at 2 years after revision surgery, but they had no effect on activity levels.

**Cooper JM**, member of the Mars (Multicenter ACL Revision Study) Group. The development and early to midterm findings of the multicenter revision anterior cruciate ligament study. *J Knee Surg.* 2016 Oct;29(7):528-32.

**BACKGROUND:** Revision anterior cruciate ligament (ACL) reconstruction has been documented to have worse outcomes compared with primary ACL reconstructions. **PURPOSE/HYPOTHESIS:** The purpose of this study was to determine if the prevalence, location, and/or degree of meniscal and chondral damage noted at the time of revision ACL reconstruction predicts activity level, sports function, and osteoarthritis symptoms at 2-year follow-up. The hypothesis was that meniscal loss and high-grade chondral damage noted at the time of revision ACL reconstruction will result in lower activity levels, decreased sports participation, more pain, more stiffness, and more functional limitation 2 years after revision surgery. **STUDY DESIGN:** Cohort study; Level of evidence, 2. **METHODS:** Between 2006 and 2011, a total of 1205 patients who underwent revision ACL reconstruction by 83 surgeons at 52 hospitals were accumulated for study of the relationship of meniscal and articular cartilage damage to outcome. Baseline demographic and intraoperative data, including the International Knee Documentation Committee (IKDC) subjective knee evaluation, Knee injury and Osteoarthritis Outcome Score (KOOS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and Marx activity score, were collected initially and at 2-year follow-up to test the hypothesis. Regression analysis was used to control for age, sex, body mass index, smoking status, activity level, baseline outcome scores, revision number, time since last ACL reconstruction, incidence of having a previous ACL reconstruction on the contralateral knee, previous and current meniscal and articular cartilage injury, graft choice, and surgeon years of experience to assess the meniscal and articular cartilage risk factors for clinical outcomes 2 years after revision ACL reconstruction. **RESULTS:** At 2-year follow-up, 82% (989/1205) of the patients returned their questionnaires. It was found that previous meniscal injury and current articular cartilage damage were associated with the poorest outcomes, with prior lateral meniscectomy and current grade 3 to 4 trochlear articular cartilage changes having the worst outcome scores. Activity levels at 2 years were not affected by meniscal or articular cartilage pathologic changes. **CONCLUSION:** Prior lateral meniscectomy and current grade 3 to 4 changes of the trochlea were associated with worse outcomes in terms of decreased sports participation, more pain, more stiffness, and more functional limitation at 2 years after revision surgery, but they had no effect on activity levels.

Crandall CJ, Aragaki AK, LeBoff MS, Li W, Wactawski-Wende J, Cauley JA, **Margolis KL**, Manson JE. Calcium plus vitamin D supplementation and height loss: findings from the Women's Health Initiative Calcium and Vitamin D clinical trial. *Menopause.* 2016 Dec;23(12):1277-86. PMC5118123.

**OBJECTIVE:** The aim of this study was to determine the associations between calcium + vitamin D supplementation (vs placebo) and height loss in 36,282 participants of the Women's Health Initiative Calcium and Vitamin D trial. **METHODS:** Post hoc analysis of data from a double-blind randomized controlled trial of 1000 mg of elemental calcium as calcium carbonate with 400 IU of vitamin D3 daily (CaD) or placebo in postmenopausal women at 40 US clinical centers. Height was measured annually (mean follow-up 5.9 years) with a stadiometer. **RESULTS:** Average height loss was 1.28 mm/y among participants assigned to CaD versus 1.26 mm/y for women assigned to placebo ( $P = 0.35$ ). Effect modification of the CaD intervention was not observed by age, race/ethnicity, or baseline intake of calcium or vitamin D. Randomization to the CaD group did not reduce the risk of clinical height loss (loss of  $\geq 1.5$  inches [3.8 cm]: hazard ratio (95% CI) = 1.00 (0.81, 1.23). A strong association ( $P < 0.001$ ) was observed between age group and height loss. When we censored follow-up data in participants who became nonadherent to study pills, the results were similar to those of our primary analysis. **CONCLUSIONS:** Compared with placebo, the CaD supplement used in this trial did not prevent height loss in healthy postmenopausal women.

**Crane MM**, LaRose JG, Espeland MA, Wing RR, Tate DF. Recruitment of young adults for weight gain prevention: randomized comparison of direct mail strategies. *Trials.* 2016 Jun 8;17(1):282. PMC4897900.

**BACKGROUND:** Recruiting young adults (ages 18-35 years) into weight gain prevention intervention studies is challenging, and men are particularly difficult to reach. This paper describes two studies designed to improve recruitment for a randomized trial of weight gain prevention interventions. Study 1 used a quasi-experimental design to test the effect of two types of direct mailings on their overall reach. Study 2 used a randomized design to test the effect of using targeted messages to increase recruitment of men into the trial. **METHODS:** For Study 1, 60,000 male and female young-adult households were randomly assigned to receive either a recruitment brochure or postcard. Visits to recruitment websites during each mailing period were used to assess response to each mailing. Study 2 focused on postcard recruitment only. These households received either a targeted or generic recruitment postcard, where targeted postcards included the word "Men" in the headline text. Response rates to each type of card were categorized based on participant report of mailing received. **RESULTS:** The reach of the postcards and brochures were similar (421 and 386 website visits, respectively;  $P = 0.22$ ). Individuals who received the brochure were more likely to initiate the online screener than those who received a postcard ( $P = 0.01$ ). In Study 2, of those who completed the telephone screening, 60.9 % of men ( $n = 23$ ) had received the targeted postcard compared to the generic postcard (39.1 %,  $P = 0.30$ ). The reverse was true for women ( $n = 62$ , 38.7 vs. 61.3 %,  $P = 0.08$ ). **CONCLUSIONS:** These studies suggest there was little difference in the reach of postcards versus brochures. However, recipients of brochures were more likely to continue to the next stage of study participation. As expected, men's response to the weight gain prevention messages was lower than women's response, but using targeted messages appears to have modestly increased the proportion of male respondents. These studies add to the limited experimental literature on recruitment messaging and provide further indication for using targeted messages to reach underrepresented populations while providing initial evidence on the effect of mailing type on message reach.

**Crane MM**, Ward DS, Lutes LD, Bowling JM, Tate DF. Theoretical and behavioral mediators of a weight loss intervention for men. *Ann Behav Med*. 2016 Jun;50(3):460-70. PMC4867237.

**OBJECTIVE:** Men are currently underrepresented in weight loss trials despite similar obesity rates, which limits our understanding about the most effective elements of treatment for men. The purpose of this study was to test the theoretical (autonomous motivation, self-efficacy, outcome expectancies, and self-regulation) and behavioral (calorie intake, physical activity, self-weighing) mediators of a men-only, Internet-delivered weight loss intervention focused on innovative and tailored treatment elements specifically for men. **METHOD:** Data comes from a 6-month randomized trial ( $N = 107$ ) testing the intervention compared to a waitlist control group. Changes in the theoretical mediators between baseline and 3 months were tested as mediators of the intervention effect on weight change at 6 months in both single and multiple mediator models. Changes in behaviors between baseline and 6 months were tested in the same manner. **RESULTS:** The intervention produced greater weight losses compared to the control group (-5.57 kg +/- 6.6 vs. -0.65 kg +/- 3.3,  $p < 0.001$ ) and significant changes ( $p$ 's  $< 0.05$ ) in most of the theoretical and behavior mediators. In multiple mediator models, changes in diet-related autonomous motivation, self-efficacy, and self-regulation all significantly mediated the relationship between the intervention and weight loss. The intervention effect was also mediated by changes in dietary intake and self-weighing frequency. **CONCLUSIONS:** By testing the theoretical mediators of this intervention in a multiple mediator context, this study contributes to current knowledge related to the development of weight loss interventions for men and suggests that interventions should target diet-focused constructs.

Creehan S, Cuddigan J, Gonzales D, **Nix DP**, Padula W, Pittman J, Pontieri-Lewis V, Walden C, Wells B, Wheeler R. The VCU Pressure Ulcer Summit-developing centers of pressure ulcer prevention excellence: a framework for sustainability. *J Wound Ostomy Continence Nurs*. 2016 Mar-Apr;43(2):121-8.

Hospital-acquired pressure ulcer occurrences have declined over the past decade as reimbursement policies have changed, evidence-based practice guidelines have been implemented, and quality-improvement initiatives have been launched. However, the 2006-2008 Institute for Healthcare Improvement goal of zero pressure ulcers remains difficult to achieve and even more challenging to sustain. Magnet hospitals tend to have lower hospital-acquired pressure ulcer rates than non-Magnet hospitals, yet many non-Magnet hospitals also have robust pressure ulcer prevention programs. Successful programs share commonalities in structure, processes, and outcomes. A national summit of

55 pressure ulcer experts was convened at the Virginia Commonwealth University Medical Center in March 2014. The group was divided into 3 focus groups; each was assigned a task to develop a framework describing components of a proposed Magnet-designated Center of Pressure Ulcer Prevention Excellence. Systematic literature reviews, analysis of exemplars, and nominal group process techniques were used to create the framework. This article presents a framework describing the proposed Magnet-designated Centers of Pressure Ulcer Prevention Excellence. Critical attributes of Centers of Excellence are identified and organized according to the four domains of the ANCC model for the Magnet Recognition Program: transformational leadership; structural empowerment; exemplary professional practice; and new knowledge, innovation and improvements. The structures, processes, and outcome measures necessary to become a proposed Center of Pressure Ulcer Prevention Excellence are discussed.

**Dehmer SP**, Baker-Goering MM, **Maciosek MV**, Hong Y, **Kottke TE**, **Margolis KL**, Will JC, **Flottemesch TJ**, **LaFrance AB**, **Martinson BC**, **Thomas AJ**, Roy K. Modeled health and economic impact of team-based care for hypertension. *Am J Prev Med.* 2016 May;50(5 Suppl 1):S34-44. Project: A12-232 CDC Policy Modeling.

**INTRODUCTION:** Team-based interventions for hypertension care have been widely studied and shown effective in improving hypertension outcomes. Few studies have evaluated long-term effects of these interventions; none have assessed broad-scale implementation. This study estimates the prospective health, economic, and budgetary impact of universal adoption of a team-based care intervention model that targets people with treated but uncontrolled hypertension in the United States. **METHODS:** Analysis was conducted in 2014-2015 using a microsimulation model, constructed with various data sources from 1948 to 2014, designed to evaluate prospective cardiovascular disease (CVD)-related interventions in the United States. **POPULATION:** Ten-year primary outcomes included prevalence of uncontrolled hypertension; incident myocardial infarction, stroke, CVD events, and CVD-related mortality; intervention and net medical costs by payer; productivity; and quality-adjusted life-years. **RESULTS:** About 4.7 million (13%) fewer people with uncontrolled hypertension and 638,000 prevented cardiovascular events would be expected over 10 years. Assuming \$525 per enrollee, implementation would cost payers \$22.9 billion, but \$25.3 billion would be saved in averted medical costs. Estimated net cost savings for Medicare approached \$5.8 billion. Net costs were especially sensitive to intervention costs, with break-even thresholds of \$300 (private), \$450 (Medicaid), and \$750 (Medicare). **CONCLUSIONS:** Nationwide adoption of team-based care for uncontrolled hypertension could have sizable effects in reducing CVD burden. Based on the study's assumptions, the policy would be cost saving from the perspective of Medicare and may prove to be cost effective from other payers' perspectives. Expected net cost savings for Medicare would more than offset expected net costs for all other insurers.

**Dehmer SP**, **Maciosek MV**, **Flottemesch TJ**, **LaFrance AB**, Whitlock EP. Aspirin for the primary prevention of cardiovascular disease and colorectal cancer: a decision analysis for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2016 Jun 21;164(12):777-86. Project: A15-062 EPC IV Aspirin Modeling.

**BACKGROUND:** Evidence indicates that aspirin is effective for the primary prevention of cardiovascular disease (CVD) and colorectal cancer (CRC) but also increases the risk for gastrointestinal (GI) and cerebral hemorrhages. **OBJECTIVE:** To assess the net balance of benefits and harms from routine aspirin use across clinically relevant age, sex, and CVD risk groups. **DESIGN:** Decision analysis using a microsimulation model. **DATA SOURCES:** Three systematic evidence reviews. **TARGET POPULATION:** Men and women aged 40 to 79 years with a 10-year CVD risk of 20% or less and no history of CVD and without elevated risk for GI or cerebral hemorrhages that would contraindicate aspirin use. **TIME HORIZON:** Lifetime, 20 years, and 10 years. **PERSPECTIVE:** Clinical. **INTERVENTION:** Low-dose aspirin ( $\leq 100$  mg/d). **OUTCOME MEASURES:** Primary outcomes are length and quality of life measured in net life-years and quality-adjusted life-years. Benefits include reduced nonfatal myocardial infarction, nonfatal ischemic stroke, fatal CVD, CRC incidence, and CRC mortality. Harms include increased fatal and nonfatal GI bleeding and hemorrhagic stroke. **RESULTS OF BASE-CASE ANALYSIS:** Lifetime net quality-adjusted life-years are positive for most adults initiating aspirin at ages 40 to 69 years, and life expectancy gains are expected for most men and women initiating aspirin at ages 40 to 59 years

and 60 to 69 years with higher CVD risk. Harms may exceed benefits for persons starting aspirin in their 70s and for many during the first 10 to 20 years of use. RESULTS OF SENSITIVITY ANALYSIS: Results are most sensitive to the relative risk for hemorrhagic stroke and CVD mortality but are affected by all relative risk estimates, baseline GI bleeding incidence and case-fatality rates, and disutilities associated with aspirin use. LIMITATIONS: Aspirin effects by age are uncertain. Stroke benefits are conservatively estimated. Gastrointestinal bleeding incidence and case-fatality rates account only for age and sex. CONCLUSION: Lifetime aspirin use for primary prevention initiated at younger ages (40 to 69 years) and in persons with higher CVD risk shows the greatest potential for positive net benefit.

Derauf C, Pandey D, Liesinger JT, Ryu E, **Ziegenfuss JY**, Juhn Y. Cross-sectional study of perceived neighborhood collective efficacy and risk of ADHD among a nationally-representative sample of children. *J Epidemiol Res.* 2016;2(1):71-9.

Objective: The development and severity of attention deficit hyperactivity disorder (ADHD) has been linked to a number of psychosocial risk factors. Research has shown that the amount of social capital in a community influences the physical and mental health of community members. We assessed the independent role of perceived neighborhood context, including physical and socioeconomic characteristics, and collective efficacy, a form of social capital, on ADHD prevalence. Methods: Cross-sectional study utilizing the 2007 National Survey of Children's Health, a nationally representative dataset. The population of interest was children between ages 4 and 17 living in randomly selected households. Multiple logistic regression models were used to assess the association between indices of perceived neighborhood socioeconomic conditions, built environment, and collective efficacy (study exposures) on risk of ADHD (outcome), controlling for pertinent individual and family risk factors. Results: Nine percent of children in the United States (ages 4-17) had ADHD as reported by their caregiver. Univariately, all three neighborhood characteristics were associated with risk of ADHD (p-value = .01, .04, and .0002 for socioeconomic conditions, built environment, and collective efficacy, respectively). After accounting for well-established risk factors for ADHD, perceived neighborhood socioeconomic conditions and built environment were no longer associated with ADHD, while collective efficacy remained significant (p=.0002). Lower level of perceived neighborhood collective efficacy was associated with increased risk of ADHD (OR: 1.7; 95% CI: 1.3-2.2, comparing the lowest with the highest level). Conclusions: Our study suggests that perceived neighborhood collective efficacy may buffer the impact of individual-and family-level risk factors for ADHD in children.

**DeSilva MB**, Munoz FM, McMillan M, Kawai AT, Marshall H, Macartney KK, Joshi J, Onoko M, Rose AE, Dolk H, Trotta F, Spiegel H, Tomczyk S, Shrestha A, Kochhar S, **Kharbanda EO**, Brighton Collaboration Congenital Anomalies Working Group. Congenital anomalies: Case definition and guidelines for data collection, analysis, and presentation of immunization safety data. *Vaccine.* 2016 Dec 01;34(49):6015-26. PMC5139892.

**DeSilva MB**, **Vazquez-Benitez G**, **Nordin JD**, Lipkind HS, Romitti PA, DeStefano F, **Kharbanda EO**. Tdap vaccination during pregnancy and microcephaly and other structural birth defects in offspring [editorial]. *JAMA.* 2016 Nov 1;316(17):1823-5. [Comment on: *MMWR Morb Mortal Wkly Rep.* 2013 Feb 22;62(7):131-5.]

**Dhuria SV**, **Fine JM**, Bingham D, **Svitak AL**, **Burns RB**, Baillargeon AM, Panter SS, **Kazi AN**, **Frey WH**, **2nd**, **Hanson LR**. Food consumption and activity levels increase in rats following intranasal Hypocretin-1. *Neurosci Lett.* 2016 Aug 3;627:155-9.

Hypocretin-1 (HC, orexin-A) is a neuropeptide involved in regulating physiological functions of sleep, appetite and arousal, and it has been shown that intranasal (IN) administration can target HC to the brain. Recent clinical studies have shown that IN HC has functional effects in human clinical trials. In this study, we use rats to determine whether IN HC has an immediate effect on food consumption and locomotor activity, whether distribution in the brain after IN delivery is dose-dependent, and whether MAPK and PDK1 are affected after IN delivery. Food intake and wheel-running activity were quantified for 24 hours after IN delivery. Biodistribution was determined 30 minutes after IN delivery of both a high and low dose of 125I-radiolabelled HC throughout the brain and other bodily tissues, while Western blots were used to

quantify changes in cell signaling pathways (MAPK and PDK1) in the brain. Intranasal HC significantly increased food intake and wheel activity within 4 hours after delivery, but balanced out over the course of 24 hours. The distribution studies showed dose-dependent delivery in the CNS and peripheral tissues, while PDK1 was significantly increased in the brain 30 minutes after IN delivery of HC. This study adds to the growing body of evidence that IN administration of HC is a promising strategy for treatment of HC-related behaviors.

**Dickinson O**, Akdemir B, Puppala VK, Krishnan B, Detloff BLS, Sakaguchi S, Adkisson W, Benditt DG. Blunted chronotropic response to hypotension in cough syncope. *JACC Clin Electrophysiol*. 2016 Dec;2(7):818-24.

**OBJECTIVES:** This study compared hemodynamic and chronotropic responses to cough in cough syncope (CS) patients to those in control subjects. **BACKGROUND:** Cough syncope is an uncommon form of situational fainting variously attributed to both reflex and mechanical causes. We hypothesized that if baroreflex responses contribute to CS, post-cough hypotension should be associated with cardioinhibition comparable to that observed in other reflex faints. **METHODS:** The study population consisted of 8 CS patients (group 1), 21 patients with vasovagal syncope (group 2), and 6 patients with nonvertiginous "lightheadedness" (group 3). Testing with patients seated included volitional coughing that achieved a transient blood pressure (BP) of 200 mm Hg. Beat-to-beat blood pressure (systolic blood pressure [SBP]) before cough, minimum cough-induced SBP and heart rate (HR) (beats/min) after cough, and HR change during cough-induced hypotension were recorded, along with SBP recovery time from SBP nadir after cough. **RESULTS:** Compared to controls, cough-induced SBP drop was greater in CS patients (CS patients:  $48 \pm 13.1$  mm Hg vs.  $29 \pm 11.2$  mm Hg for group 2 controls;  $p = 0.005$ ; or  $25 \pm 10$  mm Hg in group 3 controls;  $p = 0.02$ ), and recovery time was longer (CS:  $46 \pm 19$  s vs.  $11 \pm 3.6$  s in group 1 controls;  $p = 0.002$ ; or  $12 \pm 5$  s in group 3 controls;  $p = 0.01$ ). Furthermore, despite greater induced hypotension, post-cough chronotropic response was less in CS patients ( $\leq 15\%$  above baseline rate) than in either group 2 ( $\geq 31\%$  above baseline rate;  $p < 0.001$ ) or group 3 ( $\geq 28\%$ ;  $p = 0.01$ ) controls. **CONCLUSIONS:** In CS patients, post-cough chronotropic response is blunted compared to that in controls despite greater cough-induced hypotension favoring baroreflex cardioinhibition contribution to the pathophysiology of cough syncope.

Dimitri D, Gubert A, **Miller AB**, Thoma B, Chan T. A quantitative study on anonymity and professionalism within an online free open-access medical education community. *Cureus*. 2016 Sep 18;8(9):e788. PMC5478247.

The increasing use of social media to share knowledge in medical education has led to concerns about the professionalism of online medical learners and physicians. However, there is a lack of research on the behavior of professionals within open online discussions. In 2013, the Academic Life in Emergency Medicine website (ALiEM.com) launched a series of moderated online case discussions that provided an opportunity to explore the relationship between anonymity and professionalism. Comments from 12 case discussions conducted over a 1-year period were analyzed using modified scales of anonymity and professionalism derived by Kilner and Hoadley. Descriptive statistics and Spearman calculations were conducted for the professionalism score, anonymity score, and level of participation. No correlation was found between professionalism and anonymity scores ( $\rho = -0.004$ ,  $p = 0.97$ ). However, the number of comments ( $\rho = 0.35$ ,  $p < 0.01$ ) and number of cases contributed to ( $\rho = 0.26$ ,  $p < 0.05$ ) correlated positively with clear identification. Our results differed from previous literature, most of which found anonymity associated with unprofessionalism. We believe that this may be a result of the fostering of a professional environment through the use of a website with a positive reputation, the modelling of respectful behavior by the moderators, the norms of the broader online community, and the pre-specified objectives for each discussion.

Dorsey ER, Achey MA, Beck CA, Beran DB, Biglan KM, Boyd CM, Schmidt PN, Simone R, Willis AW, Galifianakis NB, Katz M, Tanner CM, Dodenhoff K, Ziman N, Aldred J, Carter J, Jimenez-Shahed J, Hunter C, Spindler M, Mari Z, Morgan JC, McLane D, Hickey P, Gauger L, Richard IH, Bull MT, Mejia NI, Bwala G, **Nance MA**, Shih L, Anderson L, Singer C, Zadikoff C, Okon N, Feigin A, Ayan J, Vaughan C, Pahwa R, Cooper J, Webb S, Dhall R, Hassan A, Weis D, DeMello S, Riggare SS, Wicks P, Smith J,

Keenan HT, Korn R, Schwarz H, Sharma S, Stevenson EA, Zhu W. National randomized controlled trial of virtual house calls for people with Parkinson's disease: Interest and barriers. *Telemed J E Health*. 2016 Jul;22(7):590-8. PMC4939367.

**BACKGROUND:** Delivering specialty care remotely directly into people's homes can enhance access for and improve the health care of individuals with chronic conditions. However, evidence supporting this approach is limited. **MATERIALS AND METHODS:** Connect.Parkinson is a randomized comparative effectiveness study that compares usual care of individuals with Parkinson's disease in the community with usual care augmented by virtual house calls with a Parkinson's disease specialist from one of 18 centers nationally. Individuals in the intervention arm receive four virtual visits from a Parkinson's disease specialist over 1 year via secure, Web-based videoconferencing directly into their homes. All study activities, including recruitment, enrollment, and assessments, are conducted remotely. Here we report on interest, feasibility, and barriers to enrollment in this ongoing study. **RESULTS:** During recruitment, 11,734 individuals visited the study's Web site, and 927 unique individuals submitted electronic interest forms. Two hundred ten individuals from 18 states enrolled in the study from March 2014 to June 2015, and 195 were randomized. Most participants were white (96%) and college educated (73%). Of the randomized participants, 73% had seen a Parkinson's disease specialist within the previous year. **CONCLUSIONS:** Among individuals with Parkinson's disease, national interest in receiving remote specialty care directly into the home is high. Remote enrollment in this care model is feasible but is likely affected by differential access to the Internet.

Drake TC, Hsu FC, Hire D, Chen SH, Cohen RM, McDuffie R, **Nylen E, O'Connor PJ**, Rehman S, Seaquist ER. Factors associated with failure to achieve a glycated hemoglobin target of <8.0% in the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial. *Diabetes Obes Metab*. 2016 Jan;18(1):92-5. Project: A99-045 ACCORD.

The aim of this study was to identify the clinical features of participants in the standard therapy arm of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) glycemia trial who failed to reach the glycosylated hemoglobin (HbA1c) target. We analyzed 4685 participants in the standard therapy arm, comparing participants who reached the HbA1c target of <8.0% with those whose HbA1c level was  $\geq 8.0\%$  12 months after randomization. Baseline and 12-month clinical characteristics were compared. At 12 months after randomization, 3194 participants had HbA1c <8.0% and 1491 had HbA1c  $\geq 8.0\%$ . Black race [odds ratio (OR) 0.74, 95% confidence interval (CI) 0.61-0.89;  $p = 0.002$ ], severe hypoglycemia (OR 0.57, CI 0.37-0.89;  $p = 0.014$ ) and insulin use (OR 0.51, CI 0.40-0.65;  $p < 0.001$ ) were associated with failure to reach HbA1c goal at 12 months in the adjusted model. Even with free medications, free visits with clinicians and aggressive titration of medications, >30% of participants in the standard arm of the ACCORD trial had an HbA1c  $\geq 8.0\%$  at 1 year. Participants who were black, had severe hypoglycemia and were on insulin were more likely to have an above-target HbA1c concentration after 12 months on the standard protocol.

**Dries DJ.** Mechanical ventilation: history and harm [review article]. *Air Med J*. 2016 Jan-Feb;35(1):12-5.

**Dries DJ.** The sepsis saga: consensus to xigris. *Air Med J*. 2016 Jul-Aug;35(4):194-6.

**Dries DJ.** Assisted ventilation. *J Burn Care Res*. 2016 Mar-Apr;37(2):75-85.

Controlled Mechanical Ventilation may be essential in the setting of severe respiratory failure but consequences to the patient, including increased use of sedation and neuromuscular blockade, may contribute to delirium, atelectasis, and diaphragm dysfunction. Assisted ventilation allows spontaneous breathing activity to restore physiological displacement of the diaphragm and recruit better perfused lung regions. Pressure Support Ventilation is the most frequently used mode of assisted mechanical ventilation. However, this mode continues to provide a monotonous pattern of support for respiration which is normally a dynamic process. Noisy Pressure Support Ventilation, in which tidal volume is varied randomly by the ventilator, may improve ventilation and perfusion matching, but the degree of support is still determined by the ventilator. Two more recent modes of ventilation, Proportional Assist Ventilation and Neurally Adjusted Ventilatory Assist (NAVA), allow patient determination of the pattern and depth of ventilation. Proposed advantages of Proportional Assist Ventilation and NAVA include decrease in patient

ventilator asynchrony and improved adaptation of ventilator support to changing patient demand. Work of breathing can be normalized with these modes as well. To date, however, a clear pattern of clinical benefit has not been demonstrated. Existing challenges for both of the newer assist modes include monitoring patients with dynamic hyperinflation (auto-positive end expiratory pressure), obstructive lung disease, and air leaks in the ventilator system. NAVA depends on consistent transduction of diaphragm activity by an electrode system placed in the esophagus. Longevity of effective support with this technique is unclear.

**Dries DJ.** Acute respiratory distress syndrome and lung protection [editorial]. *Air Med J.* 2016 Mar-Apr;35(2):59-62. [Comment on: *Lancet.* 1967 Aug 12;2(7511):319-23. *Am J Respir Crit Care Med.* 1994 Mar;149(3 Pt 1):818-24. *JAMA.* 2012 Jun 20;307(23):2526-33. *JAMA.* 2012 Jun 20;307(23):2542-4.]

**Dries DJ.** Chest pain [review article]. *Air Med J.* 2016 May-Jun;35(3):107-10.

**Dries DJ.** Thanks for the memories. *Crit Care Med.* 2016 Nov;44(11):2108-9.

**Dries DJ.** Hemodynamic monitoring: Part 2. *Air Med J.* 2016 Nov-Dec;35(6):331-5.

Driscoll I, Shumaker SA, Snively BM, **Margolis KL**, Manson JE, Vitolins MZ, **Rossum RC**, Espeland MA. Relationships between caffeine intake and risk for probable dementia or global cognitive impairment: The Women's Health Initiative Memory Study. *J Gerontol A Biol Sci Med Sci.* 2016 Dec;71(12):1596-602. PMC5106861.

**BACKGROUND:** Nonhuman studies suggest a protective effect of caffeine on cognition. Although human literature remains less consistent, reviews suggest a possible favorable relationship between caffeine consumption and cognitive impairment or dementia. We investigated the relationship between caffeine intake and incidence of cognitive impairment or probable dementia in women aged 65 and older from the Women's Health Initiative Memory Study. **METHODS:** All women with self-reported caffeine consumption at enrollment were included (N = 6,467). In 10 years or less of follow-up with annual assessments of cognitive function, 388 of these women received a diagnosis of probable dementia based on a four-phase protocol that included central adjudication. We used proportional hazards regression to assess differences in the distributions of times until incidence of probable dementia or composite cognitive impairment among women grouped by baseline level of caffeine intake, adjusting for risk factors (hormone therapy, age, race, education, body mass index, sleep quality, depression, hypertension, prior cardiovascular disease, diabetes, smoking, and alcohol consumption). **RESULTS:** Women consuming above median levels (mean intake = 261 mg) of caffeine intake for this group were less likely to develop incident dementia (hazard ratio = 0.74, 95% confidence interval [0.56, 0.99], p = .04) or any cognitive impairment (hazard ratio = 0.74, confidence interval [0.60, 0.91], p = .005) compared to those consuming below median amounts (mean intake = 64 mg) of caffeine for this group. **CONCLUSION:** Our findings suggest lower odds of probable dementia or cognitive impairment in older women whose caffeine consumption was above median for this group and are consistent with the existing literature showing an inverse association between caffeine intake and age-related cognitive impairment.

DuBose SN, Weinstock RS, Beck RW, Peters AL, Aleppo G, **Bergental RM**, Rodriguez H, Largay JF, Massaro EM, Hirsch IB. Hypoglycemia in older adults with type 1 diabetes. *Diabetes Technol Ther.* 2016 Dec;18(12):765-71.

**BACKGROUND:** Hypoglycemia is a major concern in older adults with type 1 diabetes (T1D), and there is limited knowledge in this population. We examined data from 199 adults  $\geq 60$  years of age who participated in a T1D Exchange study assessing factors associated with severe hypoglycemia (SH) in older adults with T1D: 100 with SH in the prior year and 99 with no SH in prior three years (mean age 68; mean diabetes duration 40 years; 47% female; 92% non-Hispanic white). Hypoglycemia was assessed with up to 14 days of blinded continuous glucose monitoring (CGM). Linear regression models were performed to assess the association between biochemical hypoglycemia [defined as percentage of time below specific cutoffs (<70/60/50 mg/dL)] and various factors. **RESULTS:** Overall, participants had CGM values <70 mg/dL for a median of 91 minutes per day. On 53% of days, glucose levels continuously were

<70 mg/dL for  $\geq 20$  minutes. Hypoglycemia was found to be strongly associated with glucose variability ( $r = 0.76$ ;  $P < 0.001$ ). Time spent in hypoglycemia was greater in those who were younger ( $P = 0.004$ ), had shorter diabetes duration ( $P = 0.008$ ), lower HbA1c ( $P < 0.001$ ), and undetectable C-peptide ( $P = 0.001$ ) but did not differ by insulin method, education level, number of blood glucose checks per day, cognition, activities of daily living, or fear of hypoglycemia. INNOVATION: This study adds valuable data on the frequency of hypoglycemia in older adults with T1D. CONCLUSION: Future studies need to focus on how to prevent hypoglycemia in this vulnerable population of older adults with long-standing T1D.

**Dudek AZ.** Management of resistance to EGFR TKI-targeted therapy of lung cancer: lessons in monitoring cancer evolution. *Oncology (Williston Park)*. 2016 Jul;30(7):616-8. [Comment on: *Oncology (Williston Park)*. 2016 Jul;30(7):601-12.]

Duffy J, Weintraub ES, Hambidge SJ, Jackson LA, **Kharbanda EO**, Klein NP, Lee GM, Marcy SM, Nakasato CC, Naleway AL, Omer SB, Vellozzi C, DeStefano F, Vaccine Safety Datalink. Febrile seizure risk after vaccination in children 6 to 23 months. *Pediatrics*. 2016 Jul;138(1):e20160320.

**BACKGROUND AND OBJECTIVE:** An increased risk of febrile seizure (FS) was identified with concomitant administration of trivalent inactivated influenza vaccine (IIV3) and pneumococcal conjugate vaccine (PCV) 13-valent during the 2010-2011 influenza season. Our objective was to determine whether concomitant administration of IIV3 with other vaccines affects the FS risk. **METHODS:** We examined the risk of FS 0 to 1 day postvaccination for all routinely recommended vaccines among children aged 6 through 23 months during a period encompassing five influenza seasons (2006-2007 through 2010-2011). We used a population-based self-controlled risk interval analysis with a control interval of 14 to 20 days postvaccination. We used multivariable regression to control for receipt of concomitant vaccines and test for interaction between vaccines. **RESULTS:** Only PCV 7-valent had an independent FS risk (incidence rate ratio [IRR], 1.98; 95% confidence interval [CI], 1.00 to 3.91). IIV3 had no independent risk (IRR, 0.46; 95% CI, 0.21 to 1.02), but risk was increased when IIV3 was given with either PCV (IRR, 3.50; 95% CI, 1.13 to 10.85) or a diphtheria-tetanus-acellular-pertussis (DTaP)-containing vaccine (IRR, 3.50; 95% CI, 1.52 to 8.07). The maximum estimated absolute excess risk due to concomitant administration of IIV3, PCV, and DTaP-containing vaccines compared with administration on separate days was 30 FS per 100,000 persons vaccinated. **CONCLUSIONS:** The administration of IIV3 on the same day as either PCV or a DTaP-containing vaccine was associated with a greater risk of FS than when IIV3 was given on a separate day. The absolute risk of postvaccination FS with these vaccine combinations was small.

Durham J, Al-Baghdadi M, Baad-Hansen L, Breckons M, Goulet JP, Lobbezoo F, List T, Michelotti A, **Nixdorf DR**, Peck CC, Raphael K, Schiffman E, Steele JG, Story W, Ohrbach R. Self-management programs in temporomandibular disorders: results from an international Delphi process. *J Oral Rehabil*. 2016 Dec;43(12):929-36.

Self-management (SM) programs are commonly used for initial treatment of patients with temporomandibular disorders (TMD). The programs described in the literature, however, vary widely with no consistency in terminology used, components of care or their definitions. The aims of this study were therefore to construct an operationalized definition of self-management appropriate for the treatment of patients with TMD, identify the components of that self-management currently being used and create sufficiently clear and non-overlapping standardized definitions for each of those components. A four-round Delphi process with 11 international experts in the field of TMD was conducted to achieve these aims. In the first round, the participants agreed upon six principal concepts of self-management. In the remaining three rounds, consensus was achieved upon the definition and the six components of self-management. The main components identified and agreed upon by the participants to constitute the core of a SM program for TMD were as follows: education; jaw exercises; massage; thermal therapy; dietary advice and nutrition; and parafunctional behavior identification, monitoring and avoidance. This Delphi process has established the principal concepts of self-management, and a standardized definition has been agreed with the following components for use in clinical practice: education; self-exercise; self-massage; thermal therapy; dietary advice and nutrition; and parafunctional behavior identification, monitoring and avoidance. The consensus-derived concepts, definitions and components of SM offer a starting point for further research to advance the evidence base for, and clinical utility of, TMD SM.

Eaton CB, Pettinger M, Rossouw J, Martin LW, Foraker R, Quddus A, Liu S, Wampler NS, Hank Wu WC, Manson JE, **Margolis KL**, Johnson KC, Allison M, Corbie-Smith G, Rosamond W, Breathett K, Klein L. Risk factors for incident hospitalized heart failure with preserved versus reduced ejection fraction in a multiracial cohort of postmenopausal women. *Circ Heart Fail*. 2016 Oct;9(10):e002883. PMC5111360.

**BACKGROUND:** Heart failure is an important and growing public health problem in women. Risk factors for incident hospitalized heart failure with preserved ejection fraction (HFpEF) compared with heart failure with reduced ejection fraction (HFrEF) in women and differences by race/ethnicity are not well characterized. **METHODS AND RESULTS:** We prospectively evaluated the risk factors for incident hospitalized HFpEF and HFrEF in a multiracial cohort of 42,170 postmenopausal women followed up for a mean of 13.2 years. Cox regression models with time-dependent covariate adjustment were used to define risk factors for HFpEF and HFrEF. Differences by race/ethnicity about incidence rates, baseline risk factors, and their population-attributable risk percentage were analyzed. Risk factors for both HFpEF and HFrEF were as follows: older age, white race, diabetes mellitus, cigarette smoking, and hypertension. Obesity, history of coronary heart disease (other than myocardial infarction), anemia, atrial fibrillation, and more than one comorbidity were associated with HFpEF but not with HFrEF. History of myocardial infarction was associated with HFrEF but not with HFpEF. Obesity was found to be a more potent risk factor for African-American women compared with white women for HFpEF (P for interaction=0.007). For HFpEF, the population-attributable risk percentage was greatest for hypertension (40.9%) followed by obesity (25.8%), with the highest population-attributable risk percentage found in African-Americans for these risk factors. **CONCLUSIONS:** In this multiracial cohort of postmenopausal women, obesity stands out as a significant risk factor for HFpEF, with the strongest association in African-American women.

Ellington DR, Szychowski JM, Malek JM, **Gerten KA**, Burgio KL, Richter HE. Combined tolterodine and vaginal estradiol cream for overactive bladder symptoms after randomized single-therapy treatment. *Female Pelvic Med Reconstr Surg*. 2016 Jul-Aug;22(4):254-60. PMC4919279.

**OBJECTIVES:** The aims of this study were to compare 12-week outcomes of single-therapy tolterodine (Detrol LA) extended release to intravaginal estrogen (Estrace) for overactive bladder (OAB) symptoms and characterize 24- and 52-week outcomes in women undergoing combined therapy. **METHODS:** A single-site randomized, open-label trial in women with urinary frequency, urgency, nocturia, and/or urgency urinary incontinence symptoms was performed. Fifty-eight participants were randomized to oral tolterodine extended release daily or intravaginal estradiol cream nightly for 6 weeks, then twice per week. The primary outcome was change in Overactive Bladder Questionnaire (OAB-q) symptom bother score at 12 weeks. Secondary outcomes included the Health-Related Quality of Life Questionnaire (HRQL) of the OAB-q and a 3-day bladder diary. At 12 weeks, subjects were offered addition of the alternative therapy with follow-up at 24 and 52 weeks. **RESULTS:** There was no difference in symptom bother score improvement between the tolterodine and intravaginal estradiol groups baseline to 12 weeks (20.6 +/- 21.7, -15.8 +/- 23.3, respectively, P = 0.45). There was a significant within-group decrease in symptom bother score from baseline to 12 weeks (tolterodine, P < 0.0001, and intravaginal estradiol, P = 0.002). Secondary outcome improvement within groups was noted in the HRQL total, urinary incontinence episodes, and median voiding frequency (all P <= 0.03) in the tolterodine group and in the HRQL total score (P = 0.03) in the intravaginal estradiol group, with no differences between groups. Combined therapy outcomes at 24 and 52 weeks compared with single therapy at 12 weeks revealed significant improvement in symptom bother score in the intravaginal estradiol + tolterodine group at 24 and 52 weeks (20.0 +/- 23.9, P = 0.008; -16.7 +/- 23.3, P = 0.02, respectively). **CONCLUSIONS:** Significant within-group improvement in OAB-q symptom bother was noted in both the intravaginal estradiol and tolterodine groups for OAB symptoms, with no difference between groups. Greater improvement from 12-week single therapy to 24 and 52 weeks of combined therapy was noted in the group originally assigned to intravaginal estradiol. The role of combined medical therapy for OAB symptoms needs further investigation.

Elwir S, Shaukat A, Mesa H, Colbach C, Dambow P, **Shaw MJ**. Ischemic gastritis: a multicenter case series of a rare clinical entity and a review of the literature [review article]. *J Clin Gastroenterol*. 2016 Oct;50(9):722-6.

**GOALS:** To report a case series of ischemic gastritis and discuss its etiology, management, and associated mortality according to our results and the published English literature. **BACKGROUND:** Ischemic gastritis is rare, given the rich blood supply of the stomach. It has been reported in isolated case reports and small case series. Most cases are vascular in origin and associated with a high mortality. **STUDY:** Pathology databases from three hospitals affiliated with the University of Minnesota Medical School were searched for cases of ischemic gastritis in the last 10 years. Patients' demographics, clinical course, and 1-month and 1-year mortalities were collected from electronic medical records. **RESULTS:** A total of 12 patients were identified (age range 32.1 to 83.2), the largest series reported to date. The presenting symptoms were gastrointestinal bleeding (8), abdominal pain (2), nausea (1), and symptomatic anemia (1). The etiology included postinterventional radiology embolization (2), hemodynamic changes in the setting of celiac axis stenosis (2), vasculitis (1), systemic hypotension (1), and unknown (6). Treatment included steroid therapy, and revascularization by interventional radiology, surgery, or supportive treatment. Thirty-day and 1-year mortalities were 33% and 41%, respectively. **CONCLUSIONS:** Ischemic gastritis is rare but is associated with a high mortality. Evaluation for treatable etiologies should be sought and corrected, if present.

Ensrud KE, Blackwell TL, Cawthon PM, Bauer DC, Fink HA, **Schousboe JT**, Black DM, Orwoll ES, Kado DM, Cauley JA, Mackey DC, Osteoporotic Fractures in Men (MrOS), Study of Osteoporotic Fractures (SOF) Research Groups. Degree of trauma differs for major osteoporotic fracture events in older men versus older women. *J Bone Miner Res.* 2016 Jan;31(1):204-7. PMC4730881.

To examine the degree of trauma in major osteoporotic fractures (MOF) in men versus women, we used data from 15,698 adults aged  $\geq 65$  years enrolled in the Osteoporotic Fractures in Men (MrOS) study (5994 men) and the Study of Osteoporotic Fractures (SOF) (9704 women). Participants were contacted tri-annually to ascertain incident fractures, which were confirmed by radiographic reports and coded according to degree of self-reported trauma. Trauma was classified as low (fall from  $\leq$  standing height; fall on stairs, steps, or curb; minimal trauma other than fall [coughing, turning over]); moderate (collisions with objects during normal activity without associated fall); or high (fall from  $>$  standing height; severe trauma [motor vehicle accident, assault]). MOF included hip, clinical vertebral, wrist, and humerus fractures. Mean fracture follow-up was 9.1 years in SOF and 8.7 years in MrOS. A total of 14.6% of the MOF in men versus 6.3% of the MOF in women were classified as high trauma ( $p < 0.001$ ); men versus women more often experienced fractures resulting from severe trauma as well as from fall  $>$  standing height. High-trauma fractures were significantly more common in men versus women at the hip ( $p = 0.002$ ) and wrist ( $p < 0.001$ ) but not at the spine or humerus. Among participants with MOF, the odds ratio of a fracture related to high-trauma fracture among men versus women was 3.12 (95% confidence interval [CI] 1.70-5.71) after adjustment for traditional risk factors. Findings were similar in analyses limited to participants with hip fractures (odds ratio [OR] = 3.34, 95% CI 1.04-10.67) and those with wrist fracture (OR = 5.68, 95% CI 2.03-15.85). Among community-dwelling older adults, MOF are more likely to be related to high trauma in men than in women. These findings are not explained by sex differences in conventional risk factors and may reflect a greater propensity among men to engage in risky behavior.

Ensrud KE, Blackwell TL, Fink HA, Zhang J, Cauley JA, Cawthon PM, Black DM, Bauer DC, Curtis JR, Orwoll ES, Barrett-Connor E, Kado DM, Marshall LM, Shikany JM, **Schousboe JT**, Osteoporotic Fractures in Men (MrOS) Research Group. What proportion of incident radiographic vertebral fractures in older men is clinically diagnosed and vice versa: a prospective study. *J Bone Miner Res.* 2016 Aug;31(8):1500-3. PMC5065098.

To determine the proportion of incident radiographic vertebral fractures (vfx) also diagnosed as incident clinical vfx in older men and vice-versa, we used data from 4398 community-dwelling men aged  $\geq 65$  years enrolled in the Osteoporotic Fractures in Men (MrOS) study. Incident radiographic vfx were identified by comparing baseline and follow-up lateral thoracic and lumbar spine study films (average 4.6 years between films) using a semiquantitative (SQ) method and defined as a change in SQ reading of  $\geq 1$  at a given vertebral level from baseline to follow-up study radiograph. Participants were contacted triannually to ascertain incident clinical vfx; community spinal imaging studies were obtained, and clinical vfx were confirmed when the study radiologist determined that the community imaging study showed a new deformity of higher grade than was present in the same vertebra on the baseline study radiograph. A

total of 237 incident radiographic vfx were identified in 197 men, whereas 31 men experienced 37 confirmed incident clinical vfx. Of incident radiographic vfx, 13.5% were also clinically diagnosed as incident fractures, with clinical diagnoses made for 16.3% of the radiographic vfx with SQ grade change  $\geq 2$ . Of incident clinical vfx, 86.5% were identified as incident radiographic vfx, most of them with SQ grade change  $\geq 2$ . In summary, less than 15% of incident radiographic vfx were also clinically diagnosed, whereas most incident clinical vfx were identified as severe radiographic vfx. These results in men supplement those previously published for women and suggest a complex relationship between clinical and radiographic vfx in older adults.

Ensrud KE, Lui LY, Paudel ML, **Schousboe JT**, Kats AM, Cauley JA, McCulloch CE, Yaffe K, Cawthon PM, Hillier TA, Taylor BC, Study of Osteoporotic Fractures (SOF) Research Group. Effects of mobility and cognition on risk of mortality in women in late life: A prospective study. *J Gerontol A Biol Sci Med Sci*. 2016 Jun;71(6):759-65. PMC4888393.

**BACKGROUND:** This study examines the effects of mobility and cognition on mortality risk in women late in life. **METHODS:** A prospective study was conducted among 1495 women (mean age 87.6 years) participating in the Study of Osteoporotic Fractures Year 20 examination (2006-2008). Mobility (ascertained by Short Physical Performance Battery [SPPB]) was categorized as poor (SPPB 0-3, n = 312), intermediate (SPPB 4-9, n = 799), or good (SPPB 10-12, n = 384). Cognitive status (adjudicated based on neuropsychological tests) was classified as normal (n = 873), mild cognitive impairment (n = 354), or dementia (n = 268). Deaths (n = 749) were identified from Year 20 through July 31, 2014 (average follow-up 4.9 years). **RESULTS:** There was not strong evidence of an interaction between mobility and cognition for prediction of mortality risk (p interaction term .16). Compared to women with good mobility, mortality risks were increased among women with intermediate mobility (hazard ratio [HR] 1.26, 95% confidence interval [CI] 1.02-1.57) and those with poor mobility (HR 1.64, 95% CI 1.24-2.16) after consideration of cognition and other mortality risk factors. Similarly, mortality risks were higher among women with mild cognitive impairment (HR 1.46, 95% CI 1.21-1.76) and those with dementia (HR 1.88, 95% CI 1.54-2.31) compared to women with normal cognition after consideration of mobility and other mortality risk factors. **CONCLUSIONS:** Among women late in life, 5-year mortality risk was substantially increased among women with deficits in mobility, even after accounting for cognition and traditional prognostic indicators. Similarly, deficits in cognition were associated with increased 5-year mortality despite consideration of mobility and conventional risk factors.

**Ernest EV**, Brazelton TB, Carhart ED, Studnek JR, Tritt PL, Philip GA, **Burnett AM**. Prevalence of unique pediatric pathologies encountered by paramedic students across age groups. *Prehosp Disaster Med*. 2016 Aug;31(4):386-91.

**INTRODUCTION:** Traditionally, emergency medical services (EMS) educators have divided the pediatric population into age groups to assist in targeting their clinical and didactic curriculum. Currently, the accrediting body for paramedic training programs requires student exposure to pediatric patients based entirely on age, without specifying exposure to specific pathologies within each age stratification. Identifying which pathologies are most common within the different pediatric age groups would allow educators to design curriculum targeting the most prevalent pathologies in each age group and incorporate the physiologic and psychological developmental milestones commonly seen at that age. **Hypothesis:** It was hypothesized that there are unique clusterings of pathologies, represented by paramedic student primary impressions that are found in different age groups, which can be used to target provider education. **METHODS:** This is a retrospective review of prospectively collected data documented by paramedic students in the Fisdap (Field Internship Student Data Acquisition Project; Saint Paul, MN, USA) database over a 1-year period. For the purposes of this study, pediatric patients were defined arbitrarily as those between ages 0-16 years. All paramedic student primary impressions recorded in Fisdap for patients aged 0-16 years were abstracted. Primary impression by age was calculated and graphed. The frequency of primary impression was then assessed for significance of trend by age, with an alpha  $\leq .05$  considered significant. **RESULTS:** The following primary impressions showed clinically and statistically significant variability in prevalence among different pediatric age groups: respiratory distress, medical-other, abdominal pain, seizure, overdose/poisoning, behavioral, and cardiac. In patients younger than 13 years old, respiratory and other-medical were the most common two primary

impressions, and both decreased with age. In patients 5-16 years old, the prevalence of abdominal pain and behavioral/psych increased. Bimodal distributions for overdose were seen, with one spike in the toddler and another in the adolescent population. Seizures were most common in the age group associated with febrile seizure. Sepsis was seen most often in the youngest patients, and its prevalence decreased with age. **CONCLUSION:** There are statistically significant variations in the frequency of paramedic student primary impressions as a function of age in the pediatric population. Emphasizing paramedic student exposure to the most common pathologies encountered in each age group, in the context of the psychological and physiological milestones of each age, may improve paramedic student pediatric practice.

Eum S, **Bergsbaken RL, Harvey CL, Warren JB, Rotschafer JC.** Discrepancy in vancomycin AUC/MIC ratio targeted attainment based upon the susceptibility testing in *Staphylococcus aureus*. *Antibiotics (Basel)*. 2016 Sep 27;5(4):E34. PMC5187515.

This study demonstrated a statistically significant difference in vancomycin minimum inhibitory concentration (MIC) for *Staphylococcus aureus* between a common automated system (Vitek 2) and the E-test method in patients with *S. aureus* bloodstream infections. At an area under the serum concentration time curve (AUC) threshold of 400 mg/h/L, we would have reached the current Infectious Diseases Society of America (IDSA)/American Society of Health System Pharmacists (ASHP)/Society of Infectious Diseases Pharmacists (SIDP) guideline-suggested AUC/MIC target in almost 100% of patients while using the Vitek 2 MIC data; however, we could only generate 40% target attainment while using E-test MIC data ( $p < 0.0001$ ). An AUC of 450 mg/h/L or greater was required to achieve 100% target attainment using either Vitek 2 or E-test MIC results.

Fabricant PD, Chin CS, Grawe BM, Dines JS, **Craig EV**, Dines DM. Staged bilateral total shoulder arthroplasty: improved outcomes with less than 6 months between surgeries. *J Shoulder Elbow Surg*. 2016 Nov;25(11):1774-9.

**BACKGROUND:** Research on optimal timing of bilateral anatomic total shoulder arthroplasty (TSA) is lacking. The purpose of this study was to investigate functional outcomes in patients undergoing bilateral anatomic TSA to understand the ideal timing for the second arthroplasty. **METHODS:** Patients who underwent bilateral TSA for osteoarthritis between 2000 and 2012 with a minimum follow-up of 12 months since their most recent surgery were evaluated. Postoperative patient-reported outcomes (University of California-Los Angeles [UCLA] shoulder rating scale, Constant score, and Simple Shoulder Test [SST]), biometrics (strength and range of motion), and a subjective questionnaire were compared for four "interval groups" based on timing between surgeries: <6 months, 6 to 12 months, 12 to 24 months, and >24 months. **RESULTS:** Eighty-two shoulders (41 patients, 70 +/- 9 years old) were analyzed. Mean postoperative UCLA, Constant, and SST scores were 29, 72, and 9 points, respectively; 83% of patients reported satisfaction with both shoulders. Patients with <6 months between surgeries demonstrated significantly better UCLA scores than 6- to 12-month interval patients ( $P = .04$ ), greater Constant scores compared with all other groups ( $P < .001$ ), and greater SST scores compared with 6- to 12-month and 12- to 24-month interval patients ( $P = .002$ ), with no differences in length of follow-up between groups. **CONCLUSION:** In the absence of extrinsic factors, such as convenience, changes in social support structure, or changes in health status, patients may be advised that having the second surgery within 6 months of the first might optimize their postoperative functional outcomes and satisfaction compared with waiting a longer interval between surgeries.

Fabrizius RG, Anderson K, **Hendel-Paterson BR, Kaiser RM, Maalim SM, Walker PF.** Guillain-Barre syndrome associated with Zika virus infection in a traveler returning from Guyana. *Am J Trop Med Hyg*. 2016 Nov 2;95(5):1161-5. PMC5094233.

Zika virus (ZIKV) is a mosquito-borne flavivirus with a significant public health impact highlighted by the ongoing epidemic in the Americas. We describe a 44-year-old male presenting to our tropical medicine center with complaints of fever, headache, joint pain, and rash after recent travel to Guyana. The patient subsequently developed gait imbalance and lower extremity weakness, with clinical examination, cerebrospinal fluid studies, and magnetic resonance imaging of the spine consistent with a diagnosis of

Guillain-Barre syndrome (GBS). ZIKV infection was confirmed via detection of ZIKV RNA in urine by polymerase chain reaction. The patient was treated with intravenous immunoglobulin and experienced near-complete neurologic recovery, reporting ongoing mild paresthesia up to 2 months later. This case highlights the diagnostic challenges posed by ZIKV and underscores the need for clinician awareness of the potential for neurological complications such as GBS with ZIKV infection.

Fink HA, Litwack-Harrison S, Taylor BC, Bauer DC, Orwoll ES, Lee CG, Barrett-Connor E, **Schousboe JT**, Kado DM, Garimella PS, Ensrud KE, Osteoporotic Fractures in Men (MrOS) Study Group. Clinical utility of routine laboratory testing to identify possible secondary causes in older men with osteoporosis: the Osteoporotic Fractures in Men (MrOS) Study. *Osteoporos Int*. 2016 Jan;27(1):331-8. PMC4719570. [Erratum in: *Osteoporos Int*. 2016 Oct 20.]

We investigated the value of routine laboratory testing for identifying underlying causes in older men diagnosed with osteoporosis. Most osteoporotic and nonosteoporotic men had  $\geq 1$  laboratory abnormality. Few individual laboratory abnormalities were more common in osteoporotic men. The benefit of routine laboratory testing in older osteoporotic men may be low. INTRODUCTION: To evaluate the utility of recommended laboratory testing to identify secondary causes in older men with osteoporosis, we examined prevalence of laboratory abnormalities in older men with and without osteoporosis. METHODS: One thousand five hundred seventy-two men aged  $\geq 65$  years in the Osteoporotic Fractures in Men study completed bone mineral density (BMD) testing and a battery of laboratory measures, including serum calcium, phosphorus, alkaline phosphatase, parathyroid hormone (PTH), thyroid-stimulating hormone (TSH), 25-OH vitamin D, total testosterone, spot urine calcium/creatinine ratio, spot urine albumin/creatinine ratio, creatinine-derived estimated glomerular filtration rate, 24-hour urine calcium, and 24-hour urine free cortisol. Using cross-sectional analyses, we calculated prevalence ratios (PRs) and 95% confidence intervals (CI) for the association of any and specific laboratory abnormalities with osteoporosis and the number of men with osteoporosis needed to test to identify one additional laboratory abnormality compared to testing men without osteoporosis. RESULTS: Approximately 60% of men had  $\geq 1$  laboratory abnormality in both men with and without osteoporosis. Among individual tests, only vitamin D insufficiency (PR, 1.13; 95% CI, 1.05-1.22) and high alkaline phosphatase (PR, 3.05; 95% CI, 1.52-6.11) were more likely in men with osteoporosis. Hypercortisolism and hyperthyroidism were uncommon and not significantly more frequent in men with osteoporosis. No osteoporotic men had hypercalciuria. CONCLUSIONS: Though most of these older men had  $\geq 1$  laboratory abnormality, few routinely recommended individual tests were more common in men with osteoporosis than in those without osteoporosis. Possibly excepting vitamin D and alkaline phosphatase, the benefit of routine laboratory testing to identify possible secondary causes in older osteoporotic men appears low. Results may not be generalizable to younger men or to older men in whom history and exam findings raise clinical suspicion for a secondary cause of osteoporosis.

Fleg JL, Evans GW, **Margolis KL**, Barzilay JI, Basile JN, Bigger JT, Cutler JA, Grimm R, Pedley C, Peterson K, Pop-Busui R, **Sperl-Hillen JM**, Cushman WC. Orthostatic hypotension in the ACCORD (Action to Control Cardiovascular Risk in Diabetes) blood pressure trial: prevalence, incidence, and prognostic significance. *Hypertension*. 2016 Oct;68(4):888-95. PMC5016241. Project: A05-113 ACCORD.

Orthostatic hypotension (OH) is associated with hypertension and diabetes mellitus. However, in populations with both hypertension and diabetes mellitus, its prevalence, the effect of intensive versus standard systolic blood pressure (BP) targets on incident OH, and its prognostic significance are unclear. In 4266 participants in the ACCORD (Action to Control Cardiovascular Risk in Diabetes) BP trial, seated BP was measured 3 times, followed by readings every minute for 3 minutes after standing. Orthostatic BP change, calculated as the minimum standing minus the mean seated systolic BP and diastolic BP, was assessed at baseline, 12 months, and 48 months. The relationship between OH and clinical outcomes (total and cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, heart failure hospitalization or death and the primary composite outcome of nonfatal myocardial infarction, nonfatal stroke, and cardiovascular death) was assessed using proportional hazards analysis. Consensus OH, defined by orthostatic decline in systolic BP  $\geq 20$  mm Hg or diastolic BP  $\geq 10$  mm Hg, occurred at  $\geq 1$  time point in 20% of participants. Neither age nor systolic BP treatment target (intensive,  $<120$  mm Hg versus standard,  $<140$  mm Hg) was related to OH incidence. Over a median follow-up of 46.9 months,

OH was associated with increased risk of total death (hazard ratio, 1.61; 95% confidence interval, 1.11-2.36) and heart failure death/hospitalization (hazard ratio, 1.85, 95% confidence interval, 1.17-2.93), but not with the primary outcome or other prespecified outcomes. In patients with type 2 diabetes mellitus and hypertension, OH was common, not associated with intensive versus standard BP treatment goals, and predicted increased mortality and heart failure events.

**Fortuna LA, Pawloski PA, Parker ED, Trower NK, Kottke TE.** Proton pump inhibitor use by aspirin-treated coronary artery disease patients is not associated with increased risk of cardiovascular events. *Eur Heart J Cardiovasc Pharmacother.* 2016 Jan;2(1):13-9. Project: A12-021 PPI/ASA in CAD.

**AIMS:** Daily low-dose aspirin is recommended for prevention of cardiovascular events in patients with coronary artery disease (CAD), and proton pump inhibitors (PPIs) are recommended to prevent or treat aspirin-associated gastrointestinal injury. Previous studies have reported contradictory findings regarding the risk of major adverse cardiovascular events (MACE) in patients who use PPI with aspirin therapy. We sought to examine associations between PPI use and MACE and all-cause mortality in aspirin-treated CAD patients. **METHODS AND RESULTS:** Using electronic medical record and healthcare claims data, we conducted a retrospective population-based cohort study to examine patients 40 years or older with a diagnosis of CAD and documented aspirin use. Patients taking clopidogrel or other antiplatelet or anticoagulant agents were excluded. Risk of MACE and all-cause mortality associated with PPI use vs. no PPI use was analyzed by Cox proportional hazards regression with standard covariate adjustment. Of the 2011 patients included in the study, 295 (14.7%) used a PPI. During a mean follow-up of 3.1 years, 294 patients [63 PPI users (21.4%) and 231 PPI non-users (13.5%)] experienced a MACE. In the adjusted model, the risk of MACE with PPI treatment was no different than without PPI treatment [hazard ratio (HR) 1.32 (95% confidence interval 0.8–2.4)]. Likewise, there was no difference between groups for risk of all-cause mortality; 201 patients [47 PPI users (15.9%) and 154 PPI non-users (9.0%)] died of any cause [HR 1.33 (0.9–1.9)]. Results were validated by robust propensity score-matching methods (n = 574). **CONCLUSIONS:** No evidence was found that PPI use is associated with increased risk of MACE or all-cause mortality in aspirin-treated CAD patients.

Foster NC, Miller KM, Tamborlane WV, **Bergental RM**, Beck RW, Network TDEC. Continuous glucose monitoring in patients with type 1 diabetes using insulin injections [editorial]. *Diabetes Care.* 2016 Jun;39(6):e81-82. PMC5317243.

Fox CK, Kaizer AM, Rudser KD, Nathan BM, Gross AC, Sunni M, Abuzzahab JM, **Schwartz BL**, Kumar S, Petryk A, Billington CJ, Ryder JR, Kelly AS. Meal replacements followed by topiramate for the treatment of adolescent severe obesity: A pilot randomized controlled trial. *Obesity (Silver Spring).* 2016 Dec;24(12):2553-61. PMC5125846.

**OBJECTIVE:** To assess the safety and efficacy of short-term meal replacement therapy followed by topiramate for body mass index (BMI) reduction in adolescents with severe obesity. **METHODS:** Adolescents (ages 12-18 years) with severe obesity (BMI  $\geq 1.2$  times the 95th percentile or BMI  $\geq 35$  kg/m<sup>2</sup>) were recruited for this double-blind, randomized, placebo-controlled trial. Participants completed 4 weeks of meal replacement therapy followed by randomization (1:1) to either 24 weeks of topiramate 75 mg/day or placebo. Mean changes were compared between groups. **RESULTS:** Thirty adolescents (mean age 15.2 +/- 1.7 years, mean BMI 40.3 +/- 4.6 kg/m<sup>2</sup>) completed the meal replacement phase and were randomized; 21 completed the study. The difference in mean percent change in BMI between the topiramate and placebo groups was not significant (-1.9%; 95% CI: -5.2% to +1.5%; P = 0.291). Significant improvements in visceral fat and very-low-density lipoprotein cholesterol were observed in the topiramate compared with the placebo group. There were no concerning changes in neurocognitive function or bone health. **CONCLUSIONS:** In this pilot study, 4 weeks of meal replacement therapy followed by 24 weeks of low-dose topiramate compared with meal replacement therapy alone did not result in significant BMI reduction for adolescents with severe obesity.

**Frail CK**, Garza OW, Haas AL. Experience with technology-supported transitions of care to improve medication use. *J Am Pharm Assoc (2003).* 2016 Sep-Oct;56(5):568-72.

**OBJECTIVE:** To describe an innovative community pharmacy-based pilot program using technology to support transitions of care for patients living in rural areas. **SETTING:** This service occurred through a partnership between one independent community pharmacy organization with five locations in Ohio and Indiana and one 92-bed general medical and surgical county hospital during May 2014 to May 2015. **PRACTICE DESCRIPTION AND INNOVATION:** Community pharmacists worked with patients immediately following discharge to reconcile their medications and make recommendations to optimize therapy. The pharmacy packaged their new medication regimen in clear, individual dose adherence packaging. Medications were delivered by a staff driver to the patient's home within 72 hours of discharge. Patients consulted with the pharmacist by videoconference using a computer tablet device. Patients received telephone follow-up shortly before their medication supply was to run out, and additionally as needed on an individual basis. **EVALUATION:** Self-reported hospital readmissions were collected at 30 and 180 days after enrollment. Patient satisfaction data were also collected at 30 and 180 days using a tool modified from the five-item Transition Measure (15-item Care Transitions Measure). **RESULTS:** Eighteen patients participated in the evaluation of the pilot. Three patients were readmitted within 30 days (17%), and two additional patients were readmitted within 180 days (11%). Patient satisfaction results were positive overall. Lessons learned relate to establishing partnerships, logistics, and patient engagement. These lessons will assist future community pharmacies in implementing a transition of care service. **CONCLUSION:** This pharmacist care model may offer a solution to increase access to pharmacy services for patients in rural areas during a critical transition in care.

Frank T, Osterhoff G, Sprague S, Garibaldi A, Bhandari M, Slobogean GP, Faith Investigators, **Regions Hospital Investigators - Switzer JA, Cole PA, Anderson SA, Lafferty PM, Li M, Ly TV, Marston SB, Foley AL, Vang A, Wright DM.** The Radiographic Union Score for Hip (RUSH) identifies radiographic nonunion of femoral neck fractures. *Clin Orthop Relat Res.* 2016 Jun;474(6):1396-404.

**BACKGROUND:** The Radiographic Union Score for Hip (RUSH) is a previously validated outcome instrument designed to improve intra- and inter-observer reliability when describing the radiographic healing of femoral neck fractures. The ability to identify fractures that have not healed is important for defining nonunion in clinical trials and predicting which patients will likely require additional surgery to promote fracture healing. We sought to investigate the utility of the RUSH score to define femoral neck fracture nonunion. **QUESTIONS/PURPOSES:** (1) What RUSH score threshold yields at least 98% specificity to diagnose nonunion at 6 months postinjury? (2) Using the threshold identified, are patients below this threshold at greater risk of reoperation for nonunion and for other indications? **METHODS:** A representative sample of 250 out of a cohort of 725 patients with adequate 6-month hip radiographs was analyzed from a multinational elderly hip fracture trial (FAITH). All patients had a femoral neck fracture and were treated with either multiple cancellous screws or a sliding hip screw. Two reviewers independently determined the RUSH score based on the 6-month postinjury radiographs, and interrater reliability was assessed with the interclass correlation coefficient (ICC). There was substantial reliability between the reviewers assigning the RUSH scores (ICC, 0.81; 95% confidence interval [CI], 0.76-0.85). The RUSH score is a checklist-based system that quantifies four measures of healing: cortical bridging, cortical fracture disappearance, trabecular consolidation, and trabecular fracture disappearance. Fracture healing was determined by two independent methods: (1) concurrently by the treating surgeon using both clinical and radiographic assessments as per routine clinical care; and (2) retrospectively by a central adjudication committee using complete obliteration of the fracture line on radiographs alone. Receiver operating characteristic tables were used to define a RUSH threshold score that was >98% specific for fracture nonunion. **RESULTS:** A threshold score of <18 was associated with a 100% specificity (95% CI, 97%-100%) and a positive predictive value of 100% (95% CI, 73%-100%) for radiographic nonunion. In contrast, using the fracture healing assessments of the treating surgeons failed to identify a useful discriminatory nonunion threshold, and the highest positive predictive value was 43%. With respect to complications, patients with RUSH scores below 18 had greater risk of undergoing reoperation for nonunion (reoperation when < 18: six of 13 [46%]; reoperation when  $\geq$  18: 11 of 237 [54%]; relative risk [RR], 9.9 [95% CI, 4.4-22.7];  $p < 0.001$ ) and for all indications (reoperation when <18: eight of 13 [62%]; reoperation when  $\geq$  18: 54 of 237 [38%]; RR, 2.7 [95% CI, 1.7-4.4];  $p = 0.004$ ). **CONCLUSIONS:** The 6-month RUSH score is a reliable method for assessing radiographic healing. Our results highlight the discordance between radiographic determinations and clinician assessments of fracture healing and stress the need for clinical data to be incorporated in research studies evaluating fracture healing.

French SA, **Sherwood NE**, **JaKa MM**, Haapala JL, Ebbeling CB, Ludwig DS. Physical changes in the home environment to reduce television viewing and sugar-sweetened beverage consumption among 5- to 12-year-old children: a randomized pilot study. *Pediatr Obes*. 2016 Oct;11(5):e12-15. PMC4833674. Project: A10-083.

This study evaluated the feasibility of a home-based intervention to reduce sugar-sweetened beverage intake and television viewing among children. Lower-income parents of overweight children aged 5-12 years (n = 40) were randomized to a home environment intervention to reduce television viewing with locking devices and displace availability of sugar-sweetened beverages with home delivery of non-caloric beverages (n = 25) or to a no-intervention control group (n = 15) for 6 months. Data were collected at baseline and 6 months. After 6 months, television viewing hours per day were significantly lower in the intervention group compared with the control group (1.7 [SE = .02] vs. 2.6 [SE = .25] hours/day, respectively, P < .01). Sugar-sweetened beverage intake was marginally significantly lower among intervention group compared to control group children (0.21 [SE = .09] vs. 0.45 [SE = .10], respectively, P < .09). Body mass index (BMI) z-score was not significantly lower among intervention compared to control children. Among a lower-income sample of children, a home-based intervention reduced television viewing but not sugar-sweetened beverage intake or BMI z-score.

**Frey WH, 2nd**. Intranasal drug delivery bypasses the blood–brain barrier *Neurol Rev*. 2016 Apr;24(4):1, 40-1.

The nasal mucosa in the upper third of the nasal cavity provides a direct pathway from the external environment to the brain and, according to William H. Frey II, PhD, that pathway can be used to noninvasively deliver therapeutics into the brain. This pathway effectively bypasses the blood–brain barrier and avoids the systemic exposure and side effects associated with therapeutics that enter the bloodstream. At the 19th Annual Meeting of the North American Neuromodulation Society (Las Vegas), Dr. Frey presented an in-depth look at intranasal delivery of therapeutics to the brain.

Frich JC, Rae D, Roxburgh R, Miedzybrodzka ZH, Edmondson M, Pope EB, Goodman L, Haddad MS, Giuliano J, Nelson EC, Guttman M, **Nance MA**. Health care delivery practices in Huntington's disease specialty clinics: an international survey. *J Huntingtons Dis*. 2016 Jun 27;5(2):207-13. PMC4942722.

**BACKGROUND:** Little is known about the organization of clinical services for Huntington's disease (HD). **OBJECTIVE:** To describe how health care services are organized and delivered in HD clinics taking part in or eligible for the Enroll-HD study. **METHODS:** In 2014, a 69-item survey was administered to sites taking part in or eligible for the Enroll-HD study. **RESULTS:** Of 231 sites surveyed, 121 (52.2%) sites in Europe, North America, Latin America, and Oceania responded. Most sites in the sample serve large populations, with 61.1% serving more than 1.5 million people and another 33% serving >500,000. Almost all (86.0%) centers see patients from outside their region. Most centers (59.7%) follow 50-199 patients, 21.9% care for more than 200. Most centers provide care in all stages of HD, and nearly all review pre-symptomatic cases. Multidisciplinary case reviews are offered in 54.5% of sites, with outreach clinics offered by 48.1%. Videoconferencing and telemedicine are used by 23.6%. Separate consultations for caregivers are offered in more than half of the centers. Most centers (70.4%) report following published guidelines or local care pathways for HD. **CONCLUSIONS:** Most centers serve a large population and use a multidisciplinary approach. The survey gives insight into factors underpinning HD service delivery globally. There is a need for more in-depth studies of clinical practice to understand how services are organized and how such features may be associated with quality of care.

**Fricton JR**. Myofascial pain: mechanisms to management [review article]. *Oral Maxillofac Surg Clin North Am*. 2016 Aug;28(3):289-311.

More than 100 million adults in the United States have chronic pain conditions, costing more than \$500 billion annually in medical care and lost productivity. They are the most common reason for seeking health care, for disability and addiction, and the highest driver of health care costs. Myofascial pain is the most common condition causing chronic pain and can be diagnosed through identifying clinical characteristics and muscle palpation. Management is focused on integrating patient training in changing

lifestyle risk factors with evidence-based treatment. Understanding the cause, diagnosis, and management of myopain conditions will help prevent the impact of chronic pain.

**Fricton JR**, Eli B, Gupta A, **Johnson NJ**. Preventing chronic pain after acute jaw sprain or strain. *J Am Dent Assoc*. 2016 Dec;147(12):979-86.

Chronic pain conditions, including temporomandibular disorders, constitute the primary reason for seeking health care, the most common reason for disability and opioid addiction, and the highest driver of health care costs. For this reason, the Institute of Medicine (now known as the National Academy of Medicine) and the Interagency Pain Research Coordinating Committee have made efforts to address this problem and made preventing chronic pain among their highest priorities for health care. From a dental perspective, acute jaw joint and muscle sprain and strain (JAMSS), often resulting from dental and orofacial trauma, can lead to chronic orofacial pain, temporomandibular disorders, and headache. All dental health care professionals need to know how to provide prompt and appropriate treatment of jaw JAMSS to prevent this progression. Three patients treated by the first author (J.F.) illustrate the dilemma that acute jaw JAMSS can present to the dental health care professional.

Fulton JE, Carlson SA, Ainsworth BE, Berrigan D, Carlson C, Dorn JM, Heath GW, Kohl HW, 3rd, Lee IM, Lee SM, Masse LC, Morrow JR, Jr., Gabriel KP, Pivarnik JM, **Pronk NP**, Rodgers AB, Saelens BE, Sallis JF, Troiano RP, Tudor-Locke C, Wendel A. Strategic priorities for physical activity surveillance in the United States. *Med Sci Sports Exerc*. 2016 Oct;48(10):2057-69.

**PURPOSE:** Develop strategic priorities to guide future physical activity surveillance in the United States. **METHODS:** The Centers for Disease Control and Prevention and the American College of Sports Medicine convened a scientific roundtable of physical activity and measurement experts. Participants summarized the current state of aerobic physical activity surveillance for adults, focusing on practice and research needs in three areas: 1) behavior, 2) human movement, and 3) community supports. Needs and challenges for each area were identified. At the conclusion of the meeting, experts identified one overarching strategy and five strategic priorities to guide future surveillance. **RESULTS:** The identified overarching strategy was to develop a national plan for physical activity surveillance similar to the U.S. National Physical Activity Plan for promotion. The purpose of the plan would be to enhance coordination and collaboration within and between sectors, such as transportation and public health, and to address specific strategic priorities identified at the roundtable. These strategic priorities were used to 1) identify and prioritize physical activity constructs; 2) assess the psychometric properties of instruments for physical activity surveillance; 3) provide training and technical assistance for those collecting, analyzing, or interpreting surveillance data; 4) explore accessing data from alternative sources; and 5) improve communication, translation, and dissemination about estimates of physical activity from surveillance systems. **CONCLUSION:** This roundtable provided strategic priorities for physical activity surveillance in the United States. A first step is to develop a national plan for physical activity surveillance that would provide an operating framework from which to execute these priorities.

Gandhi R, **Narang PD**, Lippmann SB. Are musical and auditory hallucinations related [editorial]? *Psychosomatics*. 2016 Jul-Aug;57(4):442-3.

Ganesan C, Obulareddy SJ, Fischer JH, Antonysamy MA, Jha G, Bliss RL, **Dudek AZ**. Phase I study of pazopanib and ixabepilone in patients with solid tumors. *Am J Clin Oncol*. 2016 Jun;39(3):280-7.

**OBJECTIVES:** Pazopanib is a tyrosine kinase inhibitor predominantly acting on tumor endothelium, and ixabepilone is a semisynthetic analog of epothilone B that promotes microtubule stabilization inducing tumor and tumor endothelial cell apoptosis. The purpose of this study was to determine the optimal tolerated dose (OTD) of the combination of pazopanib and ixabepilone for the treatment of metastatic, previously treated solid tumors. **METHODS:** Dose escalation started at 32 mg/m of ixabepilone and increased to 40 mg/m. Pazopanib was administered initially at 400 mg and escalated at 200 mg increments up to 800 mg. Pharmacokinetic analysis assessed the effect of ixabepilone on pazopanib metabolism. Correlative studies evaluated changes in angiogenic cytokines. **RESULTS:** Thirty-one patients (20 male and 11 female; median age, 58 years) with ECOG PS of zero or one were enrolled.

Three patients had dose-limiting toxicities (fatigue and neutropenia) at dose level 2 (ixabepilone 40 mg/m and pazopanib 400 mg); therefore, the ixabepilone dose was decreased (32 mg/m) before escalating pazopanib to levels 3 and 4. One patient had a dose-limiting toxicity (thrombocytopenia) at dose level 4 (ixabepilone 32 mg/m and pazopanib 800 mg). Dose level 3 was determined to be the OTD (pazopanib 600 mg and ixabepilone 32 mg/m). The most common toxicities were cytopenias. A significant decrease in the level of sE-selectin was associated with improvement in progression-free survival. **CONCLUSIONS:** The OTD for combination of pazopanib and ixabepilone was established. There was no impact of ixabepilone on pazopanib pharmacokinetics. The relationship between sE-selectin and progression-free survival warrants further investigation.

Garcia S, Drexel T, Bekwelem W, Raveendran G, Caldwell E, Hodgson L, Wang Q, Adabag S, Mahoney BD, **Frascone RJ**, Helmer G, Lick C, Conterato M, Baran K, Bart B, Bachour F, Roh S, Panetta C, Stark R, Haugland M, Mooney M, Wesley K, Yannopoulos D. Early access to the cardiac catheterization laboratory for patients resuscitated from cardiac arrest due to a shockable rhythm: The Minnesota Resuscitation Consortium Twin Cities Unified Protocol. *J Am Heart Assoc.* 2016 Jan;5(1):pii e002670. PMC4859384.

**BACKGROUND:** In 2013, the Minnesota Resuscitation Consortium developed an organized approach for the management of patients resuscitated from shockable rhythms to gain early access to a cardiac catheterization laboratory (CCL) in the metro area of Minneapolis-St. Paul. **METHODS AND RESULTS:** Eleven hospitals with 24/7 percutaneous coronary intervention capabilities agreed to provide early (within 6 hours of arrival at the emergency department) access to the CCL with the intention to perform coronary revascularization for outpatients who were successfully resuscitated from ventricular fibrillation/ventricular tachycardia arrest. Other inclusion criteria were age >18 and <76 and presumed cardiac etiology. Patients with other rhythms, known do not resuscitate/do not intubate, noncardiac etiology, significant bleeding, and terminal disease were excluded. The primary outcome was survival to hospital discharge with favorable neurological outcome. Patients (315 out of 331) who were resuscitated from VT/VF and transferred alive to the emergency department had complete medical records. Of those, 231 (73.3%) were taken to the CCL per the Minnesota Resuscitation Consortium protocol, while 84 (26.6%) were not taken to the CCL (protocol deviations). Overall, 197 (63%) patients survived to hospital discharge with good neurological outcome (cerebral performance category of one or two). Of the patients who followed the Minnesota Resuscitation Consortium protocol, 121 (52%) underwent percutaneous coronary intervention, and 15 (7%) underwent coronary artery bypass graft. In this group, 151 (65%) survived with good neurological outcome, whereas in the group that did not follow the Minnesota Resuscitation Consortium protocol, 46 (55%) survived with good neurological outcome (adjusted odds ratio: 1.99; [1.07-3.72], P=0.03). **CONCLUSIONS:** Early access to the CCL after cardiac arrest due to a shockable rhythm in a selected group of patients is feasible in a large metropolitan area in the United States and is associated with a 65% survival rate to hospital discharge with a good neurological outcome.

Garcia S, Drexel T, Bekwelem W, Raveendran G, Caldwell E, Hodgson L, Wang Q, Adabag S, Mahoney BD, **Frascone RJ**, Helmer G, Lick C, Conterato M, Baran K, Bart B, Bachour F, Roh S, Panetta C, Stark R, Haugland M, Mooney MR, Wesley K, Yannopoulos D. Early access to the cardiac catheterization laboratory for patients resuscitated from cardiac arrest due to a shockable rhythm: The Minnesota Resuscitation Consortium Twin Cities Unified Protocol. *J Am Heart Assoc.* 2016 Jan 7;5(1):e002670. PMC4859384.

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Gattinoni L, **Marini JJ**, Pesenti A, Quintel M, Mancebo J, Brochard L. The "baby lung" became an adult [review article]. *Intensive Care Med.* 2016 May;42(5):663-73.

The baby lung was originally defined as the fraction of lung parenchyma that, in acute respiratory distress syndrome (ARDS), still maintains normal inflation. Its size obviously depends on ARDS severity and relates to the compliance of the respiratory system.  $CO_2$  clearance and blood oxygenation primarily occur within the baby lung. While the specific compliance suggests the intrinsic mechanical characteristics to be nearly normal, evidence from positron emission tomography suggests that at least a part of the well-aerated baby lung is inflamed. The baby lung is more a functional concept than an anatomical one; in fact, in the prone position, the baby lung "shifts" from the ventral lung regions toward the dorsal lung regions while usually increasing its size. This change is associated with better gas exchange, more homogeneously distributed trans-pulmonary forces, and a survival advantage. Positive end expiratory pressure also increases the baby lung size, both allowing better inflation of already open units and adding new pulmonary units. Viewed as surrogates of stress and strain, tidal volume and plateau pressures are better tailored to baby lung size than to ideal body weight. Although less information is available for the baby lung during spontaneous breathing efforts, the general principles regulating the safety of ventilation are also applicable under these conditions.

**Gertner E, Rosenbloom MH.** Susac syndrome with prominent dermatological findings and a prompt response to intravenous immunoglobulin, steroids, and rituximab: a case report. *J Med Case Rep.* 2016 May 27;10(1):137. PMC4884366.

**BACKGROUND:** Susac syndrome (retinocochleocerebral vasculopathy) is an autoimmune endotheliopathy affecting the precapillary arterioles of the brain, retina, and inner ear. It presents with encephalopathy, branch retinal artery occlusions, and hearing loss. The condition is often underrecognized because the clinical symptoms may present at different times, and physicians may be unfamiliar with the syndrome. Peripheral findings would be helpful in early diagnosis. There are numerous treatment regimens proposed, with varying effectiveness. **CASE PRESENTATION:** We report the case of a 22-year-old Caucasian man in whom there were prominent skin findings, including livedo reticularis and a micropapular eruption that responded promptly to treatment, suggesting that skin involvement may facilitate earlier diagnosis. Rituximab has occasionally been used in more refractory disease. We observed a prompt response to the combination of intravenous immunoglobulin, corticosteroids, and rituximab instituted immediately after diagnosis. **CONCLUSIONS:** A careful search for dermatological manifestations may help with earlier diagnosis. Skin findings may be another marker of endothelial cell involvement. Early use of rituximab as part of the therapeutic regimen may be warranted.

Ginsberg RL, Tinker L, Liu J, Gray J, Sangi-Haghpeykar H, Manson JE, **Margolis KL.** Prevalence and correlates of body image dissatisfaction in postmenopausal women. *Women Health.* 2016 Jan;56(1):23-47.

Dissatisfaction with one's body image is widespread and can have serious health consequences; however, research about its prevalence and correlates in older women is limited. We analyzed data from 75,256 women participating in the Women's Health Initiative Observational Study, a longitudinal study of postmenopausal women's health. Measures used in the study were collected at baseline and/or the third

year of follow-up between 1993 and 2002. Most participants (83%) in this study were dissatisfied with their bodies because they perceived themselves as heavier than their ideal. Overall, the multiple and significant correlates of body image dissatisfaction explained 36.2% of the variance in the body image dissatisfaction score, with body mass index (BMI) and change in BMI being the two most important contributors to explaining the variance. The results of this study suggest that future research should focus on the utility of interventions to reduce dissatisfaction with body image in postmenopausal women that target either maintenance of a lower BMI through diet and exercise and/or body acceptance. Further, future research should aim to identify factors in addition to body size that drive body image dissatisfaction.

**Gonzaga TA, Jenabzadeh K, Anderson CP, Mohr WJ, Endorf FW, Ahrenholz DH.** Use of intra-arterial thrombolytic therapy for acute treatment of frostbite in 62 patients with review of thrombolytic therapy in frostbite. *J Burn Care Res.* 2016 Jul-Aug;37(4):e323-34. PMC4933583.

Amputations are common after severe frostbite injuries, often mediated by postinjury arterial thrombosis. Since 1994, the authors have performed angiography to identify perfusion deficits in severely frostbitten digits and treated these lesions with intraarterial infusion of thrombolytic agents, usually combined with papaverine to reduce vasospasm. A retrospective review was performed of patients admitted to the regional burn center with frostbite injury from 1994 to 2007. Patients with severe frostbite, without contraindications to thrombolytic therapy, underwent diagnostic angiography of the affected extremities. Limbs with perfusion defects received intraarterial thrombolytic therapy according to protocol, and the response was documented. Delayed amputation was performed for mummified digits. Angiogram results and amputation rates were tabulated. In this 14-year review, 114 patients were admitted for frostbite injuries. There was a male predominance (84%), and the mean age was 40.4 years. Of this group, 69 patients with severe frostbite underwent angiography; 66 were treated with intraarterial thrombolytic therapy. Four treated were excluded due to incomplete data. In the remaining 62 patients, angiography identified 472 digits with frostbite injury and impaired arterial perfusion. At the termination of thrombolytic infusion, a completion angiogram was performed. Partial or complete amputations were performed on only four of 198 digits (2.0%) with distal vascular blush, and in 71 of 75 digits (94.7%) with no improvement. Amputations occurred in 73 of 199 digits (36.7%) with partially restored flow. Overall complete digit salvage rate was 68.6%. Angiography after severe frostbite is a sensitive method to detect impaired arterial blood flow and permits catheter-directed treatment with thrombolytic agents. Improved perfusion after such treatment decreases late amputations following frostbite injury.

Gosselin S, Hoegberg LC, Hoffman RS, Graudins A, Stork CM, Thomas SH, **Stellpflug SJ**, Hayes BD, Levine MD, Morris M, Nesbitt-Miller A, Turgeon AF, Bailey B, Calello DP, Chuang R, Bania TC, Megarbane B, Bhalla A, Lavergne V. Evidence-based recommendations on the use of intravenous lipid emulsion therapy in poisoning [review article]. *Clin Toxicol (Phila).* 2016 Dec;54(10):899-923.

**BACKGROUND:** Although intravenous lipid emulsion (ILE) was first used to treat life-threatening local anesthetic (LA) toxicity, its use has expanded to include both non-local anesthetic (non-LA) poisoning and less severe manifestations of toxicity. A collaborative workgroup appraised the literature and provides evidence-based recommendations for the use of ILE in poisoning. **METHODS:** Following a systematic review of the literature, data were summarized in four publications: LA and non-LA poisoning efficacy, adverse effects, and analytical interferences. Twenty-two toxins or toxin categories and three clinical situations were selected for voting. Voting statements were proposed using a predetermined format. A two-round modified Delphi method was used to reach consensus on the voting statements. Disagreement was quantified using the RAND/UCLA Appropriateness Method. **RESULTS:** For the management of cardiac arrest, we recommend using ILE with bupivacaine toxicity, while our recommendations are neutral regarding its use for all other toxins. For the management of life-threatening toxicity, (1) as first-line therapy, we suggest not to use ILE with toxicity from amitriptyline, non-lipid soluble beta receptor antagonists, bupropion, calcium channel blockers, cocaine, diphenhydramine, lamotrigine, malathion but are neutral for other toxins, (2) as part of treatment modalities, we suggest using ILE in bupivacaine toxicity if other therapies fail but are neutral for other toxins, (3) if other therapies fail, we recommend ILE for bupivacaine toxicity, and we suggest using ILE for toxicity due to other LAs, amitriptyline, and bupropion, but our recommendations are neutral for all other toxins. In the treatment of non-life-

threatening toxicity, recommendations are variable according to the balance of expected risks and benefits for each toxin. For LA-toxicity, we suggest the use of Intralipid(R) 20%, as it is the formulation the most often reported. There is no evidence to support a recommendation for the best formulation of ILE for non-LAs. The voting panel is neutral regarding ILE dosing and infusion duration due to insufficient data for non-LAs. All recommendations were based on a very low quality of evidence. **CONCLUSION:** Clinical recommendations regarding the use of ILE in poisoning were only possible in a small number of scenarios and were based mainly on a very low quality of evidence, balance of expected risks and benefits, adverse effects, laboratory interferences, and related costs and resources. The workgroup emphasizes that dose-finding and controlled studies reflecting human poisoning scenarios are required to advance knowledge of limitations, indications, adverse effects, effectiveness, and best regimen for ILE treatment.

Gourlay ML, Overman RA, Fine JP, Filteau G, Cawthon PM, **Schousboe JT**, Orwoll ES, Wilt TJ, Nguyen TV, Lane NE, Szulc P, Taylor BC, Dam TT, Nielson CM, Cauley JA, Barrett-Connor E, Fink HA, Lapidus JA, Kado DM, Diem SJ, Ensrud KE, Osteoporotic Fractures in Men (MrOS) Research Group. Time to osteoporosis and major fracture in older men: The MrOS Study. *Am J Prev Med.* 2016 Jun;50(6):727-36. PMC4875888.

**INTRODUCTION:** For older men who undergo bone mineral density (BMD) testing, the optimal osteoporosis screening schedule is unknown. Time-to-disease estimates are necessary to inform screening intervals. **METHODS:** A prospective cohort study of 5415 community-dwelling men aged  $\geq 65$  years without hip or clinical vertebral fracture or antifracture treatment at baseline was conducted. Participants had concurrent BMD and fracture follow-up between 2000 and 2009 and additional fracture follow-up through 2014. Data were analyzed in 2015. Time to incident osteoporosis (lowest T-score  $\leq -2.50$ ) for men without baseline osteoporosis and time to hip or clinical vertebral fracture or major osteoporotic fracture for men without or with baseline osteoporosis were estimated. **RESULTS:** Nine men (0.2%) with BMD T-scores  $> -1.50$  at baseline developed osteoporosis during follow-up. The adjusted estimated time for 10% to develop osteoporosis was 8.5 (95% CI=6.7, 10.9) years for those with moderate osteopenia (lowest T-score, -1.50 to -1.99) and 2.7 (95% CI=2.1, 3.4) years for those with advanced osteopenia (lowest T-score, -2.00 to -2.49) at baseline. The adjusted times for 3% to develop a first hip or clinical vertebral fracture ranged from 7.1 (95% CI=6.0, 8.3) years in men with baseline T-scores  $> -1.50$  to 1.7 (95% CI=1.0, 3.1) years in men with baseline osteoporosis. **CONCLUSIONS:** Men aged 65 years and older with femoral neck, total hip, and lumbar spine BMD T-scores  $> -1.50$  on a first BMD test were very unlikely to develop osteoporosis during follow-up. Additional BMD testing may be most informative in older men with T-scores  $\leq -1.50$ .

Goveas JS, Rapp SR, Hogan PE, Driscoll I, Tindle HA, Smith JC, Kesler SR, Zaslavsky O, **Rossum RC**, Ockene JK, Yaffe K, Manson JE, Resnick SM, Espeland MA. Predictors of optimal cognitive aging in 80+ women: The Women's Health Initiative Memory Study. *J Gerontol A Biol Sci Med Sci.* 2016 Mar;71(Suppl 1):S62-71. PMC4759985.

**BACKGROUND:** Independent predictors of preserved cognitive functioning and factors associated with maintaining high preserved cognitive function in women  $\geq 80$  years remain elusive. **METHODS:** Two thousand two hundred twenty-eight women with a mean age of 85 years who participated in the Women's Health Initiative Memory Study were classified as cognitively normal ( $n = 1,905$ , 85.5%), mild cognitive impairment ( $n = 88$ , 3.9%), dementia ( $n = 121$ , 5.4%) or other cognitive impairment ( $n = 114$ ,  $n = 5.1\%$ ) by central adjudication. Global cognitive functioning was assessed using telephone interview for cognitive status-modified in those women who did not meet cognitive impairment criteria. Differences between women grouped by cognitive status with respect to each potential risk factor were assessed using chi-squared tests and t-tests. Backward stepwise logistic regression was used to select factors that were independently associated with cognitive status. **RESULTS:** Factors associated with preserved cognitive functioning were younger age, higher education, family incomes, being non-Hispanic white, better emotional wellbeing, fewer depressive symptoms, more insomnia complaints, being free of diabetes, and not carrying the apolipoprotein E-epsilon 4 allele. Cognitively, normal women who demonstrated sustained high preserved cognition were younger, more educated, and endorsed better self-reported general health, emotional wellbeing, and higher physical functioning. **CONCLUSIONS:** Addressing

sociodemographic disparities such as income inequality and targeting interventions to improve depressive symptoms and vascular risk factors, including diabetes, may play an important role in preserving cognition among women who survive to 80 years of age. Person-centered approaches that combine interventions to improve physical, cognitive, and psychosocial functioning may promote maintenance of high preserved cognitive health in the oldest-old.

**Grall KH, Panchal AR, Chuffe E, Stoneking LR.** Feasibility of Spanish-language acquisition for acute medical care providers: novel curriculum for emergency medicine residencies. *Adv Med Educ Pract.* 2016 Feb;8(7):81-6. PMC4767065.

**INTRODUCTION:** Language and cultural barriers are detriments to quality health care. In acute medical settings, these barriers are more pronounced, which can lead to poor patient outcomes. **MATERIALS AND METHODS:** We implemented a longitudinal Spanish-language immersion curriculum for emergency medicine (EM) resident physicians. This curriculum includes language and cultural instruction and is integrated into the weekly EM didactic conference, longitudinal over the entire 3-year residency program. Language proficiency was assessed at baseline and annually on the Interagency Language Roundtable (ILR) scale via an oral exam conducted by the same trained examiner each time. The objective of the curriculum was improvement of resident language skills to ILR level 1+ by year 3. Significance was evaluated through repeated-measures analysis of variance. **RESULTS:** The curriculum was launched in July 2010 and followed through June 2012 (n=16). After 1 year, 38% had improved over one ILR level, with 50% achieving ILR 1+ or above. After year 2, 100% had improved over one level, with 90% achieving the objective level of ILR 1+. Mean ILR improved significantly from baseline, year 1, and year 2 (F=55, df =1; P<0.001). **CONCLUSION:** Implementation of a longitudinal, integrated Spanish-immersion curriculum is feasible and improves language skills in EM residents. The curriculum improved EM-resident language proficiency above the goal in just 2 years. Further studies will focus on the effect of language acquisition on patient care in acute settings.

**Grommesh B, Lausch MJ, Vannelli AJ, Mullen DM, Bergenstal RM, Richter SA, Fish LH.** Hospital insulin protocol aims for glucose control in glucocorticoid-induced hyperglycemia. *Endocr Pract.* 2016 Feb;22(2):180-9. [Comment in: *Endocr Pract.* 2016 Feb;22(2):271-3.]

**OBJECTIVE:** To compare the effectiveness of 2 insulin protocols to treat glucocorticoid-induced hyperglycemia in the nonintensive care hospital setting. **METHODS:** A randomized, open-label, parallel-arm study was conducted comparing standard recommended care of complete insulin orders (CIO) (i.e., 3-part insulin regimen of long-acting basal [background], rapid-acting bolus [mealtime], and rapid-acting correction factor) to an experimental group following a regimen of Neutral Protamine Hagedorn (NPH) plus CIO (NPH-CIO). The primary outcome was mean blood glucose (BG), and the secondary outcome was percent of BG in target range of 70 to 180 mg/dL. Hypoglycemia was also evaluated. **RESULTS:** Sixty-one patients completed 2 to 5 consecutive inpatient days (31 CIO; 30 NPH-CIO). Baseline mean BG results were 237.2 +/- 50.2 and 221.9 +/- 35.8 mg/dL (P = .30) in the CIO and NPH-CIO groups, respectively. No significant difference in overall mean BG between the 2 groups was detected; however, a significant difference arose on day 3: mean BG 181.8 +/- 32.6 mg/dL (CIO) versus 157.2 +/- 6.1 mg/dL (NPH-CIO) (P = .03). Moreover, the total daily doses (TDDs) of insulin did not differ: 34.8 +/- 43.0 units (CIO) versus 35.8 +/- 25.0 units (NPH-CIO) (P = .13). Percent of BG in target was 54.6% (CIO) and 62% (NPH-CIO) (P = .24). Incidence of severe hypoglycemia (<50 mg/dL) was the same in both groups (0.1%). **CONCLUSION:** NPH added to 3-part insulin regimen (CIO) may be an effective way to combat glucocorticoid-induced hyperglycemia, though further research is needed in a larger population. **ABBREVIATIONS:** A1C = hemoglobin A1C BG = blood glucose CIO = complete insulin orders DM = diabetes mellitus NPH = neutral protamine Hagedorn NPH-CIO = neutral protamine Hagedorn plus CIO TDD = total daily dose.

Groom HC, Henninger ML, Smith N, Koppolu P, Cheetham TC, Glanz JM, Hambidge SJ, Jackson LA, **Kharbanda EO**, Klein NP, McCarthy NL, **Nordin JD**, Weintraub ES, Naleway AL. Influenza vaccination during pregnancy: influenza seasons 2002-2012, Vaccine Safety Datalink. *Am J Prev Med.* 2016 Apr;50(4):480-8.

**INTRODUCTION:** Pregnant women are at risk for influenza-related complications and have been recommended for vaccination by the Advisory Committee on Immunization Practices (ACIP) since 1990. Annual rates of influenza coverage of pregnant women have been consistently low. The Vaccine Safety Datalink was used to assess influenza vaccine coverage over 10 consecutive years (2002-2012); assess patterns related to changes in ACIP recommendations; identify predictors of vaccination; and compare the results with those published by national U.S. surveys. **METHODS:** Retrospective cohort study of 721,898 pregnancies conducted in 2014. Coverage rates were assessed for all pregnancies and for live births only. Multivariate regression analysis identified predictors associated with vaccination. **RESULTS:** Coverage increased from 8.8% to 50.9% in 2002-2012. Seasonal coverage rates increased slowly following the 2004 ACIP influenza vaccine recommendation (to remove the first-trimester restriction) but spiked significantly during the 2009 H1N1 influenza pandemic. Significant predictors of vaccination during pregnancy included older age; vaccination in a previous season; high-risk conditions in addition to pregnancy; pregnancy during either the 2004-2005 or 2009-2010 seasons; entering the influenza season after the first trimester of pregnancy; and a pregnancy with longer overlap with the influenza season ( $p < 0.001$  for each). **CONCLUSIONS:** Influenza vaccination coverage among pregnant women increased between the 2002-2003 and 2011-2012 seasons, although it was still below the developmental Healthy People 2020 goal of 80%. The 2004 ACIP language change positively impacted first-trimester vaccination uptake. Vaccine Safety Datalink data estimates were consistent with U.S. estimates.

Guetzko J, Dierich MTJ, **Von Sternberg TL**. Standardization of standing orders in long-term care. *Ann Longterm Care*. 2016 Jun;24(6):21-32.

Standing orders (SOs) are widely used in long-term care facilities (LTCFs) to improve efficiency. SO content varies across facilities and frequently lacks an evidence base, raising concerns from a quality and safety perspective. The aim of this project was to create a consensus-based SO set grounded in high-quality evidence, clinical practice guidelines (CPGs), and expert opinion for approval and use by multiple practices/providers across multiple facilities. A purposive sample of SOs from 13 diverse Minnesota NHs was compiled into one SO document. Revisions were based on a coalition of geriatric experts' opinions and achieved content validity when they were satisfied with the contents.

Halcon L, Lillehei A, **Melin MM, Shapiro AC**, Robinson C. Wound care: multicenter feasibility study. *Adv Skin Wound Care*. 2016 Jan;29(1):26-31.

**OBJECTIVES:** The aims of this study were to determine a sound recruitment strategy for multisite wound studies to address the rising prevalence and incidence of chronic wounds and to identify appropriate adult patient populations with wounds of interest and establish partnerships with their clinicians and clinical services as a model for a multisite wound care feasibility study. **DESIGN:** A pilot multisite recruitment feasibility study. **SETTING:** Three wound clinics located in a large, Midwestern metropolitan area. **PARTICIPANTS AND INTERVENTION:** A convenience sample of 3 staff and 3 patients with lower-extremity wounds from each clinic was interviewed. Medical records of all patients with lower-extremity wounds seen during 1 week at each clinic were reviewed. Outcome measures included characteristics of patients being treated at the 3 wound care clinics (patient demographics and wound characteristics) and wound treatments used. Barriers and opportunities that could be addressed in recruitment and other research strategies were identified. **MAIN RESULTS:** Barriers and facilitators for future research were identified and varied within and between clinics. Patients reported that they were willing to participate in future research, although fewer were willing if the study was blinded. Patients received a variety of treatments within and across clinics. Medical record reviews provided further information about wound clinic patients, wound characteristics, and barriers and facilitators for future study. **CONCLUSIONS:** Characteristics of wound clinic patients and their wounds were found to vary by site, suggesting that tailored recruitment methods by site within multisite wound care studies may be most productive. This study suggests successful recruitment strategies for future wound care intervention research.

**Haley KB**, Lerner EB, Guse CE, Pirralo RG. Effect of system-wide interventions on the assessment and treatment of pain by emergency medical services providers. *Prehosp Emerg Care*. 2016 Nov-Dec;20(6):752-8.

**BACKGROUND:** An estimated 20% of patients arriving by ambulance to the emergency department are in moderate to severe pain. However, the management of pain in the prehospital setting has been shown to be inadequate. Untreated pain may have negative physiologic and psychological consequences. The prehospital community has acknowledged this inadequacy and made treatment of pain a priority. **OBJECTIVES:** To determine if system-wide pain management improvement efforts (i.e., education and protocol implementation) improve the assessment of pain and treatment with opioid medications in the prehospital setting and to determine if improvements are maintained over time. **METHODS:** This was a retrospective before-and-after study of a countywide prehospital patient care database. The study population included all adult patients transported by EMS between February 2004 and February 2012 with a working assessment of trauma or burn. EMS patient care records were searched for documentation of pain scores and opioid administration. Four time periods were examined: 1) before interventions, 2) after pediatric specific pain management education, 3) after pain management protocol implementation, and 4) maintenance phase. Frequencies and 95% confidence intervals were calculated for all patients meeting the inclusion criteria in each time period and Chi-square was used to compare frequencies between time periods. **RESULTS:** 15,228 adult patients transported by EMS during the study period met the inclusion criteria. Subject demographics were similar between the four time periods. Pain score documentation improved between the time periods but was not maintained over time (13% [95%CI 12-15%] to 32% [95%CI 31-34%] to 29% [95 CI 27-30%] to 19% [95%CI 18-21%]). Opioid administration also improved between the time periods and was maintained over time (7% [95%CI 6-8%] to 18% [95%CI 16-19%] to 24% [95%CI 22-25%] to 23% [95% CI 22-24%]). **CONCLUSIONS:** In adult patients, both pediatric-focused education and pain protocol implementation improved the administration of opioid pain medications. Documentation and assessment of pain scores were less affected by specific pain management improvement efforts.

Hansen C, Andrade SE, Freiman H, Dublin S, Haffner K, Cooper WO, Cheetham TC, Toh S, Li DK, Raebel MA, Kuntz JL, Perrin N, Rosales AG, Carter S, **Pawloski PA**, Maloney EM, Graham DJ, Sahin L, Scott PE, Yap J, Davis RL. Trimethoprim-sulfonamide use during the first trimester of pregnancy and the risk of congenital anomalies. *Pharmacoepidemiol Drug Saf.* 2016 Feb;25(2):170-178. PMC4772767. [Selected as one of the best papers in *Pharmacoepidemiology and Drug Safety (PDS)* in 2016.]

**BACKGROUND:** Sulfonamide antibacterials are widely used in pregnancy, but evidence about their safety is mixed. The objective of this study was to assess the association between first-trimester sulfonamide exposure and risk of specific congenital malformations. **METHODS:** Mother-infant pairs were selected from a cohort of 1.2 million live-born deliveries (2001-2008) at 11 US health plans comprising the Medication Exposure in Pregnancy Risk Evaluation Program. Mothers with first-trimester trimethoprim-sulfonamide (TMP-SUL) exposures were randomly matched 1:1 to (i) a primary comparison group (mothers exposed to penicillins and/or cephalosporins) and (ii) a secondary comparison group (mothers with no dispensing of an antibacterial, antiprotozoal, or antimalarial medication during the same time period). The outcomes were cardiovascular abnormalities, cleft palate/lip, clubfoot, and urinary tract abnormalities. **RESULTS:** We first identified 7615 infants in the TMP-SUL exposure group, of which 7595 (99%) were exposed to a combination of TMP-SUL and the remaining 1% to sulfonamides alone. After matching (1:1) to the comparator groups and only including those with complete data on covariates, there were 20 064 (n = 6688 per group) in the primary analyses. Overall, cardiovascular defects (1.52%) were the most common and cleft lip/palate (0.10%) the least common that were evaluated. Compared with penicillin/cephalosporin exposure, and no antibacterial exposure, TMP-SUL exposure was not associated with statistically significant elevated risks for cardiovascular, cleft lip/palate, clubfoot, or urinary system defects. **CONCLUSIONS:** First-trimester TMP-SUL exposure was not associated with a higher risk of the congenital anomalies studied compared with exposure to penicillins and/or cephalosporins or no exposure to antibacterials.

Hanson BJ, Koene RJ, Roy SS, Eckman PM, John R, **Chaudhary NA**, Vega-Peralta J. Safety and outcomes of capsule endoscopy in patients with left ventricular assist device: a single-center retrospective case series. *J Cardiovasc Transl Res.* 2016 Aug;9(4):402-4.

Obscure gastrointestinal bleeding (GIB) in patients with continuous-flow left ventricular assist devices (CF-LVAD) is common. Capsule endoscopy (CE) can be used in the diagnosis of obscure GIB. Safety

and outcomes of CE in patients with CF-LVAD are unknown. The aim is to define the safety and outcomes of CE in this population. Patients with CF-LVAD undergoing CE at a single center between 2007 and 2014 were retrospectively reviewed. Thirty-four CE studies were performed. Positive CE occurred in 19 studies. No clinically significant cardiac events occurred. Medical intervention was the most common management strategy. Rebleeding after CE occurred in 10 patients. Patients with active bleeding or lesions such as arteriovenous malformations (AVM) incurred a higher risk of rebleeding, transfusion, and repeated endoscopy. CE is safe in patients with CF-LVAD. The risk of rebleeding was more common in patients with active bleeding or AVM lesions, although this result did not reach statistical significance.

Hardeman RR, **Medina EM**, Kozhimannil KB. Structural racism and supporting black lives - the role of health professionals. *N Engl J Med*. 2016 Dec;375(22):2113-5.

Harris WS, Luo J, Pottala JV, **Margolis KL**, Espeland MA, Robinson JG. Red blood cell fatty acids and incident diabetes mellitus in the Women's Health Initiative Memory Study. *PLoS One*. 2016 Feb 16;11(2):e0147894. PMC4755935.

**CONTEXT:** The relationship between dietary and/or circulating levels of fatty acids and the development of type 2 diabetes is unclear. Protective associations with the marine omega-3 fatty acids and linoleic acid and with a marker of fatty acid desaturase activity delta-5 desaturase (D5D ratio) have been reported, as have adverse relationships with saturated fatty acids and D6D ratio. **OBJECTIVE:** To determine the associations between red blood cell (RBC) fatty acid distributions and incident type 2 diabetes. **DESIGN:** Prospective observational cohort study nested in the Women's Health Initiative Memory Study. **SETTING:** General population. **SUBJECTS:** Postmenopausal women. **MAIN OUTCOME MEASURES:** Self-reported incident type 2 diabetes. **RESULTS:** There were 703 new cases of type 2 diabetes over 11 years of follow up among 6379 postmenopausal women. In the fully adjusted models, baseline RBC D5D ratio was inversely associated with incident type 2 diabetes [Hazard Ratio (HR) 0.88, 95% confidence interval (CI) 0.81-0.95] per 1 SD increase. Similarly, baseline RBC D6D ratio and palmitic acid were directly associated with incident type 2 diabetes (HR 1.14, 95% CI 1.04-1.25; and HR 1.24, 95% CI 1.14-1.35, respectively). None of these relationships were materially altered by excluding incident cases in the first 2 years of follow-up. There were no significant relationships with eicosapentaenoic, docosahexaenoic or linoleic acids. **CONCLUSIONS:** Whether altered fatty acid desaturase activities or palmitic acid levels are causally related to the development of type 2 diabetes cannot be determined from this study, but our findings suggest that proportions of certain fatty acids in RBC membranes are associated with risk for type 2 diabetes.

Hart DE, McNeil MA, **Hegarty CB**, Rush R, Jr., Chipman J, Clinton J, Reihisen T, Sweet R. Literature evidence on live animal versus synthetic models for training and assessing trauma resuscitation procedures [review article]. *J Spec Oper Med*. 2016 Summer;16(2):44-51.

There are many models currently used for teaching and assessing performance of trauma-related airway, breathing, and hemorrhage procedures. Although many programs use live animal (live tissue [LT]) models, there is a congressional effort to transition to the use of nonanimal-based methods (i.e., simulators, cadavers) for military trainees. We examined the existing literature and compared the efficacy, acceptability, and validity of available models with a focus on comparing LT models with synthetic systems. Literature and Internet searches were conducted to examine current models for 7 core trauma procedures. We identified 185 simulator systems. Evidence on acceptability and validity of models was sparse. We found only 1 underpowered study comparing the performance of learners after training on LT versus simulator models for tube thoracostomy and cricothyrotomy. There is insufficient data-driven evidence to distinguish superior validity of LT or any other model for training or assessment of critical trauma procedures.

**Haus E**, Reinberg AE, Mauvieux B, Le Floc'h N, Sackett-Lundeen LL, Touitou Y. Risk of obesity in male shift workers: A chronophysiological approach. *Chronobiol Int*. 2016;33(8):1018-36.

**AIMS:** Why are some healthy male shift workers (SWers) overweight [body mass index (BMI) >25 and

<30] if not obese (BMI >30)? Seven risk factors potentially causing overweight and obesity were evaluated, namely (1) age, (2) physical/sports activity, (3) length of exposure to shift work (SW), (4) speed of shift rotation, (5) tolerance to SW, (6) internal desynchronization of circadian rhythms and (8) night eating (nocturnal nibbling). "New" as well as "old" data acquired from longitudinal and individual time series of 5-56 days recording span were reanalyzed. The data were analyzed from a set of field studies of 67 SWers and 53 non-shift workers (non-SWers). To estimate the respective weight of these factors, a multiple regression analysis (MRA) was used, among other statistical tools. A similar age-related increase in BMI was validated (with  $p < 0.001$ ) in both SWers and non-SWers. However, in SWers, desynchronization of rhythms increases the effect of age on BMI. Length of exposure to SW, tolerance to SW, and speed of rotation do not seem to play a role as risk factors. Major effects are likely related to a sedentary lifestyle (lack of regular physical or sport activities) (MRA with  $p < 0.01$ ), as well as, presumably, to a nocturnal nibbling of carbohydrates, which mimics the night eating syndrome.

Heimer G, Keratar JM, Riley LG, Balasubramaniam S, Eyal E, Pietikainen LP, Hiltunen JK, Marek-Yagel D, Hamada J, Gregory A, Rogers C, Hogarth P, **Nance MA**, Shalva N, Veber A, Tzadok M, Nissenkorn A, Tonduti D, Renaldo F, Kraoua I, Panteghini C, Valletta L, Garavaglia B, Cowley MJ, Gayevskiy V, Roscioli T, Silberstein JM, Hoffmann C, Raas-Rothschild A, Tiranti V, Anikster Y, Christodoulou J, Kastaniotis AJ, Ben-Zeev B, Hayflick SJ, University of Washington Center for Mendelian Genomics. MECR mutations cause childhood-onset dystonia and optic atrophy, a mitochondrial fatty acid synthesis disorder. *Am J Hum Genet.* 2016 Dec 1;99(6):1229-44. PMC5142118.

Mitochondrial fatty acid synthesis (mtFAS) is an evolutionarily conserved pathway essential for the function of the respiratory chain and several mitochondrial enzyme complexes. We report here a unique neurometabolic human disorder caused by defective mtFAS. Seven individuals from 5 unrelated families presented with childhood-onset dystonia, optic atrophy, and basal ganglia signal abnormalities on MRI. All affected individuals were found to harbor recessive mutations in MECR encoding the mitochondrial trans-2-enoyl-coenzyme A-reductase involved in human mtFAS. All 6 mutations are extremely rare in the general population, segregate with the disease in the families, and are predicted to be deleterious. The nonsense c.855T>G (p.Tyr285 \*), c.247\_250del (p.Asn83Hisfs \*4), and splice site c.830+2\_830+3insT mutations lead to C-terminal truncation variants of MECR. The missense c.695G>A (p.Gly232Glu), c.854A>G (p.Tyr285Cys), and c.772C>T (p.Arg258Trp) mutations involve conserved amino acid residues, are located within the cofactor binding domain, and are predicted by structural analysis to have a destabilizing effect. Yeast modeling and complementation studies validated the pathogenicity of the MECR mutations. Fibroblast cell lines from affected individuals displayed reduced levels of both MECR and lipoylated proteins as well as defective respiration. These results suggest that mutations in MECR cause a distinct human disorder of the mtFAS pathway. The observation of decreased lipoylation raises the possibility of a potential therapeutic strategy.

**Heinmiller LJ**, Gunton KB. A review of the current practice in diagnosis and management of visual complaints associated with concussion and postconcussion syndrome. *Curr Opin Ophthalmol.* 2016 Sep;27(5):407-12.

**PURPOSE OF REVIEW:** Concussions and their related sequelae have received significant attention given the high-profile media coverage from professional sports and recreational leagues. A better understanding of the diagnosis and symptom management may limit the long-term impact these injuries have on the affected individual. The aim of this review is to provide updated information for both diagnosis and ongoing management for visual symptoms of concussions. **RECENT FINDINGS:** New testing, including a brief vestibular/ocular motor screening assessment, and the importance of near point of convergence measurements may prove beneficial to the diagnosis and identification of patients at greater risk for developing postconcussion syndrome. In addition, the development of postconcussion syndrome is more likely when symptom burden is greater upon presentation. **SUMMARY:** Currently, there is not a single testing method that can universally identify all individuals with concussion. Current management of concussion focuses on targeted treatment based on symptoms and signs present at onset to decrease disease burden and help restore baseline functioning as soon as possible.

Herberts M, **Butcher MJ**, Kohler T. The effect of LUTS/BPH and treatments on ejaculatory function [review article]. *Curr Urol Rep*. 2016 Jul;17(7):48.

As men age, there is an increased incidence of lower urinary tract symptoms (LUTS), often from benign prostatic hyperplasia (BPH), which can adversely affect sexual function. There are many different treatments for these symptoms; however, many of the treatments also affect sexual quality of life, specifically in the realm of ejaculation. Our paper will review the medications, surgical procedures, minimally invasive procedures, and even investigational procedures used to treat LUTS/BPH and the effect they have on ejaculation. The aim of this paper is to help practitioners counsel patients more effectively on treatment options when ejaculation is a concern.

Herrero Babiloni A, Kapos FP, **Nixdorf DR**. Intraoral administration of botulinum toxin for trigeminal neuropathic pain. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2016 Jun;121(6):e148-53.

This article presents 2 cases of different neuropathic trigeminal pain conditions treated with intraoral botulinum toxin injections. There is a growing body of evidence to support the use of this substance when administered subcutaneously in the treatment of neuropathic pain, such as in extraoral injections for trigeminal neuralgia. However, reports of intraoral submucosal administration are still lacking. In the 2 cases presented here, neuropathic pain was refractory to treatment, with an important intraoral peripheral component, so onabotulinum toxin A was introduced as an adjuvant therapy. The technique, doses, and dilution are discussed. The patients reported significant reductions in pain frequency and intensity, with minimal side effects of temporary mucosal dryness and smile droopiness. The analgesic benefits of botulinum toxin may be utilized to address intraoral neuropathic pain. Further studies are needed to confirm safety and effectiveness in larger samples.

Holets SR, **Marini JJ**. Is automated weaning superior to manual spontaneous breathing trials [review article]? *Respir Care*. 2016 Jun;61(6):749-60.

Weaning from mechanical ventilation involves the reduction or withdrawal of ventilatory support in proportion to the patient's ability to sustain spontaneous ventilation. Protocolized weaning has been shown to reduce weaning duration; however, its weakness lies in the reliance on human intervention. Automated weaning is theoretically superior to manual weaning because of its ability to rapidly recognize deviations from desired behavior and enforce compliance with a standardized weaning strategy unencumbered by external influences. Whether currently available methods for automated weaning fulfill that potential to achieve superiority depends on patient type, care environment, and cause of ventilator dependence.

**House CM, Nguyen D, Thomas AJ, Nelson WB, Zhu DW**. Normalization of left ventricular ejection fraction and incidence of appropriate antitachycardia therapy in patients with implantable cardioverter defibrillator for primary prevention of sudden death. *J Card Fail*. 2016 Feb;22(2):125-32.

**BACKGROUND:** Patients with severely depressed left ventricular ejection fractions (LVEFs) receive implantable cardioverter-defibrillators (ICDs) for the primary prevention of sudden death. In some patients, however, LVEF may improve or even normalize over time. Limited data are available on the incidence of appropriate antitachycardia therapy, including pacing and shock, in these patients.

**METHODS AND RESULTS:** We retrospectively identified consecutive patients at our institution with an ICD for primary prevention who had LVEF measurement available at initial implantation and at the time of generator replacement. None of these patients had ever received appropriate antitachycardia therapy before generator replacement. The incidence of appropriate antitachycardia therapy after generator replacement was assessed. Of the 125 patients who received generator replacement, 53 (42%) received an ICD and 72 (58%) a cardiac resynchronization therapy-defibrillator (CRT-D). Among them, 30 (21%) had LVEF normalized to  $\geq 50\%$ , 25 (17%) had LVEF partially improved to 36%-49%, and 70 (63%) had LVEF that remained depressed at  $\leq 35\%$ . During an overall follow-up period of 25  $\pm$  18 months, none of the individuals with normalized LVEF experienced appropriate antitachycardia therapy, regardless of ICD or CRT-D. Meanwhile, 20% of patients with LVEF at 36%-49% and 14% of patients with LVEF at  $\leq 35\%$  received appropriate ICD therapy. The omnibus P value for any differences among the 3 LVEF groups was 0.046 for the entire cohort, 0.01 for ICD, and 0.15 for CRT-D patients. **CONCLUSIONS:**

These preliminary data suggest that patients with reduced LVEF and primary-prevention ICDs who normalize their LVEF over time may be at lower risk for appropriate antitachycardia therapy.

**House CM, Zhu DW, Saha MK, Hamieh TS, Benditt DG, Nelson WB.** Feasibility of an elective cardioversion service led by advanced practice providers without direct cardiologist supervision. *Int J Heart Rhythm.* 2016 Sep;1(1):38-42.

**BACKGROUND:** Elective direct current cardioversion (DCCV) has traditionally been performed by physicians in the United States. A few recent reports from the United Kingdom suggested that a specialist nurse-led service for elective DCCV of persistent atrial fibrillation was feasible. This practice has not been reported in the United States previously. Several years ago, we introduced a program in which specially trained advanced practice providers (APPs) (physician assistants and nurse practitioners) assisted by an anesthesiology team, performed elective DCCV in patients with atrial fibrillation and atrial flutter, without direct cardiologist supervision. **METHODS:** Upon receiving approval from the Institutional Review Board, we conducted a retrospective analysis of 447 consecutive DCCVs electively performed by APPs, for atrial fibrillation or atrial flutter, at Regions Hospital between 12/2006 and 10/2010. Transient deep sedation was administered by an anesthesiology team. The cohort was evaluated for procedural success and safety. **RESULTS:** The procedural success rate was 92% (412/447). The incidence of procedural-related adverse events requiring immediate intervention was 0.2% (1/447). This patient required emergent temporary pacing catheter insertion followed by a permanent pacemaker implantation at a later date. There were no other procedure-related complications and no thromboembolic events. A comparison with 50 elective cardioversions performed by cardiologists during the same period found no statistical difference in procedural success rates or complications. **CONCLUSION:** Under deep sedation administered by an anesthesiology service, elective DCCV of atrial fibrillation and atrial flutter performed by well-trained APPs, without direct cardiologist supervision, is feasible and does not compromise patient safety.

**Hsu CJ, George SZ, Chmielewski TL.** Association of quadriceps strength and psychosocial factors with single-leg hop performance in patients with meniscectomy. *Orthop J Sports Med.* 2016 Dec 21;4(12):2325967116676078. PMC5298555.

**BACKGROUND:** Clinicians use the single-leg hop test to assess readiness for return to sports after knee injury. Few studies have reported the results of single-leg hop testing after meniscectomy. In addition, the contributions of impairments in quadriceps strength and psychosocial factors to single-leg hop performance are unknown. **PURPOSE:** To compare single-leg hop performance (distance and landing mechanics) between limbs and to examine the association of single-leg hop performance with quadriceps strength and psychosocial factors in patients with meniscectomy. **STUDY DESIGN:** Descriptive laboratory study. **METHODS:** A total of 22 subjects who underwent meniscectomy for traumatic meniscal tears received either standard rehabilitation alone or with additional quadriceps strengthening. Testing was conducted immediately postrehabilitation and at 1 year postsurgery. A single-leg hop test was performed bilaterally, and hop distance was used to create a hop symmetry index. Landing mechanics (peak knee flexion angle, knee extension moment, and peak vertical ground-reaction force) were analyzed with a motion-capture system and a force plate. An isokinetic dynamometer (60 deg/s) assessed knee extensor peak torque and rate of torque development (RTD0-200ms and RTD0-peak torque). Questionnaires assessed fear of reinjury (Tampa Scale for Kinesiophobia [TSK-11]) and self-efficacy (Knee Activity Self-Efficacy [KASE]). **RESULTS:** Rehabilitation groups did not significantly differ in single-leg hop performance; therefore, groups were combined for further analyses. The mean hop symmetry index was 88.6% and 98.9% at postrehabilitation and 1 year postsurgery, respectively. Compared with the nonsurgical limb, the surgical limb showed decreased peak knee flexion angle at postrehabilitation and decreased knee extension moment at 1 year postsurgery. The hop symmetry index was positively associated with peak torque, RTD0-200ms, and the KASE score at postrehabilitation. Moreover, at postrehabilitation, the peak knee flexion angle was positively associated with peak torque and RTD0-200ms, and the knee extension moment was positively associated with RTD0-200ms. At 1 year postsurgery, peak knee flexion angle and knee extension moment were both positively associated with peak torque, RTD0-200ms, and RTD0-peak torque. **CONCLUSION:** Although the hop symmetry index could be considered satisfactory for returning to sports, asymmetries in landing mechanics still exist in the

first year postmeniscectomy. Greater quadriceps strength was associated with greater single-leg hop distance and better landing mechanics at both postrehabilitation and 1 year postsurgery. Knee activity self-efficacy was the only psychosocial factor associated with single-leg hop performance and isolated to a positive association with single-leg hop distance at postrehabilitation. **CLINICAL RELEVANCE:** Rate of development is not typically measured in the clinic but can be an additional quadriceps measure to monitor for single-leg hop performance. Quadriceps strength and psychosocial factors appear to have separate influence on single-leg hop performance after meniscectomy, which has implications for developing appropriate interventions for optimal single-leg hop performance.

Idiyatullin D, Garwood M, Gaalaas L, **Nixdorf DR**. Role of MRI for detecting micro cracks in teeth. *Dentomaxillofac Radiol*. 2016;45(7):20160150.

**OBJECTIVES:** To evaluate the limit of tooth crack width visualization by two MRI pulse sequences in comparison with CBCT. **METHODS:** Two extracted human teeth with known crack locations and dimensions, as determined by reference standard microCT, were selected for experimental imaging. Crack location/dimension and the presence of common dental restorative materials such as amalgam were typical of that found clinically. Experimental imaging consisted of conventional CBCT scans and MRI scans with two pulse sequences, including Sweep Imaging with Fourier Transformation (SWIFT) and gradient echo (GRE). CBCT and MR images of extracted teeth were acquired using acquisition parameters identical to those used for in vivo imaging. Experimental and reference standard images were registered, and the limit of tooth crack visualization was determined. **RESULTS:** Collected images indicate that SWIFT could demonstrate cracks with 20-microm width, which is 10 times narrower than the imaging voxel size. Cracks of this size were not visible in GRE images, even with a short echo time of 2.75 ms. The CBCT images were distorted by artifacts owing to close location of metallic restorations. **CONCLUSIONS:** The successful visualization of cracks with the SWIFT MRI sequence compared with other clinical modalities suggests that SWIFT MRI can effectively detect microcracks in teeth and therefore may have potential to be a non-invasive method for the in vivo detection of cracks in human teeth.

Ikramuddin S, Korner J, Lee WJ, Bantle JP, **Thomas AJ**, Connett JE, Leslie DB, Inabnet WB, 3rd, Wang Q, Jeffery RW, Chong K, Chuang LM, Jensen MD, Vella A, Ahmed L, Belani K, Olofson AE, Bainbridge HA, Billington CJ. Durability of addition of roux-en-Y gastric bypass to lifestyle intervention and medical management in achieving primary treatment goals for uncontrolled type 2 diabetes in mild to moderate obesity: A randomized control trial. *Diabetes Care*. 2016 Sep;39(9):1510-8. PMC5001141.

**OBJECTIVE:** We compared 3-year achievement of an American Diabetes Association composite treatment goal (HbA1c <7.0%, LDL cholesterol <100 mg/dL, and systolic blood pressure <130 mmHg) after 2 years of intensive lifestyle-medical management intervention, with and without Roux-en-Y gastric bypass, with 1 additional year of usual care. **RESEARCH DESIGN AND METHODS:** A total of 120 adult participants with BMI 30.0-39.9 kg/m<sup>2</sup> and HbA1c  $\geq$ 8.0% were randomized 1:1 to 2 treatment arms at 3 clinical sites in the U.S. and one in Taiwan. All patients received the lifestyle-medical management intervention for 24 months; half were randomized to also receive gastric bypass. **RESULTS:** At 36 months, the triple end point goal was met in 9% of lifestyle-medical management patients and 28% of gastric bypass patients (P = 0.01): 10% and 19% lower than at 12 months. Mean (SD) HbA1c values at 3 years were 8.6% (3.5) and 6.7% (2.0) (P < 0.001). No lifestyle-medical management patient had remission of diabetes at 36 months, whereas 17% of gastric bypass patients had full remission and 19% had partial remission. Lifestyle-medical management patients used more medications than gastric bypass patients: mean (SD) 3.8 (3.3) vs. 1.8 (2.4). Percent weight loss was mean (SD) 6.3% (16.1) in lifestyle-medical management vs. 21.0% (14.5) in gastric bypass (P < 0.001). Over 3 years, 24 serious or clinically significant adverse events were observed in lifestyle-medical management vs. 51 with gastric bypass. **CONCLUSIONS:** Gastric bypass is more effective than lifestyle-medical management intervention in achieving diabetes treatment goals, mainly by improved glycemic control. However, the effect of surgery diminishes with time and is associated with more adverse events.

Jacob V, Chattopadhyay SK, Hopkins DP, Murphy Morgan J, Pitan AA, Clymer JM, **Pronk NP**, member of the Community Preventive Services Task Force. Increasing coverage of appropriate vaccinations: a

Community Guide systematic economic review [review article]. *Am J Prev Med.* 2016 Jun;50(6):797-808. PMC4514191.

**CONTEXT:** Population-level coverage for immunization against many vaccine-preventable diseases remains below optimal rates in the U.S. The Community Preventive Services Task Force recently recommended several interventions to increase vaccination coverage based on systematic reviews of the evaluation literature. The present study provides the economic results from those reviews. **EVIDENCE ACQUISITION:** A systematic review was conducted (search period, January 1980 through February 2012) to identify economic evaluations of 12 interventions recommended by the Task Force. Evidence was drawn from included studies; estimates were constructed for the population reach of each strategy, cost of implementation, and cost per additional vaccinated person because of the intervention. Analyses were conducted in 2014. **EVIDENCE SYNTHESIS:** Reminder systems, whether for clients or providers, were among the lowest-cost strategies to implement and the most cost-effective in terms of additional people vaccinated. Strategies involving home visits and combination strategies in community settings were both costly and less cost-effective. Strategies based in settings such as schools and MCOs that reached the target population achieved additional vaccinations in the middle range of cost-effectiveness. **CONCLUSIONS:** The interventions recommended by the Task Force differed in reach, cost, and cost effectiveness. This systematic review presents the economic information for 12 effective strategies to increase vaccination coverage that can guide implementers in their choice of interventions to fit their local needs, available resources, and budget.

**JaKa MM**, Haapala JL, Trapl ES, **Kunin-Batson AS**, **Olson-Bullis BA**, Heerman WJ, Berge JM, Moore SM, Matheson D, **Sherwood NE**. Reporting of treatment fidelity in behavioral pediatric obesity intervention trials: A systematic review [review article]. *Obes Rev.* 2016 Dec;17(12):1287-300. PMC5193220.

Behavioral interventions for pediatric obesity are promising, but detailed information on treatment fidelity (i.e., design, training, delivery, receipt, and enactment) is needed to optimize the implementation of more effective interventions. Little is known about current practices for reporting treatment fidelity in pediatric obesity studies. This systematic review, in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, describes the methods used to report treatment fidelity in randomized controlled trials. Treatment fidelity was double-coded using the National Institutes of Health Fidelity Framework checklist. Three hundred articles (N = 193 studies) were included. Mean inter-coder reliability across items was 0.83 (SD = 0.09). Reporting of treatment design elements within the field was high (e.g., 77% of studies reported designed length of treatment session), but reporting of other domains was low (e.g., only 7% of studies reported length of treatment sessions delivered). Few reported gold standard methods to evaluate treatment fidelity (e.g., coding treatment content delivered). General study quality was associated with reporting of treatment fidelity ( $p < 0.01$ ), as was the number of articles published for a given study ( $p < 0.01$ ). The frequency of reporting treatment fidelity components has not improved over time ( $p = 0.26$ ). Specific recommendations are made to support pediatric obesity researchers in leading health behavior disciplines towards more rigorous measurement and reporting of treatment fidelity.

Javedani PP, Ratnabalasuriar R, **Grali KJ**. Spontaneous compartment syndrome of the thigh in the absence of trauma. *J Emerg Med.* 2016 Jul;51(1):70-2.

**BACKGROUND:** Compartment syndrome occurs when an increase in pressure results in vascular and functional impairment of the underlying nerve and muscles. Thigh compartment syndrome (TCS) is uncommon, but clinical suspicion warrants emergent surgical consultation and fasciotomy. **CASE REPORT:** We present a 42-year-old man evaluated for right lateral thigh pain, without a history of trauma, deep venous thrombosis (DVT), previous surgery, or intravenous drug use. He was febrile, tachycardic, with a mild leukocytosis, an elevated C-reactive protein level, and an elevated creatinine kinase level. Radiographs showed no abnormality, and right lower extremity duplex ultrasound showed no DVT. A computed tomography scan of the right lower extremity was concerning for compartment syndrome. Surgical consultation was obtained, and the patient was taken to the operating room for fasciotomy. He was diagnosed with compartment syndrome intraoperatively. The patient was discharged on hospital day

10. WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?: TCS is exceedingly rare, especially in the absence of underlying traumatic and nontraumatic etiologies. The diagnosis is challenging because more elastic fascia with larger space in the thigh allows for accommodation of acute increases in pressure. Consequently, there may not be the expected acute rise in compartment pressures; increased compartment pressure may only be a late sign, when underlying neurovascular damage has already occurred. TCS is complicated by high morbidity and mortality. Emergent surgical consultation should be obtained when there is a high clinical suspicion for TCS, and limb-saving fasciotomy should not be delayed. This case shows the importance of a high level of suspicion for TCS in patients with no identifiable etiology and no historical risk factors for development of compartment syndrome, because TCS may not present with classic symptoms.

Johnson K, **McEvoy CE**, Naqvi S, Wendt C, Reilkoff RA, Kunisaki KM, Wetherbee EE, Nelson D, Tirouvanziam R, Niewoehner DE. High-dose oral N-acetylcysteine fails to improve respiratory health status in patients with chronic obstructive pulmonary disease and chronic bronchitis: a randomized, placebo-controlled trial. *Int J Chron Obstruct Pulmon Dis*. 2016 Apr;11:799-807. PMC4846045.

**BACKGROUND:** Clinical outcomes are worse in patients with COPD and chronic bronchitis. N-acetylcysteine (NAC) is commonly prescribed for such patients but with uncertain clinical benefits. We postulated that oral NAC, at much larger doses than those ordinarily prescribed, would improve clinical outcomes in a subset of patients with COPD and chronic bronchitis. **OBJECTIVE:** The aim of this study was to determine whether very high-dose NAC would improve respiratory health status in patients with COPD and chronic bronchitis. **METHODS:** Patients with COPD and chronic bronchitis were enrolled in a randomized, controlled, double-blinded trial. Patients received oral NAC (1,800 mg) or matching placebo twice daily for 8 weeks in addition to their usual respiratory medications. The primary outcome, respiratory health status, was assessed by changes in the St. George's Respiratory Questionnaire. The effects of NAC on lung function and circulating markers of oxidative stress and inflammation were also evaluated. **RESULTS:** We terminated the study prematurely because new external information suggested the possibility of a safety issue. Of the planned 130 patients, 51 were randomized, and 45 (22 in the placebo arm and 23 in the NAC arm) completed the study. There was no statistically significant difference between changes in the St. George's Respiratory Questionnaire total score, comparing NAC to placebo (adjusted mean difference, 0.1 U; 95% CI, -7.8 to 8.18 U; P=0.97). There were also no significant NAC-related improvements in any of the secondary outcomes. **CONCLUSION:** In this 8-week trial, we were unable to show any clinical benefit from a very high dose of NAC in patients with COPD and chronic bronchitis.

Jung D, Carman M, **Aga RC**, **Burnett AM**. Disaster preparedness in the emergency department using in situ simulation. *Adv Emerg Nurs J*. 2016 Jan-Feb;38(1):56-68.

High influxes of patients during disasters have led to increased incidence of medical errors in emergency departments (EDs), ultimately leading to poor patient outcomes. Nearly 30% of errors committed in EDs are due to deficiencies in knowledge and skills, and 60% to 70% of errors occur due in part from communication breakdowns. The goal of this project was to examine whether in situ simulation will increase health care providers' knowledge of how to perform during a disaster, improve competency in skills related to those actions, and improve communication regarding the special circumstances inherent to a disaster in the ED. A mixed-methods pilot project analyzed the effects of an in situ simulation. Results of the project demonstrate that in situ simulation can improve knowledge and communication during a disaster situation.

**Kane RL**, **Switzer JA**, Forte ML. Rethinking orthopaedic decision-making for frail patients with hip fracture: Commentary on an article by Marilyn Heng, MD, FRCSC, et al.: "Abnormal mini-cog is associated with higher risk of complications and delirium in geriatric patients with fracture." *J Bone Joint Surg Am*. 2016 May 4;98(9):e39.

Karia SJ, Rykken JB, **McKinney ZJ**, Zhang L, McKinney AM. Utility and significance of gadolinium-based contrast enhancement in posterior reversible encephalopathy syndrome. *AJNR Am J Neuroradiol*. 2016 Mar;37(3):415-22.

**BACKGROUND AND PURPOSE:** Posterior reversible encephalopathy syndrome is a clinicroadiologic syndrome. Literature regarding associated factors and the prognostic significance of contrast enhancement in posterior reversible encephalopathy syndrome is sparse. This study set out to evaluate an association between the presence of enhancement in posterior reversible encephalopathy syndrome and various clinical factors in a large series of patients with this syndrome. **MATERIALS AND METHODS:** From an MR imaging report search that yielded 176 patients with clinically confirmed posterior reversible encephalopathy syndrome between 1997 and 2014, we identified 135 patients who had received gadolinium-based contrast. The presenting symptoms, etiology, clinical follow-up, and maximum systolic and diastolic blood pressures within 1 day of MR imaging were recorded. MRIs were reviewed for parenchymal hemorrhage, MR imaging severity, and the presence and pattern of contrast enhancement. Statistical analyses evaluated a correlation between any clinical features and the presence or pattern of enhancement. **RESULTS:** Of 135 included patients (67.4% females; age range, 7-82 years), 59 (43.7%) had contrast enhancement on T1-weighted MR imaging, the most common pattern being leptomeningeal ( $n = 24$ , 17.8%) or leptomeningeal plus cortical ( $n = 21$ , 15.6%). Clinical outcomes were available in 96 patients. No significant association was found between the presence or pattern of enhancement and any of the variables, including sex, age, symptom, MR imaging severity, blood pressure, or outcome (all  $P > .05$  after Bonferroni correction). **CONCLUSIONS:** The presence or pattern of enhancement in posterior reversible encephalopathy syndrome is not associated with any of the tested variables. However, an association was found between MR imaging severity and clinical outcome.

Karpyak VM, Biernacka JM, Geske JR, Abulseoud OA, Brunner MD, Chauhan M, Hall-Flavin DK, **Lewis KA**, Loukianova LL, Melnyk GJ, Onsrud DA, Proctor BD, Schneekloth TD, Skime MK, Wittkopp JE, Frye MA, Mrazek DA. Gender-specific effects of comorbid depression and anxiety on the propensity to drink in negative emotional states. *Addiction*. 2016 Aug;111(8):1366-75. PMC4940218.

**BACKGROUND AND AIMS:** Depression and anxiety are often comorbid with alcoholism and contribute to craving and relapse. We aimed to estimate the prevalence of lifetime diagnoses of major depressive disorder (MDD), substance-induced depression (SID), anxiety disorder (AnxD), and substance-induced anxiety (SIA), the effects of these comorbidities on the propensity to drink in negative emotional states (negative craving), and test whether these effects differ by sex. **DESIGN:** Secondary analyses of baseline data collected in a single-arm study of pharmacogenetic predictors of acamprosate response. **SETTING:** Academic medical center and affiliated community-based treatment programs in the American upper Midwest. **PARTICIPANTS:** A total of 287 males and 156 females aged 18-80 years meeting DSM-IV criteria for alcohol dependence. **MEASUREMENTS:** The primary outcome measure was 'propensity to drink in negative emotional situations' (determined by the Inventory of Drug Taking Situations), and the key predictors/covariates were sex and psychiatric comorbidities, including MDD, SID, AnxD, and SIA (determined by Psychiatric Research Interview of Substance and Mood Disorders). **FINDINGS:** The prevalence of MDD, SID, and AnxD was higher in females compared with males (33.1 versus 18.4%, 44.8 versus 26.4% and 42.2 versus 27.4%, respectively;  $P < 0.01$ , each), while SIA was rare (3.3%) and did not differ by sex. Increased propensity to drink in negative emotional situations was associated with comorbid MDD (beta = 6.6,  $P = 0.013$ ) and AnxD (beta = 4.8,  $P = 0.042$ ) as well as a SID x sex interaction effect ( $P = 0.003$ ), indicating that the association of SID with propensity to drink in negative emotional situations differs by sex and is stronger in males (beta = 7.9,  $P = 0.009$ ) compared with females (beta = -6.6,  $P = 0.091$ ). **CONCLUSIONS:** There appears to be a higher prevalence of comorbid depression and anxiety disorders as well as propensity to drink in negative emotional situations in female compared with male alcoholics. SID appears to have a sex-specific effect on the increased risk of drinking in negative emotional situations in males.

**Katz AS, Pronk NP**, Chestnut K, Pfeiffer GJ, Childress J. Congruence of organizational self-score and audit-based organizational assessments of workplace health capabilities: an analysis of the HealthLead workplace accreditation. *J Occup Environ Med*. 2016 May;58(5):471-6.

**OBJECTIVE:** The aim of this study was to provide descriptive characteristics of companies accredited as part of the HealthLead Workplace Accreditation and to assess congruence between data reported via online organizational self-assessment and third-party onsite audit. **METHODS:** Synthesized organizational-level data collected through the HealthLead accreditation process ( $N = 22$ ). Online self-

assessment and onsite third-party audit data were compared using paired t-tests. **RESULTS:** Statistical tests revealed significantly higher onsite audit scores than organizational self-assessment scores. Descriptive analyses demonstrated that Outcomes Reporting was the lowest scoring area among all companies. Companies also varied widely in levels of Leadership Support for wellness. **CONCLUSIONS:** Gaps observed between organizational self-assessment and onsite audit scores were relatively stable across the sample, indicating that observed differences may be process-related. Organizations awarded accreditation show a wide variation in Leadership Support, and Outcomes Reporting appears to be low across the sample.

**Keenan JC, Cortes-Puentes GA, Adams AB, Dries DJ, Marini JJ.** The effect of compartmental asymmetry on the monitoring of pulmonary mechanics and lung volumes. *Respir Care*. 2016 Nov;61(11):1536-42.

**BACKGROUND:** Esophageal pressure measurement for computation of transpulmonary pressure (Ptp) has begun to be incorporated into clinical use for evaluating forces across the lungs. Gaps exist in our understanding of how esophageal pressure (and therefore Ptp), a value measured at a single site, responds when respiratory system compartments are asymmetrically affected by whole-lung atelectasis or unilateral injury as well as changes in chest wall compliance. We reasoned that Ptp would track with aerated volume changes as estimated by functional residual capacity (FRC) and tidal volume. We examined this hypothesis in the setting of asymmetric lungs and changes in intra-abdominal pressure. **METHODS:** This study was conducted in the animal laboratory of a university-affiliated hospital. Models of unilateral atelectasis and unilateral and bilateral lung injury exposed to intra-abdominal hypertension (IAH) in 10 deeply sedated, mechanically ventilated swine. Atelectasis was created by balloon occlusion of the left main bronchus. Unilateral lung injury was induced by saline lavage of isolated right lung. Diffuse lung injury was induced by saline lavage of both lungs. The peritoneum was insufflated with air to create a model of pressure-regulated IAH. We measured esophageal pressures, airway pressures, FRC by gas dilution, and oxygenation. **RESULTS:** FRC was reduced by IAH in normal lungs ( $P < .001$ ) and both asymmetric lung pathologies ( $P < .001$ ). Ptp at end-expiration was decreased by IAH in bilateral ( $P = .001$ ) and unilateral lung injury ( $P = .003$ ) as well as unilateral atelectasis ( $P = .019$ ). In the setting of both lung injury models, end-expiratory Ptp showed a moderate correlation in tracking with FRC. **CONCLUSIONS:** Ptp tracks with aerated lung volume in the setting of thoracic asymmetry and changes in intra-abdominal pressure. However, used alone, it cannot distinguish the relative contributions of air-space distention and recruitment of lung units.

Kendler DL, Bauer DC, Davison KS, Dian L, Hanley DA, Harris ST, McClung MR, Miller PD, **Schousboe JT**, Yuen CK, Lewiecki EM. Vertebral fractures: clinical importance and management [review article]. *Am J Med*. 2016 Feb;129(2):221.e2-10.

Vertebral fractures are common and can result in acute and chronic pain, decreases in quality of life, and diminished lifespan. The identification of vertebral fractures is important because they are robust predictors of future fractures. Most vertebral fractures do not come to clinical attention. Numerous modalities exist for visualizing suspected vertebral fracture. Although differing definitions of vertebral fracture may present challenges in comparing data between different investigations, at least 1 in 5 men and women aged >50 years have 1 or more vertebral fractures. There is clinical guidance to target spine imaging to individuals with a high probability of vertebral fracture. Radiology reports of vertebral fracture need to clearly state that the patient has a "fracture," with further pertinent details such as the number, recency, and severity of vertebral fracture, each of which is associated with risk of future fractures. Patients with vertebral fracture should be considered for antifracture therapy. Physical and pharmacologic modalities of pain control and exercises or physiotherapy to maintain spinal movement and strength are important components in the care of vertebral fracture patients.

Keshtgarpour M, Tan WS, Zwanziger J, Awadalla S, Langi FG, **Dudek AZ.** Prognostic value of serum proteomic test and comorbidity index in diversified population with lung cancer. *Anticancer Res*. 2016 Apr;36(4):1759-65.

**BACKGROUND:** The usefulness of serum proteomic test (VeriStrat) in African-Americans with non-small

cell lung cancer (NSCLC), as well as the relationship between comorbidity and test performance, have not been studied. **MATERIALS AND METHODS:** We reviewed records of patients with NSCLC in our practice for whom VeriStrat was performed to assist with the selection of therapy. We correlated survival with VeriStrat test classification, race, and comorbidity index using SAS software 9.4. **RESULTS:** We identified 49 qualified patients; 33 with VeriStrat Good (VSG), 16 with VeriStrat Poor (VSP). When stratified by VSG vs. VSP, overall survival (OS) did not differ between African-Americans and whites [hazard ratio (HR) test (VSG/VSP)=0.78, 95% confidence interval (CI)=0.38-1.61; p=0.51]. OS adjusted for mean Charlson Comorbidity Index (CCI) was not different between erlotinib- and chemotherapy-treated groups in patients with non-squamous NSCLC (adjusted HR=0.91, 95% CI= 0.37-2.23; p=0.84) but was inferior in patients with squamous NSCLC treated with erlotinib (adjusted HR=10.6, 95% CI=1.28-87.8; p=0.029). Cox proportional hazard model for OS effect of VeriStrat test was estimated after adjusting for CCI. In both the VSG and VSP groups, a higher CCI value was associated with lower survival, and at any CCI value, the VSG group had better survival than the VSP group. **CONCLUSION:** Our study corroborates that race does not influence prognostic and predictive values of VeriStrat; however, comorbidities have a significant impact on survival in each proteomic stratum.

Kharbanda AB, Madhok M, Krause E, **Vazquez-Benitez G**, Kharbanda EO, Mize W, Schmelting D. Implementation of electronic clinical decision support for pediatric appendicitis. *Pediatrics*. 2016 May;137(5):e20151745.

**BACKGROUND AND OBJECTIVE:** Computed tomography (CT) and ultrasound (US) are commonly used in patients with acute abdominal pain. We sought to standardize care and reduce CT use while maintaining patient safety through implementation of a multicomponent electronic clinical decision support tool for pediatric patients with possible appendicitis. **METHODS:** We conducted a quasi-experimental study of children 3 to 18 years old who presented with possible appendicitis to the pediatric emergency department (ED) between January 2011 and December 2013. Outcomes were use of CT and US. Balancing measures included missed appendicitis, ED revisits within 30 days, appendiceal perforation, and ED length of stay. **RESULTS:** Of 2803 patients with acute abdominal pain over the 3-year study period, 794 (28%) had appendicitis and 207 (26.1% of those with appendicitis) had a perforation. CT use during the 10-month preimplementation period was 38.8% and declined to 17.7% by the end of the study (54% relative decrease). For CT, segmented regression analysis revealed that there was a significant change in trend from the preimplementation period to implementation (monthly decrease -3.5%; 95% confidence interval: -5.9% to -0.9%; P = .007). US use was 45.7% preimplementation and 59.7% during implementation. However, there was no significant change in US or total imaging trends. There were also no statistically significant differences in rates of missed appendicitis, ED revisits within 30 days, appendiceal perforation, or ED length of stay between time periods. **CONCLUSIONS:** Our electronic clinical decision support tool was associated with a decrease in CT use while maintaining safety and high-quality care for patients with possible appendicitis.

**Kharbanda EO, Vazquez-Benitez G**, Lipkind HS, Klein NP, Cheetham TC, Naleway AL, Lee GM, Hambidge SJ, Jackson ML, Omer SB, McCarthy NL, **Nordin JD**. Maternal Tdap vaccination: coverage and acute safety outcomes in the Vaccine Safety Datalink, 2007-2013. *Vaccine*. 2016 Feb 10;34(7):968-73.

**INTRODUCTION:** Since October 2012, the combined tetanus toxoid, reduced diphtheria toxoid, acellular pertussis vaccine (Tdap) has been recommended in the United States during every pregnancy. **METHODS:** In this observational study from the Vaccine Safety Datalink, we describe receipt of Tdap during pregnancy among insured women with live births across 7 health systems. Using a retrospective matched cohort, we evaluated risks for selected medically attended adverse events in pregnant women occurring within 42 days of vaccination. Using a generalized estimating equation, we calculated adjusted incident rate ratios (AIRR). **RESULTS:** Our vaccine coverage cohort included 438,487 live births between January 1, 2007 and November 15, 2013. Across the coverage cohort, 14% received Tdap during pregnancy. By 2013, Tdap was administered during pregnancy in 41.7% of live births, primarily in the third trimester. Our vaccine safety cohort included 53,885 vaccinated and 109,253 matched unvaccinated pregnant women. There was no increased risk for a composite outcome of medically attended acute adverse events within 3 days of vaccination. Similarly, across the safety cohort, over a 42-day window,

incident neurologic events, thrombotic events, and new-onset proteinuria did not differ by maternal receipt of Tdap. Among women receiving Tdap at 20 weeks gestation or later, as compared to their matched controls, there was no increased risk of gestational diabetes or cardiac events, while venous thromboembolic events and thrombocytopenia were diagnosed within 42 days of vaccination at slightly decreased rates. CONCLUSION: Tdap coverage during pregnancy increased from 2007 through 2013 but was still below 50%. No acute maternal safety signals were detected in this large cohort.

**Kottke TE, Gallagher JM, Rauri S, Tillema JO, Pronk NP, Knudson SM.** New summary measures of population health and well-being for implementation by health plans and accountable care organizations. *Prev Chronic Dis.* 2016 Jul 7;13:E89. PMC4951073.

Health plans and accountable care organizations measure many indicators of patient health, with standard metrics that track factors such as patient experience and cost. They lack, however, a summary measure of the third leg of the Triple Aim, population health. In response, HealthPartners has developed summary measures that align with the recommendations of the For the Public's Health series of reports from the Institute of Medicine. (The series comprises the following 3 reports: For the Public's Health: Investing in a Healthier Future, For the Public's Health: Revitalizing Law and Policy to Meet New Challenges, and For the Public's Health: The Role of Measurement in Action and Accountability.) The summary measures comprise 3 components: current health, sustainability of health, and well-being. The measure of current health is disability-adjusted life years (DALYs) calculated from health care claims and death records. The sustainability of health measure comprises member reporting of 6 behaviors associated with health plus a clinical preventive services index that indicates adherence to evidence-based preventive care guidelines. Life satisfaction represents the summary measure of subjective well-being. HealthPartners will use the summary measures to identify and address conditions and factors that have the greatest impact on the health and well-being of its patients, members, and community. The method could easily be implemented by other institutions and organizations in the United States, helping address a persistent need in population health measurement for improvement.

**Kottke TE, Huebsch JA, McGinnis P, Nichols JM, Parker ED, Tillema JO, Maciosek MV.** Using principles of complex adaptive systems to implement secondary prevention of coronary heart disease in primary care. *Perm J.* 2016 Spring;20(2). PMC4867821.

CONTEXT: Primary care practice. OBJECTIVE: To test whether the principles of complex adaptive systems are applicable to implementation of team-based primary care. DESIGN: We used complex adaptive system principles to implement team-based care in a private, 5-clinic primary care practice. We compared randomly selected samples of patients with coronary heart disease (CHD) and diabetes before system implementation (March 1, 2009, to February 28, 2010) and after system implementation (December 1, 2011, to March 31, 2013). MAIN OUTCOME MEASURES: Rates of patients meeting the composite goals for CHD (blood pressure <140/90 mmHg, low-density lipoprotein cholesterol level <100 mg/dL, tobacco-free, and using aspirin unless contraindicated) and diabetes (CHD goal plus hemoglobin A1c concentration <8%) before and after the intervention. We also measured provider and patient satisfaction with preventive services. RESULTS: The proportion of patients with CHD who met the composite goal increased from 40.3% to 59.9% ( $p < 0.0001$ ) because documented aspirin use increased (65.2%-97.5%,  $p < 0.0001$ ), and attainment of the cholesterol goal increased (77.0%-83.9%,  $p = 0.0041$ ). The proportion of diabetic patients meeting the composite goal rose from 24.5% to 45.4% ( $p < 0.0001$ ) because aspirin use increased (58.6%-97.6%,  $p < 0.0001$ ). Increased percentages of patients meeting the CHD and diabetes composite goals were not significantly different ( $p = 0.2319$ ). Provider satisfaction with preventive services delivery increased significantly ( $p = 0.0017$ ). Patient satisfaction improved but not significantly. CONCLUSION: Principles of complex adaptive systems can be used to implement team-based care systems for patients with CHD and possibly diabetic patients.

**Kottke TE, Maciosek MV, Huebsch JA, McGinnis P, Nichols JM, Parker ED, Tillema JO.** The financial impact of team-based care on primary care. *Am J Manag Care.* 2016 Aug;22(8):e283-6. Project: A09-132 WWMA Trial.

OBJECTIVES: Although team-based care can improve coronary heart disease (CHD) risk factors and is

considered cost-effective from a healthcare system perspective, little is known about the financial impact of team-based primary care for secondary prevention of CHD. The purpose of this study was to define the impact of team-based care for CHD on utilization, costs, and revenue of a private primary care practice. **STUDY DESIGN:** Interrupted time series analysis. **METHODS:** Between March 1, 2010, and March 31, 2013, we assisted a private medical practice comprising 5 primary care clinic sites to organize and deliver team-based care for patients with CHD. We used billing records and the registered nurse care manager's diary to calculate the cost of team-based care, differences in the average number of visits per patient, and revenue per patient before and after the implementation of team-based care. **RESULTS:** The net cost of team-based primary care was \$291 per patient over the 1-year period of observation. **CONCLUSIONS:** The findings from this study are consistent with other economic analyses of team-based care and suggest that payment for care must be restructured if patients are expected to enjoy the benefits of team-based primary care.

**Kottke TE**, Stiefel M, **Pronk NP**. "Well-Being in All Policies": promoting cross-sectoral collaboration to improve people's lives. *Prev Chronic Dis*. 2016 Apr 14;13:E52. PMC4852755.

Krishnan JK, Arun P, Appu AP, Vijayakumar N, Figueiredo TH, Braga MF, Baskota S, Olsen CH, Farkas N, Dagata J, **Frey WH, 2nd**, Moffett JR, Namboodiri AM. Intranasal delivery of obidoxime to the brain prevents mortality and CNS damage from organophosphate poisoning. *Neurotoxicology*. 2016 Mar;53:64-73. PMC4808345.

Intranasal delivery is an emerging method for bypassing the blood brain barrier (BBB) and targeting therapeutics to the CNS. Oximes are used to counteract the effects of organophosphate poisoning, but they do not readily cross the BBB. Therefore, they cannot effectively counteract the central neuropathologies caused by cholinergic overactivation when administered peripherally. For these reasons, we examined intranasal administration of oximes in an animal model of severe organophosphate poisoning to determine their effectiveness in reducing mortality and seizure-induced neuronal degeneration. Using the paraoxon model of organophosphate poisoning, we administered the standard treatment (intramuscular pralidoxime plus atropine sulphate) to all animals and then compared the effectiveness of intranasal application of obidoxime (OBD) to saline in the control groups. Intranasally administered OBD was effective in partially reducing paraoxon-induced acetylcholinesterase inhibition in the brain and substantially reduced seizure severity and duration. Further, intranasal OBD completely prevented mortality, which was 41% in the animals given standard treatment plus intranasal saline. Fluoro-Jade-B staining revealed extensive neuronal degeneration in the surviving saline-treated animals 24 hours after paraoxon administration, whereas no detectable degenerating neurons were observed in any of the animals given intranasal OBD 30 minutes before or 5 minutes after paraoxon administration. These findings demonstrate that intranasally administered oximes bypass the BBB more effectively than those administered peripherally and provide an effective method for protecting the brain from organophosphates. The addition of intranasally administered oximes to the current treatment regimen for organophosphate poisoning would improve efficacy, reducing both brain damage and mortality.

Kumar S, Hossain J, **Nader N**, Aguirre R, Sriram S, Balagopal PB. Decreased circulating levels of spexin in obese children. *J Clin Endocrinol Metab*. 2016 Jul;101(7):2931-6. PMC4929838.

**CONTEXT:** Spexin is a novel peptide that is implicated in obesity and related energy homeostasis in animals and adult humans. Little is known about its role in children. **OBJECTIVE:** The aim of the current study was to determine the potential role of Spexin in obese children and explore its relationships with various cardiometabolic risk factors. **DESIGN AND PARTICIPANTS:** This was a cross-sectional study composed of 69 children (51 obese and 18 normal weight; age 15.3 +/- 0.26 years). **OUTCOME MEASURES:** Spexin was measured using a specific enzyme-linked immunosorbent assay. Leptin, total and high-molecular-weight adiponectin, IL-6, high-sensitivity C-reactive protein, glucose, and insulin were also measured. Mann-Whitney U test, Pearson and Spearman rank correlations, logistic regression, and cluster analysis were used for the analysis and interpretation of the data. **RESULTS:** Spexin levels were significantly lower in obese vs normal-weight children, median (IQR) (0.33 ng/mL [0.27-0.44] vs 0.42 ng/mL [0.33-0.55]; P = .024) but did not correlate with other adipokines and/or insulin and glucose levels. Ordinal categorical variables of Spexin showed a strictly reverse association of obesity with the level of

Spexin. Cluster analysis of Spexin and body mass index z score resulted in splitting the participants into normal-weight and obese-weight groups with high accuracy. **CONCLUSIONS:** Lower circulating levels of Spexin in obese children compared with their normal-weight counterparts and the ability to discriminate obese and normal-weight groups based on Spexin concentration enabled us to suggest a potential role for this novel peptide in childhood obesity. The clinical significance of these findings needs additional investigation.

**Kunin-Batson AS,** Lu X, Balsamo L, Graber K, Devidas M, Hunger SP, Carroll WL, Winick NJ, Mattano LA, Jr., Maloney KW, Kadan-Lottick NS. Prevalence and predictors of anxiety and depression after completion of chemotherapy for childhood acute lymphoblastic leukemia: A prospective longitudinal study. *Cancer*. 2016 May 15;122(10):1608-17. PMC4860039.

**BACKGROUND:** The months immediately after the completion of treatment for childhood acute lymphoblastic leukemia (ALL) are often regarded as a stressful time for children and families. In this prospective, longitudinal study, the prevalence and predictors of anxiety and depressive symptoms after the completion of treatment were examined. **METHODS:** Participants included 160 children aged 2 to 9 years with standard-risk ALL who were enrolled on Children's Oncology Group protocol AALL0331. Parents completed standardized rating scales of their children's emotional-behavioral functioning and measures of coping and family functioning at approximately 1 month, 6 months, and 12 months after diagnosis and again 3 months after the completion of chemotherapy. **RESULTS:** At 3 months off therapy, approximately 24% of survivors had at-risk/clinically elevated anxiety scores, and 28% had elevated depression scores, which are significantly higher than the expected 15% in the general population ( $P = .028$  and  $.001$ , respectively). Patients with elevated anxiety 1 month after diagnosis were at greater risk of off-therapy anxiety (odds ratio, 4.1; 95% confidence interval, 1.31-12.73 [ $P = .022$ ]), and those with elevated depressive symptoms 6 months after diagnosis were at greater risk of off-therapy depression (odds ratio, 7.88; 95% confidence interval, 2.61-23.81 [ $P = .0002$ ]). In adjusted longitudinal analyses, unhealthy family functioning ( $P = .008$ ) and less reliance on social support coping ( $P = .009$ ) were found to be associated with risk of emotional distress. Children from Spanish-speaking families ( $P = .05$ ) also were found to be at a greater risk of distress. **CONCLUSIONS:** A significant percentage of children experience emotional distress during and after therapy for ALL. These data provide a compelling rationale for targeted early screening and psychosocial interventions to support family functioning and coping skills.

**Kunin-Batson AS,** Shapiro EG, Rudser KD, Lavery CA, Bjoraker KJ, Jones SA, Wynn RF, Vellodi A, Tolar J, Orchard PJ, Wraith JE. Long-term cognitive and functional outcomes in children with mucopolysaccharidosis (MPS)-IH (Hurler syndrome) treated with hematopoietic cell transplantation. *JIMD Rep*. 2016;29:95-102. PMC5059216.

The long-term cognitive and functional outcomes of children with mucopolysaccharidosis type I (MPS-IH) post-hematopoietic cell transplant (HCT) are not well documented, and the role of genetic and treatment factors in these outcomes has yet to be defined. In this multisite, international study, we (1) characterize the cognitive and functional status of 47 individuals (ages 2-25, mean of 10.6 years) with MPS-IH who are 1 to 24 years post HCT (mean = 9 years) and (2) examine contributions of genotype, transplant characteristics, and sociodemographic factors to cognitive ability, adaptive behavior, and quality of life. The overall cognitive ability of our sample was mildly impaired, more than 2 standard deviations below general population norms. Parent reported adaptive behaviors (i.e., communication, daily living, and motor skills) were similarly impaired with a relative strength in socialization. Quality of life, as reported by parents, fell more than 2 standard deviations below population norms for physical functioning; however, psychosocial quality of life (emotional well-being) approximated population norms. In linear regression analysis, adjusted for demographic and treatment factors, mutation severity was associated with lower cognitive ability ( $p = 0.005$ ) and adaptive functioning ( $p = 0.004$ ) but not parent ratings of children's quality of life. Older age at HCT was associated with poorer physical quality of life ( $p = 0.002$ ); lower socioeconomic status ( $p = 0.028$ ) and unrelated bone marrow HCT ( $p = 0.010$ ) were associated with poorer psychosocial quality of life. Implications for screening and early intervention for children at risk for poorer cognitive and functional outcomes are described.

**Kunin-Batson AS,** Steele J, Mertens A, Neglia JP. A randomized controlled pilot trial of a Web-based

resource to improve cancer knowledge in adolescent and young adult survivors of childhood cancer. *Psychooncology*. 2016 Nov;25(11):1308-16. PMC5079825.

**OBJECTIVE:** This study examined cancer knowledge in adolescent and young adult (AYA) survivors and pilot tested a Web-based resource to provide individually tailored information regarding cancer treatment history, late effects risk, and resources. **METHODS:** Fifty-two survivors (15 to 28 years old) who completed cancer treatment were recruited from the University of Minnesota oncology clinics. Participants were randomly assigned to receive access to personalized health history, late effects information, and resources via a password-protected Web portal or to standard of care (physician counseling) only. Participants completed surveys measuring cancer knowledge, health locus of control, and psychosocial well-being before randomization and approximately 1 year later. **RESULTS:** Overall, few participants accurately reported their chemotherapy history with detail (19% at baseline and 33% at follow-up), and many did not recognize that previous cancer treatments could impact future health (60% at baseline and 54% at follow-up). Among those randomized to receive access to the website, utilization was very low, making it difficult to draw conclusions about efficacy. Nonetheless, these data suggest that offering tailored information through the Web was not more effective than standard of care at improving cancer knowledge. Anxiety and health beliefs were associated with cancer knowledge, including knowledge of steps survivors could take to mitigate late effects risks ( $p < 0.1$ ). **CONCLUSIONS:** Knowledge gaps exist among AYA survivors regarding important aspects of their treatment histories and ongoing health risks. Offering purely educational information (either in person by providers or via the Web) does not appear to be enough to close this gap.

Lafata JE, Karter AJ, **O'Connor PJ**, Morris H, Schmittiel JA, Ratliff S, Newton KM, Raebel MA, Pathak RD, Thomas A, Butler MG, Reynolds K, Waitzfelder BE, Steiner JF. Medication adherence does not explain black-white differences in cardiometabolic risk factor control among insured patients with diabetes. *J Gen Intern Med*. 2016 Feb;31(2):188-95. PMC4720651. Project: A13-132 SUPREME DM. [Comment in: *J Gen Intern Med*. 2016 Feb;31(2):223.]

**BACKGROUND:** Among patients with diabetes, racial differences in cardiometabolic risk factor control are common. The extent to which differences in medication adherence contribute to such disparities is not known. We examined whether medication adherence, controlling for treatment intensification, could explain differences in risk factor control between black and white patients with diabetes. **METHODS:** We identified 3 cohorts of black and white patients treated with oral medications and who had poor risk factor control at baseline (2009): those with glycosylated hemoglobin (HbA1c)  $>8\%$  ( $n = 37,873$ ), low-density lipoprotein cholesterol (LDL-C)  $>100$  mg/dl ( $n = 27,954$ ), and systolic blood pressure (SBP)  $>130$  mm Hg ( $n = 63,641$ ). Subjects included insured adults with diabetes who were receiving care in 1 of 9 U.S. integrated health systems comprising the SURveillance, PREvention, and ManagEment of Diabetes Mellitus (SUPREME-DM) consortium. Baseline and follow-up risk factor control and sociodemographic and clinical characteristics were obtained from electronic health records. Pharmacy-dispensing data were used to estimate medication adherence (i.e., medication refill adherence [MRA]) and treatment intensification (i.e., dose increase or addition of new medication class) between baseline and follow-up. County-level income and educational attainment were estimated via geocoding. Logistic regression models were used to test the association between race and follow-up risk factor control. Models were specified with and without medication adherence to evaluate its role as a mediator. **RESULTS:** We observed poorer medication adherence among black patients than white patients ( $p < 0.01$ ): 50.6% of blacks versus 39.7% of whites were not highly adherent (i.e., MRA  $<80\%$ ) to HbA1c oral medication(s); 58.4% of blacks and 46.7% of whites were not highly adherent to lipid medication(s); and 33.4% of blacks and 23.7% of whites were not highly adherent to BP medication(s). Across all cardiometabolic risk factors, blacks were significantly less likely to achieve control ( $p < 0.01$ ): 41.5% of blacks and 45.8% of whites achieved HbA1c  $<8\%$ ; 52.6% of blacks and 60.8% of whites achieved LDL-C  $<100$ ; and 45.7% of blacks and 53.6% of whites achieved SBP  $<130$  mm Hg. Adjusting for medication adherence/treatment intensification did not alter these patterns or model fit statistics. **CONCLUSIONS:** Medication adherence failed to explain observed racial differences in the achievement of HbA1c, LDL-C, and SBP control among insured patients with diabetes.

**Lafferty PM.** Building a clinical research network in trauma orthopaedics: The Major Extremity Trauma

Research Consortium (METRC). *J Orthop Trauma*. 2016 Jul;30(7):353-61.

**OBJECTIVES:** Lessons learned from battle have been fundamental to advancing the care of injuries that occur in civilian life. Equally important is the need to further refine these advances in civilian practice so they are available during future conflicts. The Major Extremity Trauma Research Consortium (METRC) was established to address these needs. **METHODS:** METRC is a network of 22 core level I civilian trauma centers and 4 core military treatment centers with the ability to expand patient recruitment to more than 30 additional satellite trauma centers for the purpose of conducting multicenter research studies relevant to the treatment and outcomes of orthopaedic trauma sustained in the military. Early measures of success of the Consortium pertain to building an infrastructure to support the network, managing the regulatory process, and enrolling and following patients in multiple studies. **RESULTS:** METRC has been successful in maintaining the engagement of several leading, high-volume, level I trauma centers that form the core of METRC; together, they operatively manage 15,432 major fractures annually. METRC is currently funded to conduct 18 prospective studies that address 6 priority areas. The design and implementation of these studies are managed through a single coordinating center. As of December 1, 2015, a total of 4560 participants have been enrolled. **CONCLUSIONS:** Success of METRC to date confirms the potential for civilian and military trauma centers to collaborate on critical research issues and leverage the strength that comes from engaging patients and providers from across multiple centers.

Langsetmo, Vo TN, Ensrud KE, Taylor BC, Cawthon PM, Schwartz AV, Bauer DC, Orwoll ES, Lane NE, Barrett-Connor E, **Schousboe JT**, Osteoporotic Fractures in Men (MrOS) Research Group. The association between trabecular bone score and lumbar spine volumetric BMD is attenuated among older men with high body mass index. *J Bone Miner Res*. 2016 Oct;31(10):1820-6.

Trabecular bone score (TBS) has been proposed as a dual-energy X-ray absorptiometry (DXA)-derived measure of underlying quality of trabecular bone; however, TBS is not considered valid for those with body mass index (BMI)  $>37 \text{ kg/m}^2$ . Our objective was to determine the association between TBS and lumbar spine (trabecular) volumetric BMD (LS-VBMD) and to examine whether the association varied by BMI and body composition among older men below this clinical threshold. We used regression models to study 3479 men aged  $\geq 65$  years enrolled in the Osteoporotic Fractures in Men (MrOS) study who had TBS from spine DXA scans, LS-VBMD from central quantitative computed tomography, measures of trunk fat and lean mass from DXA, and BMI  $<37 \text{ kg/m}^2$ . TBS was categorized as normal ( $n = 925$ ), partially degraded ( $n = 1747$ ), and degraded ( $n = 807$ ). TBS was inversely related to BMI, trunk fat mass, and trunk lean mass (all  $p < 0.001$ ). The relationship between TBS and LS-VBMD was nonlinear, with magnitude of effect (slope of regression line using standardized variables) ranging from 0.07 (95% CI, -0.02 to 0.15) among those with degraded TBS up to 0.71 (95% CI, 0.54 to 0.89) among those with normal TBS. The relationship was still nonlinear after adjusting for age, clinical site, and either BMI, trunk lean mass, or trunk fat mass. The magnitude of effect relating TBS and LS-VBMD also decreased with increasing BMI (interaction,  $p = 0.090$ ) and increasing trunk lean mass (interaction,  $p = 0.001$ ) but not with increasing trunk fat mass (interaction,  $p = 0.224$ ). In summary, the strength of the association between TBS and LS-VBMD among older men was variable and dependent on BMI and body composition, particularly trunk lean mass. The clinical utility of TBS among older men may be somewhat limited among men with high BMI or high trunk lean mass.

**Larsen MC, Bohm KC, Rizkala AR, Ward CM.** Outcomes of nonoperative treatment of Salter-Harris II distal radius fractures: a systematic review [review article]. *Hand (N Y)*. 2016 Mar;11(1):29-35. PMC4920512.

**BACKGROUND:** Despite the frequent occurrence of these injuries, we know little about the natural history of Salter-Harris II (SH II) distal radius fractures. We conducted a systematic review of studies examining the radiographic and clinical outcomes of nonoperatively managed SH II distal radius fractures. **METHODS:** Systematic searches of the MEDLINE and Cochrane computerized literature databases and manual searches of bibliographies were performed. We reviewed both descriptive and quantitative data. **RESULTS:** Seven studies including 434 SH II fractures were reviewed. Two studies reported clinical outcomes based on patient age, but neither study described a statistical correlation between patient age

and outcome. Two studies discussed the effect of age on radiographic outcome and reported higher rates of anatomic remodeling in children 10 years or younger. Two studies with long-term (average follow-up greater than 8 years) clinical results reported complication rates of 5%. Long-term follow-up of radiographic outcomes appeared in 4 studies with variable results. Five studies reported the frequency of premature physal arrest after SH II fractures, with results ranging from 0% to 4.3%. **CONCLUSIONS:** Based on this review, no recommendations can be made as to what defines an acceptable reduction or which fractures would benefit from surgical intervention. Angular deformity seems to correct to an acceptable alignment in patients younger than 10 years, but these younger patients seem to be at higher risk for symptomatic shortening if a growth arrest occurs. Redisplacement after reduction is fairly common, and other more severe complications such as pain, loss of motion, and nerve injury can occur.

Lazenby M, Sebego M, Swart NC, Lopez L, **Peterson K**. Symptom burden and functional dependencies among cancer patients in Botswana suggest a need for palliative care nursing. *Cancer Nurs*. 2016 Jan-Feb;39(1):E29-38.

**BACKGROUND:** Palliative care and cancer nursing in sub-Saharan Africa is hampered by inadequate clinical resources and evidence base but is central to symptom management amid the growing cancer burden. **OBJECTIVE:** The aim of this study is to describe symptom burden and functional dependencies of cancer patients in Botswana using the Memorial Symptom Assessment Scale-Short Form (MSAS-SF) and Enforced Social Dependency Scale (ESDS). **METHODS:** A cross-sectional multisite study was conducted in Gaborone, Botswana, from June to August 2013 using MSAS-SF, ESDS, and Eastern Cooperative Oncology Group (ECOG) performance status at 1 time point. Descriptive statistics, tests of association, correlation, and scale validity were used. **RESULTS:** Among the 100 cancer patients, 65 were women, 21 were inpatients, 48 were human immunodeficiency virus-positive, 23 had gynecological malignancies, 34 had stage 4 disease, and 54 received chemotherapy only. Sixty-four reported pain; 54, neuropathies; 51, weight loss; and 51, hunger. Most distressing symptoms were weight loss, body image, skin changes, and pain. Recreational/social role was most affected by cancer. Cronbach's alpha for both the MSAS-SF and ESDS was .91. Variations in means for MSAS-SF and ESDS were associated with ECOG grade 2 ( $P < .05$ ); the ECOG moderately correlated (0.35) with MSAS-SF ( $P < .01$ ). No associations with human immunodeficiency virus status were found. **CONCLUSIONS:** Patients reported distressing levels of cancer pain, weight loss, hunger, and dependency in recreational/social activities. The Setswana translations of the MSAS-SF and ESDS were found reliable to assess cancer patients' symptoms and function. **IMPLICATIONS FOR PRACTICE:** Nurses trained in palliative care are needed to meet cancer patients' pain and symptom management care needs.

Lee J, Walus A, **Billing R**, Hillier LM. The role of distributed education in recruitment and retention of family physicians. *Postgrad Med J*. 2016 Aug;92(1090):436-40.

**BACKGROUND:** Distributed medical education (DME) programs in which training occurs in underserved areas have been established as a strategy to increase recruitment and retention of new physicians following graduation to these areas. Little is known about what makes physicians remain in the area in which they train. **OBJECTIVES:** To explore the factors that contributed to family physicians' decisions to practice in an underserved area following graduation from a DME program. **METHODS:** Semi-structured in-person interviews were conducted with 19 family physicians who graduated from a DME residency training program. Program records were reviewed to identify practice location of DME program graduates. **RESULTS:** Of the 32 graduates to date from this DME program, 66% (N=21) and all of the interview participants established their practices in this region after completing their residency training. Five key themes were identified from the interview analysis as impacting physicians' decisions to establish their practice in an underserved area following graduation: familial ties to the region, practice opportunities, positive clerkship and residency experiences, established relationships with specialists and services in the area and lifestyle opportunities afforded by the location. **CONCLUSIONS:** This study suggests that DME programs can be an effective strategy for equalizing the distribution of family physicians and highlights the ways in which these programs can facilitate recruitment and retention in underserved areas, including being responsive to residents' personal preferences and objectives for learning and shaping their residency experiences to meet to these objectives.

Lee SS, Victor AM, **James MG**, Roach LE, Bernstein GA. School-based interventions for anxious children: long-term follow-up. *Child Psychiatry Hum Dev*. 2016 Apr;47(2):183-93. PMC4658320.

This study examined the long-term outcomes of a nonclinical sample of anxious children (N = 61) who were randomized by school to 9 weeks of group cognitive-behavioral therapy (CBT) for children, group CBT for children plus parent training, or no-treatment control. Parents and children completed measures of anxiety symptoms at baseline, posttreatment, and at 3-, 6-, 12-month, 2-, and 3-year posttreatment follow-ups. Piecewise longitudinal growth curve analyses were applied to the data. When the 2 CBT groups were combined and compared with control, the combined treatment group showed significantly greater reduction in children's anxiety severity based on the parent ratings in the first longitudinal phase. However, on the parent Clinician Severity Rating, gains were maintained to 3 years. Child report revealed no significant differences between groups on anxiety reduction. This study maintained a small no-treatment control group during the entire follow-up period. From parental perspective only, school-based group CBT appeared to be beneficial in decreasing severity of anxiety symptoms and maintaining gains over time.

Leeman L, Dresang LT, **Fontaine PL**. Hypertensive disorders of pregnancy [review article]. *Am Fam Physician*. 2016 Jan 15;93(2):121-7.

Elevated blood pressure in pregnancy may represent chronic hypertension (occurring before 20 weeks' gestation or persisting longer than 12 weeks after delivery), gestational hypertension (occurring after 20 weeks' gestation), preeclampsia, or preeclampsia superimposed on chronic hypertension. Preeclampsia is defined as hypertension and either proteinuria or thrombocytopenia, renal insufficiency, impaired liver function, pulmonary edema, or cerebral or visual symptoms. Proteinuria is not essential for the diagnosis and does not correlate with outcomes. Severe features of preeclampsia include a systolic blood pressure of at least 160 mm Hg or a diastolic blood pressure of at least 110 mm Hg, platelet count less than 100 x 10<sup>3</sup> per microL, liver transaminase levels two times the upper limit of normal, a doubling of the serum creatinine level or level greater than 1.1 mg per dL, severe persistent right upper-quadrant pain, pulmonary edema, or new-onset cerebral or visual disturbances. Preeclampsia without severe features can be managed with twice-weekly blood pressure monitoring, antenatal testing for fetal well-being and disease progression, and delivery by 37 weeks' gestation. Preeclampsia with any severe feature requires immediate stabilization and inpatient treatment with magnesium sulfate, antihypertensive drugs, corticosteroids for fetal lung maturity if less than 34 weeks' gestation, and delivery plans. Preeclampsia can worsen or initially present after delivery. Women with hypertensive disorders should be monitored as inpatients or closely at home for 72 hours postpartum.

Leslie WD, **Schousboe JT**, Lix LM. Towards better use of the net reclassification improvement (NRI) index [editorial]. *Osteoporos Int*. 2016 Jan;27(1):411-2. [Comment on: *Osteoporos Int*. 2015 Jun;26(6):1841-8.]

Levine MD, Hoffman RS, Lavergne V, Stork CM, Graudins A, Chuang R, **Stellpflug SJ**, Morris M, Miller-Nesbitt A, Gosselin S, Lipis Emulsion Workgroup. Systematic review of the effect of intravenous lipid emulsion therapy for non-local anesthetics toxicity [meta-analysis, review article]. *Clin Toxicol (Phila)*. 2016 Mar;54(3):194-221. [Erratum in: *Clin Toxicol (Phila)*. 2016 Mar;54(3):297.]

**BACKGROUND:** The use of intravenous lipid emulsion (ILE) therapy for the treatment of lipophilic drug toxicity is increasing. Despite this, the evidence for its effect in non-local anesthetic toxicity remains sparse. Furthermore, many case reports describe ILE use for substances in which no clear efficacy data exists. The American Academy of Clinical Toxicology established a lipid emulsion workgroup. The aim of this group is to review the available evidence regarding the effect of ILE in non-LA drug poisoning and develop consensus-based recommendations on the use of this therapy. **METHODS:** A systematic review of the literature was performed to capture articles through 15 December 2014. Relevant articles were determined based upon a predefined methodology. Articles involving pre-treatment experiments, pharmacokinetic studies not involving toxicity, and studies not addressing antidotal use of ILE met predefined exclusion criteria. Agreement of at least two members of the subgroup was required before an article could be excluded. **RESULTS:** The final analysis included 203 articles: 141 for humans and 62 for

animals. These include 40 animal experiments and 22 case reports involving animal toxicity. There were three human randomized control trials (RCT): one RCT examined ILE in TCA overdose, one RCT examined ILE in various overdoses, and one study examined ILE in reversal of sedation after therapeutic administration of inhaled anesthesia. One observational study examined ILE in glyphosate overdose. In addition, 137 human case reports or case series were identified. Intravenous lipid emulsion therapy was used in the management of overdose with 65 unique substances. CONCLUSIONS: Despite the use of ILE for multiple substances in the treatment of patients with poisoning and overdose, the effect of ILE in various non-local anesthetic poisonings is heterogenous, and the quality of evidence remains low to very low.

Lewis JR, **Schousboe JT**, Lim WH, Wong G, Zhu K, Lim EM, Wilson KE, Thompson PL, Kiel DP, Prince RL. Abdominal aortic calcification identified on lateral spine images from bone densitometers are a marker of generalized atherosclerosis in elderly women. *Arterioscler Thromb Vasc Biol.* 2016 Jan;36(1):166-73. PMC4702255.

OBJECTIVE: Dual-energy x-ray absorptiometry is a low-cost, minimal radiation technique used to improve fracture prediction. Dual-energy x-ray absorptiometry machines can also capture single-energy lateral spine images, and abdominal aortic calcification (AAC) is commonly seen on these images. APPROACH AND RESULTS: We investigated whether dual-energy x-ray absorptiometry-derived measures of AAC were related to an established test of generalized atherosclerosis in 892 elderly white women aged >70 years with images captured during bone density testing in 1998/1999 and B-mode carotid ultrasound in 2001. AAC scores were calculated using a validated 24-point scale into low (AAC24 score, 0 or 1), moderate (AAC24 scores, 2-5), and severe AAC (AAC24 scores, >5) seen in 45%, 36%, and 19%, respectively. AAC24 scores were correlated with mean and maximum common carotid artery intimal medial thickness ( $rs=0.12$ ,  $P<0.001$  and  $rs=0.14$ ,  $P<0.001$ ). Compared with individuals with low AAC, those with moderate or severe calcification were more likely to have carotid atherosclerotic plaque (adjusted prevalence ratio (PR), 1.35; 95% confidence interval, 1.14-1.61;  $P<0.001$  and prevalence ratio, 1.94; 95% confidence interval, 1.65-2.32;  $P<0.001$ , respectively) and moderate carotid stenosis (adjusted prevalence ratio, 2.22; 95% confidence interval, 1.39-3.54;  $P=0.001$  and adjusted prevalence ratio, 4.82; 95% confidence interval, 3.09-7.050;  $P<0.001$ , respectively). The addition of AAC24 scores to traditional risk factors improved identification of women with carotid atherosclerosis as quantified by C-statistic (+0.075,  $P<0.001$ ), net reclassification (0.249,  $P<0.001$ ), and integrated discrimination (0.065,  $P<0.001$ ). CONCLUSIONS: AAC identified on images from a dual-energy x-ray absorptiometry machine were strongly related to carotid ultrasound measures of atherosclerosis. This low-cost, minimal radiation technique used widely for osteoporosis screening is a promising marker of generalized extracoronary atherosclerosis.

Lin CA, Bhandari M, Guyatt G, Walter SD, Schemitsch EH, Swiontkowski M, Sanders D, Tornetta P 3rd, **Cole PA**, Sprint Investigator. Does participation in a randomized clinical trial change outcomes? An evaluation of patients not enrolled in the SPRINT Trial. *J Orthop Trauma.* 2016 Mar;30(3):156-61.

OBJECTIVES: To determine the extent to which knowledge from clinical trial protocols is transferred to nonparticipating patients. DESIGN: Retrospective review of prospectively collected data from a large clinical trial. SETTING: Six level-1 international trauma centers. METHODS: We compared rates and timing of reoperation in a subset of patients enrolled in the study to prospectively evaluate Reamed Intramedullary Nails in Patients with Tibial Fractures (SPRINT) to concurrent patients who were eligible but not enrolled. This was a retrospective review of prospectively collected trial data. The records of 6 of the original SPRINT centers were searched for non-SPRINT patients who underwent intramedullary nailing of a closed tibial fracture. The rate and timing of reoperation were compared. A  $P < 0.05$  was considered significant. RESULTS: One hundred fourteen non-SPRINT patients were compared with 328 patients enrolled in SPRINT from those same sites. There were 7 reoperations (6.1%) in non-SPRINT patients versus 18 (5.2%) in SPRINT patients [odds ratio (OR) 1.19, 95% confidence interval (CI) 0.41 to 3.13;  $P = 0.811$ ]. There was no difference in the time to reoperation between the SPRINT and non-SPRINT patients (6.2 vs. 6.8 months, 95% CI of the difference -3.8 to 2.6;  $P = 0.685$ ) or in the proportion of patients who underwent reoperation before 6 months (29% vs. 43%; OR 1.75; 95% CI 0.18 to 15.41;  $P = 0.647$ ). CONCLUSIONS: Patients not enrolled in SPRINT had similarly low rates of reoperation for

nonunion, and the average time to reoperation for both groups was longer than 6 months. A 6-month waiting period may have allowed slow-to-heal fractures adequate time to heal, thereby reducing the rate of diagnosis of nonunion. As such, this waiting period could contribute to lower-than-expected reoperation rates for nonunion. It is possible that clinical trials may beneficially influence the care of nonenrolled patients.

Lin M, Joshi N, Grock A, Swaminathan A, Morley EJ, Branzetti J, Taira T, **Ankel FK**, Yarris LM. Approved instructional resources series: a national initiative to identify quality emergency medicine blog and podcast content for resident education. *J Grad Med Educ*. 2016 May;8(2):219-25. PMC4857492.

**BACKGROUND:** Emergency medicine (EM) residency programs can provide up to 20% of their planned didactic experiences asynchronously through the Individualized Interactive Instruction (III) initiative. Although blogs and podcasts provide potential material for III content, programs often struggle with identifying quality online content. **Objective:** To develop and implement a process to curate quality EM content on blogs and podcasts for resident education and III credit. **METHODS:** We developed the Approved Instructional Resources (AIR) Series on the Academic Life in Emergency Medicine website. Monthly, an editorial board identifies, peer reviews, and writes assessment questions for high-quality blog/podcast content. Eight educators rate each post using a standardized scoring instrument. Posts scoring  $\geq 30$  of 35 points are awarded an AIR badge and featured in the series. Enrolled residents can complete an assessment quiz for III credit. After 12 months of implementation, we report on program feasibility, enrollment rate, web analytics, and resident satisfaction scores. **RESULTS:** As of June 2015, 65 EM residency programs are enrolled in the AIR Series, and 2140 AIR quizzes have been completed. A total of 96% (2064 of 2140) of participants agree or strongly agree that the activity would improve their clinical competency, 98% (2098 of 2140) plan to use the AIR Series for III credit, and 97% (2077 of 2140) plan to use it again in the future. **CONCLUSIONS:** The AIR Series is a national asynchronous EM curriculum featuring quality blogs and podcasts. It uses a national expert panel and novel scoring instrument to peer review web-based educational resources.

Love JN, Ronan-Bentle SE, Lane DR, **Hegarty CB**. The standardized letter of evaluation for postgraduate training: a concept whose time has come? *Acad Med*. 2016 Nov;91(11):1480-2.

A medical student's letter of recommendation for postgraduate training applications should provide a fair and accurate assessment of academic and clinical performance, as well as define character attributes pertinent to the practice of medicine. Since its inception in 1997, the emergency medicine (EM) standardized letter of evaluation (SLOE) has evolved into an instrument that provides just such an assessment. Concise, standardized, and discriminating in its assessment of performance relevant to the practice of EM, the SLOE is judged by program directors in EM as the most valuable component of a potential resident's application. Other specialties would benefit from such a specialty-specific perspective, which is currently lacking in most Electronic Residency Application Service application materials. Creation of specialty-specific SLOEs which define performance metrics or competencies and noncognitive personality traits critical to each unique specialty would add substantially to the holistic review of our graduating students. As a result, specialty-specific SLOEs would increase the likelihood that programs could effectively identify applicants who would not only be a "good fit" for their programs but also graduate to become successful physicians.

Luo J, Hendryx M, Manson JE, Liang X, **Margolis KL**. Hysterectomy, oophorectomy, and risk of thyroid cancer. *J Clin Endocrinol Metab*. 2016 Oct;101(10):3812-9. PMC5052349.

**CONTEXT:** Estrogen has been suggested as a risk factor for thyroid cancer. **OBJECTIVE:** The aim of this study is to examine the associations between hysterectomy, bilateral salpingo-oophorectomy (BSO), and incidence of thyroid cancer. **DESIGN:** This was a prospective cohort study. **SETTING:** The study was conducted at 40 clinical centers in the United States. **PARTICIPANTS:** A total of 127 566 women aged 50-79 were enrolled in the Women's Health Initiative during 1993-1998. **MAIN OUTCOME MEASURES:** Hysterectomy and BSO were self-reported. Incident thyroid cancer cases were confirmed by medical record review. **RESULTS:** Three hundred forty-four incident thyroid cancer cases were identified during an average of 14.4 years of follow-up. Compared with women without hysterectomy, women with

hysterectomy, regardless of ovarian status, had a significantly higher risk of thyroid cancer (hazard ratio 1.46 [95% confidence interval 1.16-1.85]). Hysterectomy with BSO was not associated with a lower risk for thyroid cancer compared with hysterectomy alone. Among women with hysterectomy alone, hormone therapy use was associated with lower risk of thyroid cancer (hazard ratio 0.47 [95% confidence interval 0.28-0.78]). However, we did not observe significant associations between hormone therapy use and thyroid cancer in women without hysterectomy or women with hysterectomy plus BSO. **CONCLUSION:** Our large prospective study observed that hysterectomy, regardless of oophorectomy status, was associated with increased risk of thyroid cancer among postmenopausal women. In addition, our data did not support the hypotheses that exogenous estrogen is a risk factor or that estrogen deprivation is a protective factor for thyroid cancer. Further research is needed to clarify whether these apparent associations may be due to shared risk factors between indications for hysterectomy and thyroid cancer.

Luo J, Hendryx M, Qi L, Ho GY, **Margolis KL**. Pre-existing diabetes and lung cancer prognosis. *Br J Cancer*. 2016 Jun 28;115(1):76-9. PMC4931364.

**BACKGROUND:** The aims of this study are to investigate the impact of pre-existing diabetes and diabetes treatments on lung cancer prognosis. **METHODS:** A total of 2484 women with confirmed incident lung cancer from the Women's Health Initiative were followed for an average of 2.9 years through the date of death or 29 August 2014. **RESULTS:** Compared with women with lung cancer but without diabetes, women with lung cancer and diabetes had significantly increased risk of overall mortality (HR=1.27, 95% CI: 1.07-1.50). Women with diabetes receiving insulin or metformin or women who had long duration of diabetes also had increased risk of overall mortality. **CONCLUSIONS:** Our large prospective study provides evidence that pre-existing diabetes is associated with poor overall survival among women with lung cancer, but do not support the hypothesis that metformin use may have a protective effect in women with lung cancer and diabetes.

Luo J, Phillips L, Liu S, Wactawski-Wende J, **Margolis KL**. Diabetes, diabetes treatment, and risk of thyroid cancer. *J Clin Endocrinol Metab*. 2016 Mar;101(3):1243-8. PMC4803153. Project: A05-112 WHI - KM.

**OBJECTIVE:** The objective of this study was to assess the relationships among diabetes, diabetes treatment and thyroid cancer risk using a large prospective cohort, the Women's Health Initiative. **METHODS:** A total of 147 934 women who were free of known cancer at baseline were followed prospectively. Diabetes status and diabetes treatment at baseline and during follow-up were ascertained. Incident cases of thyroid cancers were confirmed by physician review of central medical records and pathology reports. Time-dependent Cox proportional hazards regressions were used to estimate hazard ratios and 95% confidence intervals for thyroid cancer risk associated with diabetes status, diabetes treatment, and duration of diabetes. **RESULTS:** With a median follow-up time of 15.9 years, 391 incident thyroid cancers were identified. We found no significant associations between thyroid cancer and diabetes (hazard ratio = 1.09; 95% confidence interval, 0.79-1.52), diabetes treatment, or duration of diabetes. **CONCLUSION:** Our findings do not support the hypothesis that diabetes, or treatment of diabetes is associated with risk of thyroid cancer among postmenopausal women. Studies to investigate the specific effects of hyperinsulinemia and insulin resistance on thyroid cancer risk may provide additional information.

Lyons JG, Ensrud KE, **Schousboe JT**, McCulloch CE, Taylor BC, Heeren TC, Stuver SO, Fredman L. Slow gait speed and risk of long-term nursing home residence in older women, adjusting for competing risk of mortality: results from the study of osteoporotic fractures. *J Am Geriatr Soc*. 2016 Dec;64(12):2522-7. PMC5173437.

**OBJECTIVES:** To determine whether slow gait speed increases the risk of costly long-term nursing home residence when accounting for death as a competing risk remains unknown. **DESIGN:** Longitudinal cohort study using proportional hazards models to predict long-term nursing home residence and subdistribution models with death as a competing risk. **SETTING:** Community-based prospective cohort study. **PARTICIPANTS:** Older women (mean age 76.3) participating in the Study of Osteoporotic Fractures who were also enrolled in Medicare fee-for-service plans (N = 3,755). **MEASUREMENTS:** Gait speed was

measured on a straight 6-m course and averaged over two trials. Long-term nursing home residence was defined using a validated algorithm based on Medicare Part B claims for nursing home-related care. RESULTS: Participants were followed until long-term nursing home residence, disenrollment from Medicare plan, death, or December 31, 2010. Over the follow-up period (median 11 years), 881 participants (23%) experienced long-term nursing home residence, and 1,013 (27%) died before experiencing this outcome. Slow walkers (55% of participants with gait speed <1 m/s) were significantly more likely than fast walkers to reside in a nursing home long-term (adjusted hazards ratio (aHR) = 1.79, 95% confidence interval (CI) = 1.54-2.09). Associations were attenuated in subdistribution models (aHR = 1.52, 95% CI = 1.30-1.77) but remained statistically significant. CONCLUSION: Older community-dwelling women with slow gait speed are more likely to experience long-term nursing home residence, as well as mortality without long-term residence. Ignoring the competing mortality risk may overestimate long-term care needs and costs.

Makhija SK, Lawson NC, Gilbert GH, Litaker MS, McClelland JA, **Louis DR**, Gordan VV, Pihlstrom DJ, Meyerowitz C, Mungia R, McCracken MS, National Dental PBRN Collaborative Group. Dentist material selection for single-unit crowns: Findings from the National Dental Practice-Based Research Network. *J Dent*. 2016 Dec;55:40-7. PMC5125852.

OBJECTIVES: Dentists enrolled in the National Dental Practice-Based Research Network completed a study questionnaire about techniques and materials used for single-unit crowns and an enrollment questionnaire about dentist/practice characteristics. The objectives were to quantify dentists' material recommendations and test the hypothesis that dentist's and practice's characteristics are significantly associated with these recommendations. METHODS: Surveyed dentists responded to a contextual scenario asking what material they would use for a single-unit crown on an anterior and posterior tooth. Material choices included: full metal, porcelain-fused-to-metal (PFM), all-zirconia, layered zirconia, lithium disilicate, leucite-reinforced ceramic, or other. RESULTS: 1777 of 2132 eligible dentists responded (83%). The top 3 choices for anterior crowns were lithium disilicate (54%), layered zirconia (17%), and leucite-reinforced glass ceramic (13%). There were significant differences ( $p < 0.05$ ) by dentist's gender, race, years since graduation, practice type, region, practice busyness, hours worked/week, and location type. The top 3 choices for posterior crowns were all-zirconia (32%), PFM (31%), and lithium disilicate (21%). There were significant differences ( $p < 0.05$ ) by dentist's gender, practice type, region, practice busyness, insurance coverage, hours worked/week, and location type. CONCLUSIONS: Network dentists use a broad range of materials for single-unit crowns for anterior and posterior teeth, adopting newer materials into their practices as they become available. Material choices are significantly associated with dentist's and practice's characteristics. CLINICAL SIGNIFICANCE: Decisions for crown material may be influenced by factors unrelated to tooth and patient variables. Dentists should be cognizant of this when developing an evidence-based approach to selecting crown material.

Manson TT, Reider L, O'Toole RV, Scharfstein DO, Tornetta P, 3rd, Gary JL, **Lafferty PM**, Major Extremity Trauma Research Consortium (METRC). Variation in treatment of displaced geriatric acetabular fractures among 15 Level-I trauma centers. *J Orthop Trauma*. 2016 Sep;30(9):457-62.

OBJECTIVES: To document the initial treatment of displaced acetabular fractures among older adults across multiple trauma centers and to investigate the factors that influence the decision to operate and the choice of operative procedure [open reduction internal fixation (ORIF) vs. total hip arthroplasty (THA)]. DESIGN: Retrospective observational study. SETTING: Fifteen US level-I trauma centers participating in the Major Extremity Trauma Research Consortium. PATIENTS/PARTICIPANTS: Overall, 269 patients aged 60 years or older admitted for the treatment of a displaced acetabular fracture. INTERVENTION: None. MAIN OUTCOME MEASUREMENTS: Treatment. RESULTS: Sixty percent of fractures ( $n = 162$ ) were treated operatively. Younger age (<80 years), injury from high-energy mechanism, fractures with femoral head impaction, and fractures without hip congruency were significantly associated with receiving operative treatment ( $P < 0.05$ ). Significant site variation in operative versus nonoperative treatment occurred even after accounting for these factors ( $P = 0.0044$ ). Among operatively treated patients, 88% ( $n = 142$ ) received ORIF and 12% ( $n = 20$ ) received THA as the initial treatment. Women were more likely to be treated with initial THA compared with men; of the known risk factors for poor outcomes with ORIF (ie, dome or roof impaction, femoral head impaction, or posterior wall involvement), only dome impaction was

significantly associated with receiving initial THA ( $P < 0.05$ ). **CONCLUSIONS:** Currently, no treatment guidelines exist for acetabular fractures in older adults, which likely explains the significant site variation in operative versus nonoperative treatment. This study identifies patient and injury factors that drive treatment decisions, which will be important in planning and designing future trials needed to determine the best treatment for these fractures.

Marano N, Wojno AE, **Stauffer WM**, Weinberg M, Klosovsky A, Ballew JD, Shetty S, Cookson S, **Walker PF**, Cetron MS. Partnerships that facilitate a refugee's journey to wellbeing. *Am J Trop Med Hyg*. 2016 Nov 2;95(5):985-7. PMC5094247.

The current global refugee crisis involves 65.3 million persons who have been displaced from their homes or countries of origin. While escaping immediate harm may be their first priority, displaced people go on to face numerous health risks, including trauma and injuries, malnutrition, infectious diseases, exacerbation of existing chronic diseases, and mental health conditions. This crisis highlights the importance of building capacity among health-care providers, scientists, and laboratorians to understand and respond to the health needs of refugees. The November 2016 American Society of Tropical Medicine and Hygiene (ASTMH) conference in Atlanta will feature an interactive exhibit entitled "The Refugee Journey to Wellbeing" and three symposia about refugee health. The symposia will focus on tropical disease challenges in refugee populations, careers in refugee health, and recent experiences of governmental agencies and nongovernmental organizations in responding to the global refugee crisis. We invite ASTMH attendees to attend the exhibit and symposia and consider contributions they could make to improve refugee health through tropical disease research or clinical endeavors.

**Margolis KL**, Manson JE. Calcium supplements and cardiovascular disease risk: what do clinicians and patients need to know? *Ann Intern Med*. 2016 Dec 20;165(12):884-5.

**Marini JJ**. Should we embrace the "open lung" approach [editorial]? *Crit Care Med*. 2016 Jan;44(1):237-8. [Comment on: *Crit Care Med*. 2016 Jan;44(1):32-42.]

**Marini JJ**. Strain rate and cycling frequency-The "dynamic duo" of injurious tidal stress. *Crit Care Med*. 2016 Sep;44(9):1800-1.

**Marini JJ**, Jaber S. Dynamic predictors of VILI risk: beyond the driving pressure [editorial]. *Intensive Care Med*. 2016 Oct;42(10):1597-600.

**Marini JJ**, Josephs SA, Mechlin M, Hurford WE. Should early prone positioning be a standard of care in ARDS with refractory hypoxemia [review article]? *Respir Care*. 2016 Jun;61(6):818-29.

For the past 4 decades, the prone position has been employed as an occasional rescue option for patients with severe hypoxemia unresponsive to conventional measures applied in the supine orientation. Prone positioning offers a high likelihood of significantly improved arterial oxygenation to well selected patients, but until the results of a convincing randomized trial were published, its potential to reduce mortality risk remained in serious doubt. Prone positioning does not benefit patients of all disease severities and stages but may be life-saving for others. Because it requires advanced nursing skills and escalation of monitoring surveillance to deploy safely, its place as an early stage standard of care depends on the definition of that label.

Marshall JK, Mbah OM, Ford JG, Phelan-Emrick DF, Ahmed S, Bone L, Wenzel J, **Shapiro GR**, Howerton M, Johnson L, Brown Q, Ewing A, Pollack CE. Effect of patient navigation on breast cancer screening among African American Medicare beneficiaries: a randomized controlled trial. *J Gen Intern Med*. 2016 Jan;31(1):68-76. PMC4700012.

**BACKGROUND:** There is growing evidence that patient navigation improves breast cancer screening rates; however, there are limited efficacy studies of its effect among African American older adult women. **OBJECTIVE:** To evaluate the effect of patient navigation on screening mammography among African American female Medicare beneficiaries in Baltimore, MD. **DESIGN:** The Cancer Prevention and

Treatment Demonstration (CPTD), a multi-site study, was a randomized controlled trial conducted from April 2006 through December 2010. SETTING: Community-based and clinical setting. PARTICIPANTS: The CPTD Screening Trial enrolled 1905 community-dwelling African American female Medicare beneficiaries who were  $\geq 65$  years of age and resided in Baltimore, MD. Participants were recruited from health clinics, community centers, health fairs, mailings using Medicare rosters, and phone calls. INTERVENTIONS: Participants were randomized to either: printed educational materials on cancer screening (control group) or printed educational materials + patient navigation services designed to help participants overcome barriers to cancer screening (intervention group). MAIN MEASURE: Self-reported receipt of mammography screening within 2 years of the end of the study. KEY RESULTS: The median follow-up period for participants in this analysis was 17.8 months. In weighted multivariable logistic regression analyses, women in the intervention group had significantly higher odds of being up to date on mammography screening at the end of the follow-up period compared to women in the control group (odds ratio [OR] 2.26, 95% confidence interval [CI] 1.59-3.22). The effect of the intervention was stronger among women who were not up to date with mammography screening at enrollment (OR 3.63, 95% CI 2.09-6.38). CONCLUSION: Patient navigation among urban African American Medicare beneficiaries increased self-reported mammography utilization. The results suggest that patient navigation for mammography screening should focus on women who are not up to date on their screening.

Marso SP, Daniels GH, Brown-Frandsen K, Kristensen P, Mann JF, Nauck MA, Nissen SE, Pocock S, Poulter NR, Ravn LS, Steinberg WM, Stockner M, Zinman B, **Bergenstal RM**, Buse JB, LEADER Investigators. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med.* 2016 Jul 28;375(4):311-22. PMC4985288. [Comment in: *N Engl J Med.* 2016 Jul 28;375(4):380-2. *N Engl J Med.* 2016 Nov 3;375(18):1797-9. *N Engl J Med.* 2016 Nov 3;375(18):1797. *N Engl J Med.* 2016 Nov 3;375(18):1798.]

BACKGROUND: The cardiovascular effect of liraglutide, a glucagon-like peptide 1 analogue, when added to standard care in patients with type 2 diabetes, remains unknown. METHODS: In this double-blind trial, we randomly assigned patients with type 2 diabetes and high cardiovascular risk to receive liraglutide or placebo. The primary composite outcome in the time-to-event analysis was the first occurrence of death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke. The primary hypothesis was that liraglutide would be noninferior to placebo with regard to the primary outcome, with a margin of 1.30 for the upper boundary of the 95% confidence interval of the hazard ratio. No adjustments for multiplicity were performed for the prespecified exploratory outcomes. RESULTS: A total of 9340 patients underwent randomization. The median follow-up was 3.8 years. The primary outcome occurred in significantly fewer patients in the liraglutide group (608 of 4668 patients [13.0%]) than in the placebo group (694 of 4672 [14.9%]) (hazard ratio, 0.87; 95% confidence interval [CI], 0.78 to 0.97;  $P < 0.001$  for noninferiority;  $P = 0.01$  for superiority). Fewer patients died from cardiovascular causes in the liraglutide group (219 patients [4.7%]) than in the placebo group (278 [6.0%]) (hazard ratio, 0.78; 95% CI, 0.66 to 0.93;  $P = 0.007$ ). The rate of death from any cause was lower in the liraglutide group (381 patients [8.2%]) than in the placebo group (447 [9.6%]) (hazard ratio, 0.85; 95% CI, 0.74 to 0.97;  $P = 0.02$ ). The rates of nonfatal myocardial infarction, nonfatal stroke, and hospitalization for heart failure were nonsignificantly lower in the liraglutide group than in the placebo group. The most common adverse events leading to the discontinuation of liraglutide were gastrointestinal events. The incidence of pancreatitis was nonsignificantly lower in the liraglutide group than in the placebo group. CONCLUSIONS: In the time-to-event analysis, the rate of the first occurrence of death from cardiovascular causes, nonfatal myocardial infarction, or nonfatal stroke among patients with type 2 diabetes mellitus was lower with liraglutide than with placebo.

**Martin CT, McKinney ZJ**, Hoody DG, Fish LH. Diabetic ketoacidosis critical care pathway implementation: incorporation into EMR significantly decreases length of stay. *Endocr Pract.* 2016 Jun;22(6):673-8.

OBJECTIVE: We discuss the implementation and outcomes of a diabetic ketoacidosis (DKA) critical care pathway (CCP) at a 462-bed teaching hospital. METHODS: A multi-disciplinary team implemented a DKA CCP that was translated into 3 computerized physician order entry (CPOE) order sets corresponding to the phases of DKA care. Historical and postintervention data were obtained via automated queries of the

electronic medical record (EMR) and further analyzed by manual chart review. RESULTS: Average length of stay decreased from 104.3 to 72.9 hours ( $P = .0003$ ) after implementation of a DKA CCP. CONCLUSION: Outcome data supports the use of a DKA CCP at our institution. ABBREVIATIONS: DKA = diabetic ketoacidosis CCP = critical care pathway EMR = electronic medical record CPOE = computerized physician order entry ICD-9 = International Classification of Diseases, ninth revision LoS = length of stay SQL = standard query language.

**Martinson BC**, Nelson D, Hagel-Campbell E, Mohr D, Charns MP, Bangerter A, Thrush CR, Ghilardi JR, Bloomfield H, Owen R, Wells JA. Initial results from the Survey of Organizational Research Climates (SOuRCe) in the U.S. Department of Veterans Affairs Healthcare System. *PLoS One*. 2016 Mar 11;11(3):e0151571. PMC4788347.

BACKGROUND: In service to its core mission of improving the health and well-being of veterans, Veterans Affairs (VA) leadership is committed to supporting research best practices in the VA. Recognizing that the behavior of researchers is influenced by the organizational climates in which they work, efforts to assess the integrity of research climates and share such information with research leadership in VA may be one way to support research best practices. The Survey of Organizational Research Climate (SOuRCe) is the first validated survey instrument specifically designed to assess the organizational climate of research integrity in academic research organizations. The current study reports on an initiative to use the SOuRCe in VA facilities to characterize the organizational research climates and pilot test the effectiveness of using SOuRCe data as a reporting and feedback intervention tool. METHODS: We administered the SOuRCe using a cross-sectional, online survey, with mailed follow-up to non-responders, of research-engaged employees in the research services of a random selection of 42 VA facilities (e.g., Hospitals/Stations) believed to employ 20 or more research staff. We attained a 51% participation rate, yielding more than 5,200 usable surveys. RESULTS: We found a general consistency in organizational research climates across a variety of sub-groups in this random sample of research services in the VA. We also observed similar SOuRCe scale score means, relative rankings of these scales and their internal reliability, in this VA-based sample as we have previously documented in more traditional academic research settings. Results also showed more substantial variability in research climate scores within than between facilities in the VA research service as reflected in meaningful subgroup differences. These findings suggest that the SOuRCe is suitable as an instrument for assessing the research integrity climates in VA and that the tool has similar patterns of results that have been observed in more traditional academic research settings. CONCLUSIONS: The local and specific nature of organizational climates in VA research services, as reflected in variability across sub-groups within individual facilities, has important policy implications. Global, "one-size-fits-all" type initiatives are not likely to yield as much benefit as efforts targeted to specific organizational units or sub-groups and tailored to the specific strengths and weaknesses documented in those locations.

Maskery B, Coleman MS, Weinberg M, Zhou W, Rotz L, Klosovsky A, Cantey PT, Fox LM, Cetron MS, **Stauffer WM**. Economic analysis of the impact of overseas and domestic treatment and screening options for intestinal helminth infection among US-bound refugees from Asia. *PLoS Negl Trop Dis*. 2016 Aug 10;10(8):e0004910. PMC4980012.

BACKGROUND: Many U.S.-bound refugees travel from countries where intestinal parasites (hookworm, *Trichuris trichuria*, *Ascaris lumbricoides*, and *Strongyloides stercoralis*) are endemic. These infections are rare in the United States and may be underdiagnosed or misdiagnosed, leading to potentially serious consequences. This evaluation examined the costs and benefits of combinations of overseas presumptive treatment of parasitic diseases vs. domestic screening/treating vs. no program. METHODS: An economic decision tree model terminating in Markov processes was developed to estimate the cost and health impacts of four interventions on an annual cohort of 27,700 U.S.-bound Asian refugees: 1) "No Program," 2) U.S. "Domestic Screening and Treatment," 3) "Overseas Albendazole and Ivermectin" presumptive treatment, and 4) "Overseas Albendazole and Domestic Screening for *Strongyloides*". Markov transition state models were used to estimate long-term effects of parasitic infections. Health outcome measures (four parasites) included outpatient cases, hospitalizations, deaths, life years, and quality-adjusted life years (QALYs). RESULTS: The "No Program" option is the least expensive (\$165,923 per cohort) and least effective option (145 outpatient cases, 4.0 hospitalizations, and 0.67

deaths discounted over a 60-year period for a one-year cohort). The "Overseas Albendazole and Ivermectin" option (\$418,824) is less expensive than "Domestic Screening and Treatment" (\$3,832,572) or "Overseas Albendazole and Domestic Screening for Strongyloides" (\$2,182,483). According to the model outcomes, the most effective treatment option is "Overseas Albendazole and Ivermectin," which reduces outpatient cases, deaths and hospitalization by around 80% at an estimated net cost of \$458,718 per death averted, or \$2,219/\$24,036 per QALY/life year gained relative to "No Program." **DISCUSSION:** Overseas presumptive treatment for U.S.-bound refugees is a cost-effective intervention that is less expensive and at least as effective as domestic screening and treatment programs. The addition of ivermectin to albendazole reduces the prevalence of chronic strongyloidiasis and the probability of rare, but potentially fatal, disseminated strongyloidiasis.

McCarthy NL, Gee J, Sukumaran L, Weintraub E, Duffy J, **Kharbanda EO**, Baxter RP, Irving S, King J, Daley MF, Hechter R, McNeil MM. Vaccination and 30-day mortality risk in children, adolescents, and young adults. *Pediatrics*. 2016 Mar;137(3):e20152970.

**OBJECTIVE:** This study evaluates the potential association of vaccination and death in the Vaccine Safety Datalink (VSD). **METHODS:** The study cohort included individuals ages 9 to 26 years with deaths between January 1, 2005, and December 31, 2011. We implemented a case-centered method to estimate a relative risk (RR) for death in days 0 to 30 after vaccination. Deaths due to external causes (accidents, homicides, and suicides) were excluded from the primary analysis. In a secondary analysis, we included all deaths regardless of cause. A team of physicians reviewed available medical records and coroner's reports to confirm cause of death and assess the causal relationship between death and vaccination. **RESULTS:** Of the 1100 deaths identified during the study period, 76 (7%) occurred 0 to 30 days after vaccination. The relative risks for deaths after any vaccination and influenza vaccination were significantly lower for deaths due to nonexternal causes (RR 0.57, 95% confidence interval [CI] 0.38-0.83, and RR 0.44, 95% CI 0.24-0.80, respectively) and deaths due to all causes (RR 0.72, 95% CI 0.56-0.91, and RR 0.44, 95% CI 0.28-0.65). No other individual vaccines were significantly associated with death. Among deaths reviewed, 1 cause of death was unknown, 25 deaths were due to nonexternal causes, and 34 deaths were due to external causes. The causality assessment found no evidence of a causal association between vaccination and death. **CONCLUSIONS:** Risk of death was not increased during the 30 days after vaccination, and no deaths were found to be causally associated with vaccination.

McNeil MM, Weintraub ES, Duffy J, Sukumaran L, Jacobsen SJ, Klein NP, Hambidge SJ, Lee GM, Jackson LA, Irving SA, King JP, **Kharbanda EO**, Bednarczyk RA, DeStefano F. Risk of anaphylaxis after vaccination in children and adults. *J Allergy Clin Immunol*. 2016 Mar;137(3):868-78. PMC4783279.

**BACKGROUND:** Anaphylaxis is a potentially life-threatening allergic reaction. The risk of anaphylaxis after vaccination has not been well described in adults or with newer vaccines in children. **OBJECTIVE:** We sought to estimate the incidence of anaphylaxis after vaccines and describe the demographic and clinical characteristics of confirmed cases of anaphylaxis. **METHODS:** Using health care data from the Vaccine Safety Datalink, we determined rates of anaphylaxis after vaccination in children and adults. We first identified all patients with a vaccination record from January 2009 through December 2011 and used diagnostic and procedure codes to identify potential anaphylaxis cases. Medical records of potential cases were reviewed. Confirmed cases met the Brighton Collaboration definition for anaphylaxis and had to be determined to be vaccine triggered. We calculated the incidence of anaphylaxis after all vaccines combined and for selected individual vaccines. **RESULTS:** We identified 33 confirmed vaccine-triggered anaphylaxis cases that occurred after 25,173,965 vaccine doses. The rate of anaphylaxis was 1.31 (95% CI, 0.90-1.84) per million vaccine doses. The incidence did not vary significantly by age, and there was a nonsignificant female predominance. Vaccine-specific rates included 1.35 (95% CI, 0.65-2.47) per million doses for inactivated trivalent influenza vaccine (10 cases, 7,434,628 doses given alone) and 1.83 (95% CI, 0.22-6.63) per million doses for inactivated monovalent influenza vaccine (2 cases, 1,090,279 doses given alone). The onset of symptoms among cases was within 30 minutes (8 cases), 30 to less than 120 minutes (8 cases), 2 to less than 4 hours (10 cases), 4 to 8 hours (2 cases), the next day (1 case), and not documented (4 cases). **CONCLUSION:** Anaphylaxis after vaccination is rare in all age groups. Despite its rarity, anaphylaxis is a potentially life-threatening medical emergency that vaccine providers need to be prepared to treat.

Miller CS, **Fricton JR**. Oral medicine specialty? Response to Dr. Vincent. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2016 Dec;122(6):782-3.

Minor JM, Rickey LM, **Bergental RM**. Recurrent endocrine cycles. *J Diabetes Sci Technol*. 2016 Jul;10(4):981-4. PMC4928232.

**BACKGROUND:** The chaotic nature of blood glucose creates a formidable clinical challenge for diabetes healthcare. The recent discovery of recurrent endocrine cycles offers the advantage of advanced-prediction (proactive) health care. **METHODS:** Historical studies covering 111 patients and 1 subject collected several months of glucose readings and their daily metrics. Phase portraits and phase analytics can detect recurrent metric cycles and test their ability to anticipate serious glycemic conditions. **RESULTS:** Recurrent patterns were detected having a rate of ~7 days per complete cycle. Plots and risk models based on these cycles produced advanced alerts for acute glycemia, capturing greater than 96% of true-positive days with a 5% false-positive rate. **CONCLUSIONS:** This method can be implemented graphically and functionally within a BG monitoring system to warn doctors and patients of impending serious glycemic levels.

Mishra PE, **Schwartz BL**, Sarafoglou K, Hook K, Kim Y, Petryk A. Short-term PTH(1-34) therapy in children to correct severe hypocalcemia and hyperphosphatemia due to hypoparathyroidism: two case studies. *Case Rep Endocrinol*. 2016;2016:6838626. PMC5124465.

The standard treatment of hypoparathyroidism is to control hypocalcemia using calcitriol and calcium supplementation. However, in severe cases this approach is insufficient, and the risks of intravenous (i.v.) calcium administration and prolonged hospitalization must be considered. While the use of recombinant human parathyroid hormone 1-34 [rhPTH(1-34)] for long-term control of hypocalcemia has been established, the benefits of short-term rhPTH(1-34) treatment in children have not been explored. We report 2 patients with hypoparathyroidism treated with rhPTH(1-34). Patient 1 is a 10-year-old female with polyglandular autoimmune syndrome type 1. Patient 2 is a 12-year-old female with hypoparathyroidism after total thyroidectomy. Both patients showed poor response to i.v. and oral calcium and calcitriol, and patient 1 did not respond to phosphate binders. Patient 1 had rapid increase in serum calcium with a decrease in serum phosphate after a 3-day course of subcutaneous rhPTH(1-34). Patient 2 had normalization of calcium and phosphate levels after a 7-day course of rhPTH(1-34). These cases support a role for rhPTH(1-34) in the acute management of hypoparathyroidism in hospitalized patients to more rapidly correct hypocalcemia and hyperphosphatemia, shorten hospitalization, and reduce the need for frequent i.v. calcium boluses.

Mittal A, Gupta M, Lamarre Y, **Jahagirdar B**, Gupta K. Quantification of pain in sickle mice using facial expressions and body measurements. *Blood Cells Mol Dis*. 2016 Mar;57:58-66. PMC4746724.

Pain is a hallmark feature of sickle cell disease (SCD). Subjects typically quantify pain by themselves, which can be biased by other factors leading to overtreatment or under-treatment. Reliable and accurate quantification of pain, in real time, might enable to provide appropriate levels of analgesic treatment. The mouse grimace scale (MGS), a standardized behavioral coding system with high accuracy and reliability has been used to quantify varied types of pain. We hypothesized that addition of the objective parameters of body length and back curvature will strengthen the reproducibility of MGS. We examined MGS scores and body length and back curvature of transgenic BERK sickle and control mice following cold treatment or following treatment with analgesic cannabinoid CP55,940. We observed that sickle mice demonstrated decreased length and increased back curvature in response to cold. These observations correlate with changes in facial expression for the MGS score. CP55,940 treatment of sickle mice showed an increase in body length and a decrease in back curvature concordant with MGS scores indicative of an analgesic effect. Thus, body parameters combined with facial expressions may provide a quantifiable unbiased method for objective measure of pain in SCD.

Moon J, Kolar C, Brummel A, **Ekstrand M**, Holtan H, **Rehrauer DJ**. Development and validation of a patient satisfaction survey for comprehensive medication management. *J Manag Care Spec Pharm*. 2016

Jan;22(1):81-6.

**BACKGROUND:** Comprehensive medication management (CMM) services are a relatively new standard for clinical practice. A patient satisfaction tool for pharmacists providing comparable pharmacy services is essential for measuring quality and sustainability. **OBJECTIVE:** To develop a psychometrically valid questionnaire for measuring patient satisfaction for CMM services. **METHODS:** A patient satisfaction survey tool was developed through a multiphase development process. Validation studies were conducted across 2 urban ambulatory care health system settings providing CMM services. The survey consisted of 10 items related to 3 domains: medication-related needs, pharmacist-patient engagement, and overall satisfaction. Using a 4-point scale, the surveys were mailed, collected, and analyzed for descriptive statistics, internal consistency, and factorial composition. **RESULTS:** Total surveys returned for analysis numbered 195, with an overall survey response rate of 19.2%. Factor analysis and item analysis identified 1 factor of pharmacists' patient care services. The factor was named "patient satisfaction." **CONCLUSIONS:** The instrument that was developed provided 1 factor of CMM services. This brief patient satisfaction tool appears to be reliable and valid and may serve other CMM providers to assess 1 measure of quality assurance upon further evaluation. **DISCLOSURES:** The authors have no conflicts of interest to declare. All authors contributed to the study design. Kolar took the lead in data collection, along with Brummel and Ekstrand, with assistance from Moon. Data interpretation was performed by Moon, Kolar, Brummel, and Ekstrand, with assistance from Rehrauer. The manuscript was written by Moon, Holtan, Rehrauer, and Kolar, assisted by Brummel and Ekstrand. Revisions were carried out by Moon, Kolar, Brummel, and Ekstrand, with assistance from Holtan and Rehrauer.

**Moscetti CW, Pronk NP.** Invisible seams: Preventing childhood obesity through an improved obstetrics-pediatrics care continuum [editorial]. *Prev Med reports.* 2016 Nov;5:1-3. PMC5109285.

Progress in altering the current obesity epidemic among children and adolescents remains elusive. Evidence continues to underscore the challenges of altering weight status as children age. Further, weight loss interventions among children and adults alike tend to demonstrate efficacy in the short-term, however individuals tend to slowly revert back to their original weight status over time. New understanding of obesity's early origins suggests the need to rethink current approaches, particularly within healthcare. Instead of a predominant focus on "mid-flight course corrections," healthcare should consider the "take-off" time period for health trajectories. This means improved support and promotion of healthy behaviors before and after birth, and with both the mother and infant. To meet the challenge, greater continuity will be required across obstetrics and pediatrics, which often operate independently, focused on different clinical outcomes. Likewise, there is an urgent need to remedy a significant skills gap within both practices. Through its connection with almost every new mother, healthcare plays a unique and vital role in maternal and child health outcomes. A more seamless obstetrics-pediatrics care continuum could better address the early origins of obesity, factors that we are coming to learn have life-long consequences.

Motalib S, **Dries DJ.** The sepsis saga: sepsis-3-ready for trime time? *Air Med J.* 2016 Sep-Oct;35(5):265-7.

Mullins J, Bliss DZ, **Rolnick SJ,** Henre CA, **Jackson JM.** Barriers to communication with a healthcare provider and health literacy about incontinence among informal caregivers of individuals with dementia. *J Wound Ostomy Continence Nurs.* 2016 Sep-Oct;43(5):539-44. PMC5017302.

**PURPOSE:** The purpose of this study was to examine barriers to communicating with healthcare professionals and health literacy about incontinence among different types of informal caregivers of individuals with Alzheimer disease (AD). **DESIGN:** Descriptive secondary analysis. **SUBJECTS AND SETTING:** The sample included 48 family/friend adult caregivers of individuals who had AD. Seventy-five percent were female; their mean age was 64 +/- 14 years (mean +/- SD). Caregivers were spouses (44%), daughters (31%), or extended family members/friends (25%). Nearly half (48%) of caregivers had a racially or ethnically diverse background; 58% of their care recipients had incontinence. **METHODS:** Data were collected via focus groups, interviews, and written surveys. Verbal responses were audiotaped, transcribed, and analyzed for themes by caregiver type using content analysis. **RESULTS:**

Caregivers of persons with AD described role-related barriers to improving health literacy about incontinence and its management. Main themes of barriers emerged for each type of role that were emotive in nature for daughters, experiential for both spouse caregivers, system related for husbands, and relational (being perceived as an outsider) for extended family/friends. **CONCLUSIONS:** Nurse continence specialists have an important role in raising health literacy about incontinence and its management for informal caregivers of individual with AD. Results inform the development of interventions that are tailored to the type of caregiver as recommended by national health literacy initiatives with the aim of improving outcomes such as incontinence of care recipients.

Murphy MV, Du DT, Hua W, Cortez KJ, Butler MG, Davis RL, DeCoster TA, Johnson L, Li L, Nakasato C, **Nordin JD**, Ramesh M, Schum M, Von Worley A, Zinderman C, Platt R, Klompas M. Risk factors for surgical site infections following anterior cruciate ligament reconstruction. *Infect Control Hosp Epidemiol*. 2016 Jul;37(7):827-33.

**OBJECTIVE:** To determine the effect of graft choice (allograft, bone-patellar tendon-bone autograft, or hamstring autograft) on deep tissue infections following anterior cruciate ligament (ACL) reconstructions. **DESIGN:** Retrospective cohort study. **SETTING AND POPULATION:** Patients from 6 US health plans who underwent ACL reconstruction from January 1, 2000, through December 31, 2008. **METHODS:** We identified ACL reconstructions and potential postoperative infections using claims data. A hierarchical stratified sampling strategy was used to identify patients for medical record review to confirm ACL reconstructions and to determine allograft vs autograft tissue implanted, clinical characteristics, and infection status. We estimated infection rates overall and by graft type. We used logistic regression to assess the association between infections and patients' demographic characteristics, comorbidities, and choice of graft. **RESULTS:** On review of 1,452 medical records, we found 55 deep wound infections. With correction for sampling weights, infection rates varied by graft type: 0.5% (95% CI, 0.3%-0.8%) with allografts, 0.6% (0.1%-1.5%) with bone-patellar tendon-bone autografts, and 2.5% (1.9%-3.1%) with hamstring autograft. After adjusting for potential confounders, we found an increased infection risk with hamstring autografts compared with allografts (odds ratio, 5.9; 95% CI, 2.8-12.8). However, there was no difference in infection risk among bone-patellar tendon-bone autografts vs allografts (odds ratio, 1.2; 95% CI, 0.3-4.8). **CONCLUSIONS:** The overall risk for deep wound infections following ACL reconstruction is low but it does vary by graft type. Infection risk was highest in hamstring autograft recipients compared with allograft recipients and bone-patellar tendon-bone autograft recipients.

Murray AM, Bell EJ, Tupper DE, Davey CS, Pederson SL, Amiot EM, Miley KM, McPherson L, Heubner BM, Gilbertson DT, Foley RN, Drawz PE, Slinin Y, **Rossom RC**, Lakshminarayan K, Vemuri P, Jack CR, Knopman DS. The Brain in Kidney Disease (BRINK) Cohort Study: design and baseline cognitive function. *Am J Kidney Dis*. 2016 Apr;67(4):593-600. PMC5271565.

**BACKGROUND:** The Brain in Kidney Disease (BRINK) Study aims to identify mechanisms that contribute to increased risk for cognitive impairment in patients with chronic kidney disease (CKD). We describe the rationale, design, and methods of the study and report baseline recruitment and cognitive function results. **STUDY DESIGN:** Longitudinal observational cohort study of the epidemiology of cognitive impairment in CKD. The primary aim is to characterize the association between (1) baseline and incident stroke, white matter disease, estimated glomerular filtration rate (eGFR), inflammation, microalbuminuria, and dialysis initiation and (2) cognitive decline over 3 years in a CKD cohort with a mean eGFR<45mL/min/1.73m(2). **SETTING & PARTICIPANTS:** Community-dwelling participants 45 years or older recruited from 4 health systems into 2 groups: reduced eGFR, defined as eGFR<60mL/min/1.73m(2) (non-dialysis dependent), and control, defined as eGFR>=60mL/min/1.73m(2). **PREDICTOR:** eGFR group. **OUTCOMES:** Performance on cognitive function tests and structural brain magnetic resonance imaging. **MEASUREMENTS:** Sequential cognitive and physical function testing, serum and urine biomarker measurement, and brain magnetic resonance images over 3 years. **RESULTS:** Of 554 participants, mean age was 69.3 years; 333, 88, and 133 had eGFRs<45 (non-dialysis dependent, nontransplantation), 45 to <60, and >=60 (controls) mL/min/1.73m(2), respectively. Mean eGFR in reduced-eGFR participants was 34.3mL/min/1.73m(2). Baseline cognitive performance was significantly associated with eGFR in all domains except language. Participants with eGFRs<30mL/min/1.73m(2) performed significantly worse than those with eGFRs>=30mL/min/1.73m(2) on tests of memory, processing speed, and executive

function. Participants with reduced eGFRs overall scored worst on the Immediate Brief Visual-Spatial Memory Test-Revised. LIMITATIONS: Healthy cohort bias, competing risk for death versus cognitive decline. CONCLUSIONS: Cognitive function was significantly worse in participants with eGFRs<30mL/min/1.73m<sup>2</sup>. Future BRINK analyses will measure risk factors for cognitive decline using the longitudinal data.

**Narang PD**, Johnson A, Enja M, Lippmann SB. Pharmacogenomics can enhance prescribing of psychiatric medications. *South Med J*. 2016 Oct;109(10):628-30.

Many psychiatric patients experience pharmaceutical intolerances, and some of them do not derive optimal efficacy from their pharmacotherapies. Clinical problems such as these may result in prolonged dysfunction, adverse consequences, and repeated changes in medication treatment regimens. Pharmacogenomics is a laboratory method that aids individualized medication selection by predicting drug efficacy and adverse effect profiles. It is a technique that involves the testing of patients' genetic makeup to improve medicinal response and tolerance. Pharmacogenomics aims to clarify pharmacokinetics and pharmacodynamics in addition to focusing on hepatic cytochrome enzyme metabolism. Ultimately, it facilitates optimal selection and adjustment of medications to enhance clinical outcomes. Pharmacogenomics is most useful in cases in which routinely prescribed pharmacotherapies are either suboptimally effective or have unacceptable adverse effects. Once there has been a failure of a therapeutic drug treatment, rather than "blindly" selecting an alternative medicine, pharmacogenomic test results can provide guidance for the selection of the most appropriate drug and its dose. The intent is to yield a greater likelihood of patient success in following a therapeutic intervention.

**Narang PD**, Retzlaff A, Brar K, Lippmann SB. Deep brain stimulation for treatment-refractory depression [review article]. *South Med J*. 2016 Nov;109(11):700-3.

Depression has a high lifetime prevalence and recurrence rate, with more than one-third of affected patients experiencing treatment-refractory depression. These individuals should benefit from additional treatment options such as deep brain stimulation (DBS), a research-grade intervention. DBS is being investigated for its efficacy in treatment-refractory cases. We reviewed the English-language literature published between the years 2010 and 2015 regarding the utility of DBS for patients with treatment-refractory depression. The literature review revealed that most DBS research is open label, with few large randomized, placebo-controlled trials to confirm results. Long-term response rates with DBS were between 40% and 70%, with clinical effects depending on location of electrode placement. Improvement was documented to last for months to years. Although DBS is potentially efficacious and a relatively safe option for patients with treatment resistance, it is invasive, costly, and still considered experimental. Understanding of the neurobiology of depression, the mechanism of DBS action, and biomarkers that may predict patient response remains obscure. Future research should contain careful design, including homogenous inclusion criteria and characterization of pretreatment patient mood, somatic complaints, and cognition; consistent outcome measures; monitoring of depressive symptoms at different brain-positioning targets across an adequate time course; and records of stimulus parameters.

Neal JW, Dahlberg SE, Wakelee HA, Aisner SC, Bowden M, Huang Y, Carbone DP, Gerstner GJ, **Lerner RE**, Rubin JL, Owonikoko TK, Stella PJ, Steen PD, Khalid AA, Ramalingam SS, ECOG-ACRIN 1512 Investigators. Erlotinib, cabozantinib, or erlotinib plus cabozantinib as second-line or third-line treatment of patients with EGFR wild-type advanced non-small-cell lung cancer (ECOG-ACRIN 1512): a randomized, controlled, open-label, multicenter, phase 2 trial. *Lancet Oncol*. 2016 Dec;17(12):1661-71. PMC5154681.

BACKGROUND: Erlotinib is approved for the treatment of all patients with advanced non-small-cell lung cancer (NSCLC), but is most active in the treatment of EGFR mutant NSCLC. Cabozantinib, a small molecule tyrosine kinase inhibitor, targets MET, VEGFR, RET, ROS1, and AXL, which are implicated in lung cancer tumorigenesis. We compared the efficacy of cabozantinib alone or in combination with erlotinib versus erlotinib alone in patients with EGFR wild-type NSCLC. METHODS: This three group, randomized, controlled, open-label, multicenter, phase 2 trial was done in 37 academic and community oncology practices in the USA. Patients were eligible if they had received one or two previous treatments

for advanced non-squamous, EGFR wild-type, NSCLC. Patients were stratified by performance status and line of therapy, and randomly assigned using permuted blocks within strata to receive open-label oral daily dosing of erlotinib (150 mg), cabozantinib (60 mg), or erlotinib (150 mg) and cabozantinib (40 mg). Imaging was done every 8 weeks. At the time of radiographic progression, there was optional crossover for patients in either single-drug group to receive combination treatment. The primary endpoint was to compare progression-free survival in patients given erlotinib alone versus cabozantinib alone, and in patients given erlotinib alone versus the combination of erlotinib plus cabozantinib. We assessed the primary endpoint in the per-protocol population, which was defined as all patients who were eligible, randomly assigned, and received at least one dose of treatment. The safety analysis population included all patients who received study treatment irrespective of eligibility. This trial is registered with ClinicalTrials.gov, number NCT01708954. FINDINGS: Between Feb 7, 2013, and July 1, 2014, we enrolled and randomly assigned 42 patients to erlotinib treatment, 40 patients to cabozantinib treatment, and 43 patients to erlotinib plus cabozantinib treatment, of whom 111 (89%) in total were included in the primary analysis (erlotinib [n=38], cabozantinib [n=38], erlotinib plus cabozantinib [n=35]). Compared with erlotinib alone (median 1.8 months [95% CI 1.7-2.2]), progression-free survival was significantly improved in the cabozantinib group (4.3 months [3.6-7.4]; hazard ratio [HR] 0.39, 80% CI 0.27-0.55; one-sided p=0.0003) and in the erlotinib plus cabozantinib group (4.7 months [2.4-7.4]; HR 0.37, 0.25-0.53; one-sided p=0.0003). Among participants included in the safety analysis of the erlotinib (n=40), cabozantinib (n=40), and erlotinib plus cabozantinib (n=39) groups, the most common grade 3 or 4 adverse events were diarrhea (three [8%] cases in the erlotinib group vs three [8%] in the cabozantinib group vs 11 [28%] in the erlotinib plus cabozantinib group), hypertension (none vs ten [25%] vs one [3%]), fatigue (five [13%] vs six [15%] vs six [15%]), oral mucositis (none vs four [10%] vs one [3%]), and thromboembolic event (none vs three [8%] vs two [5%]). One death due to respiratory failure occurred in the cabozantinib group, deemed possibly related to either drug, and one death due to pneumonitis occurred in the erlotinib plus cabozantinib group, deemed related to either drug or the combination. INTERPRETATION: Despite its small sample size, this trial showed that, in patients with EGFR wild-type NSCLC, cabozantinib alone or combined with erlotinib has clinically meaningful, superior efficacy to that of erlotinib alone, with additional toxicity that was generally manageable. Cabozantinib-based regimens are promising for further investigation in this patient population.

**Nelson JD.** Dogma [editorial]. *The ocular surface*. 2016 Oct;14(4):417-8.

**Nelson JD.** Complex, complicated, simple [editorial]. *The ocular surface*. 2016 Jul;14(3):321.

**Nelson JD.** An enigma [editorial]. *The ocular surface*. 2016 Apr;14(2):77.

**Nelson JD.** Transitions [editorial]. *The ocular surface*. 2016 Apr;14(2):78-9.

**Nelson JD.** Helpful and useful [editorial]. *The ocular surface*. 2016 Jan;14(1):1.

**Nelson ZJ, Stellpflug SJ, Engebretsen KM.** What can a urine drug screening immunoassay really tell us [review article]? *J Pharm Pract*. 2016 Oct;29(5):516-26.

Urine drug screening has become standard of care in many medical practice settings to assess compliance, detect misuse, and/or to provide basis for medical or legal action. The antibody-based enzymatic immunoassays used for qualitative analysis of urine have significant drawbacks that clinicians are often not aware of. Recent literature suggests that there is a lack of understanding of the shortcomings of these assays by clinicians who are ordering and/or interpreting them. This article addresses the state of each of the individual immunoassays that are most commonly used today in order to help the reader become proficient in the interpretation and application of the results. Some literature already exists regarding sources of "false positives" and "false negatives," but none seem to present the material with the practicing clinician in mind. This review aims to avoid overwhelming the reader with structures and analytical chemistry. The reader will be presented relevant clinical knowledge that will facilitate appropriate interpretation of immunoassays regardless of practice settings. Using this review as a learning tool and a reference, clinicians will be able to interpret the results of commonly used immunoassays in an evidence-based, informed manner and minimize the negative impact that

misinterpretation has on patient care.

Newman MG, Shin KE, **Zuellig AR**. Developmental risk factors in generalized anxiety disorder and panic disorder. *J Affect Disord*. 2016 Dec;206:94-102. PMC5077703.

**BACKGROUND:** There is a lack of clarity regarding specific risk factors discriminating generalized anxiety disorder (GAD) from panic disorder (PD). **GOAL:** This study investigated whether GAD and PD could be discriminated through differences in developmental etiological factors including childhood parental loss/separation, psychological disorders, and maternal and paternal attachment. **METHOD:** Twenty people with adult generalized anxiety disorder (GAD), 20 with adult panic disorder (PD), 11 with adult comorbid GAD and PD, and 21 adult non-anxious controls completed diagnostic interviews to assess symptoms of mental disorders in adulthood and childhood. Participants also reported on parental attachment, loss and separation. **RESULTS:** Childhood diagnoses of GAD and PD differentiated clinical groups from controls as well as from each other, suggesting greater likelihood for homotypic over heterotypic continuity. Compared to controls, specific phobia was associated with all three clinical groups, and childhood depression, social phobia, and PTSD were uniquely associated with adult GAD. Both maternal and paternal attachment also differentiated clinical groups from controls. However, higher levels of subscales reflecting maternal insecure avoidant attachment (e.g., no memory of early childhood experiences and balancing/forgiving current state of mind) emerged as more predictive of GAD relative to PD. There were no group differences in parental loss or separation. **CONCLUSIONS:** These results support differentiation of GAD and PD based on developmental risk factors. Recommendations for future research and implications of the findings for understanding the etiology and symptomatology of GAD and PD are discussed.

Ngo LQ, Wu AG, Nguyen MA, **McPherson LE, Gertner E**. A case report of autoimmune necrotizing myositis presenting as dysphagia and neck swelling. *BMC Ear Nose Throat Disord*. 2016 May 17;16:7. PMC4869331.

**BACKGROUND:** Severe dysphagia may occur in the immune mediated necrotizing myopathies (IMNM). Neck swelling and severe dysphagia as the initial symptoms upon presentation has not been previously described. **CASE PRESENTATION:** A 55-year-old male with a 4 week history of neck swelling, fatigue, dysphagia, myalgias, night sweats, and cough was admitted for an elevated CK. He underwent extensive infectious and inflammatory evaluation including neck imaging and muscle biopsy. Neck CT and MRI showed inflammation throughout his strap muscles, retropharyngeal soft tissues and deltoids. Infectious work up was negative. Deltoid muscle biopsy demonstrated evidence of IMNM. Lab tests revealed anti-3-hydroxy-3-methylglutaryl-coenzyme A reductase (HMGCR) antibodies confirming the diagnosis of HMGCR IMNM. **CONCLUSIONS:** HMGCR IMNM is a rare and incompletely understood disease process. Awareness of HMGCR IMNM could potentially lead to earlier diagnosis, treatment and improved clinical outcomes as disease progression can be rapid and severe.

**Nixdorf DR**, Law AS, Lindquist K, Reams GJ, Cole E, Kanter K, Nguyen RH, Harris DR, National Dental PBRN Collaborative Group. Frequency, impact, and predictors of persistent pain after root canal treatment: a national dental PBRN study. *Pain*. 2016 Jan;157(1):159-65. PMC4684798. Project: A11-037 National Dental PBRN.

Root canal treatment (RCT) is commonly performed surgery and persistent pain is known to occur, but little is known about how these patients are affected by this pain. Although biopsychosocial mechanisms are thought to be associated with the development of such pain, similar to persistent pain after surgery in other body sites, little is known about the baseline predictors for persistent pain. We assessed the frequency of persistent pain 6 months after RCT, measured the impact this pain had on patients, and determined predictive factors for persistent tooth pain in a multicenter prospective cohort study conducted within the National Dental Practice-Based Research Network. Of 708 patients enrolled, 651 (91.9%) provided follow-up data, with 65 (10.0%) meeting criteria for pain 6 months after RCT. On average, these patients reported their pain as mild to moderate in intensity, present for approximately 10 days in the preceding month, and minimally interfered with daily activities. After adjusting for the type of dental practitioner and patient age, gender, and household income, pain duration over the week before RCT

significantly increased the risk of developing persistent pain (odds ratio = 1.19 per 1day increase in pain duration, 95% confidence interval: 1.07-1.33), whereas optimism about the procedure reduced the risk (odds ratio = 0.39, 95% confidence interval: 0.22-0.67). Our data suggest that persistent pain 6 months after RCT is fairly common, but generally does not have a large impact on those experiencing it. Furthermore, patient age and gender did not predict persistent pain, whereas preoperative pain duration and the patient's expectation did.

Nuttall FQ, **Almokayyad RM**, Gannon MC. The ghrelin and leptin responses to short-term starvation vs a carbohydrate-free diet in men with type 2 diabetes; a controlled, cross-over design study. *Nutr Metab (Lond)*. 2016 Jul 22;13:47. PMC4957917.

**BACKGROUND:** We recently have reported the 24-hour glucose, insulin and glucagon responses to a 72-hour fast compared to a 72-hour macronutrient-sufficient, carbohydrate-free diet in men with type 2 diabetes. The 72-hour time period was used because it is the time required for the major metabolic adjustments to a lack of food to be instituted. As part of that study, ghrelin and leptin responses were monitored. **METHODS:** Twenty-four-hour total ghrelin and overnight fasting leptin concentrations were determined in males with type 2 diabetes when ingesting a standard, mixed meal diet (control), followed by a carbohydrate-free diet for 72 hours or were starved for 72 hours, using a crossover design. **RESULTS:** A rise in ghrelin concentration before and a decrease after meals was present when the standard diet was ingested. However, in contrast to literature reports in normal subjects, a circadian variation was not apparent. Meal-related changes were absent with starvation. A carbohydrate-free diet resulted in a daylong decrease in ghrelin. It also resulted in a 19% decrease in the overnight fasting leptin concentration. Leptin was decreased 54% with total starvation. **CONCLUSION:** Ingestion of a typical mixed-meal diet results in meal-related changes in ghrelin similar to those reported in normal subjects, although the circadian rhythm was not apparent. Except for the lack of meal-related changes, starvation did not change the concentration. A carbohydrate-free, high-fat diet resulted in a daylong suppression of ghrelin. The leptin concentration was decreased by both the carbohydrate-free diet and starvation.

Nwachukwu BU, Schairer WW, McCormick F, Dines DM, **Craig EV**, Gulotta LV. Arthroplasty for the surgical management of complex proximal humerus fractures in the elderly: a cost-utility analysis. *J Shoulder Elbow Surg*. 2016 May;25(5):704-13.

**BACKGROUND:** Shoulder hemiarthroplasty (HA) has been the standard treatment for complex proximal humerus fractures in the elderly requiring surgery but not amenable to fixation. Reverse total shoulder arthroplasty (RTSA) has also emerged as a costly albeit highly effective alternative. The purpose of this study was to compare the cost-effectiveness of nonoperative fracture care, HA, and RTSA for complex proximal humerus fractures from the perspective of both U.S. payers and hospitals. **METHODS:** A Markov model was constructed for the treatment alternatives. Costs were expressed in 2013 U.S. dollars and effectiveness in quality-adjusted life-years (QALYs). The principal outcome measure was incremental cost-effectiveness ratio (ICER). Sensitivity analyses were performed to evaluate model assumptions. **RESULTS:** In the base case, from the payer perspective, RTSA was associated with an ICER of \$8,100/QALY; HA was eliminated from payer analysis as a cost-ineffective strategy. From the hospital perspective, however, HA was not cost-ineffective and the ICER for HA was \$36,700/QALY, with RTSA providing incremental effectiveness at \$57,400/QALY. RTSA was the optimal strategy in 61% and 54% of payer and hospital probabilistic sensitivity analyses, respectively. The preferred strategy was dependent on associated QALY gains, primary RTSA cost, and failure rates for RTSA. **CONCLUSIONS:** RTSA can be a cost-effective intervention in the surgical treatment of complex proximal humerus fractures. HA can also be a cost-effective intervention, depending on the cost perspective (cost-ineffective for payor but cost-effective for the hospital). This analysis highlights the opportunities for increased cost-sharing strategies to alleviate the cost burden on hospitals.

Obremskey WT, Agel J, Archer K, To P, Tornetta P, 3rd, **Cole PA**, Sprint Investigator. Character, incidence, and predictors of knee pain and activity after infrapatellar intramedullary nailing of an isolated tibia fracture. *J Orthop Trauma*. 2016 Mar;30(3):135-41. PMC4761290.

**OBJECTIVE:** To study the activity and incidence of knee pain after sustaining an isolated tibia fracture

treated with an intrapatellar intramedullary nail at 1 year. DESIGN: Retrospective review of prospective cohort. SETTING: Multicenter Academic and Community hospitals. PATIENTS: Four hundred thirty-seven patients with an isolated tibia fracture completed a 12-month assessment on pain and self-reported activity. INTERVENTION: Infrapatellar intramedullary nail. OUTCOMES: Demographic information, comorbid conditions, injury characteristics, and surgical technique were recorded. Knee pain was defined on a 1-7 scale with 1 being "no pain" and 7 being a "very great deal of pain." Knee pain >4 was considered clinically significant. Patients reported if they were "able," "able with difficulty," or "unable" to perform the following activities: kneel, run, climb stairs, and walk prolonged. Variables were tested in multilevel multivariable regression analyses. RESULTS: In knee pain, 11% of patients reported a "good deal" to a "very great deal" of pain (>4), and 52% of patients reported "no" or "very little" pain at 12 months. In activity at 12 months, 26% and 29% of patients were unable to kneel or run, respectively, and 31% and 35% of patients, respectively, stated they were able with difficulty or unable to use stairs or walk. CONCLUSIONS: Clinically significant knee pain (>4/7) was present in 11% of patients 1 year after a tibia fracture. Of note, 31%-71% of patients had difficulty performing or were unable to perform routine daily activities of kneeling, running, and stair climbing, or walking prolonged distances.

O'Connor E, **Rossom RC**, Henninger M, Groom HC, Burda BU. Primary care screening for and treatment of depression in pregnant and postpartum women: Evidence Report and Systematic Review for the US Preventive Services Task Force [review article]. *JAMA*. 2016 Jan 26;315(4):388-406.

IMPORTANCE: Depression is a source of substantial burden for individuals and their families, including women during the pregnant and postpartum period. OBJECTIVE: To systematically review the benefits and harms of depression screening and treatment, and accuracy of selected screening instruments, for pregnant and postpartum women. Evidence for depression screening in adults in general is available in the full report. DATA SOURCES: MEDLINE, PubMed, PsycINFO, and the Cochrane Collaboration Registry of Controlled Trials through January 20, 2015; references; and government websites. STUDY SELECTION: English-language trials of benefits and harms of depression screening, depression treatment in pregnant and postpartum women with screen-detected depression, and diagnostic accuracy studies of depression screening instruments in pregnant and postpartum women. DATA EXTRACTION AND SYNTHESIS: Two investigators independently reviewed abstracts and full-text articles and extracted data from fair- and good-quality studies. Random-effects meta-analysis was used to estimate the benefit of cognitive behavioral therapy (CBT) in pregnant and postpartum women. MAIN OUTCOMES AND MEASURES: Depression remission, prevalence, symptoms, and related measures of depression recovery or response; sensitivity and specificity of selected screening measures to detect depression; and serious adverse effects of antidepressant treatment. RESULTS: Among pregnant and postpartum women 18 years and older, 6 trials (n = 11,869) showed 18% to 59% relative reductions with screening programs, or 2.1% to 9.1% absolute reductions, in the risk of depression at follow-up (3-5 months) after participation in programs involving depression screening, with or without additional treatment components, compared with usual care. Based on 23 studies (n = 5398), a cutoff of 13 on the English-language Edinburgh Postnatal Depression Scale demonstrated sensitivity ranging from 0.67 (95% CI, 0.18-0.96) to 1.00 (95% CI, 0.67-1.00) and specificity consistently 0.87 or higher. Data were sparse for Patient Health Questionnaire instruments. Pooled results for the benefit of CBT for pregnant and postpartum women with screen-detected depression showed an increase in the likelihood of remission (pooled relative risk, 1.34 [95% CI, 1.19-1.50]; No. of studies [K] = 10, I<sup>2</sup> = 7.9%) compared with usual care, with absolute increases ranging from 6.2% to 34.6%. Observational evidence showed that second-generation antidepressant use during pregnancy may be associated with small increases in the risks of potentially serious harms. CONCLUSIONS AND RELEVANCE: Direct and indirect evidence suggested that screening pregnant and postpartum women for depression may reduce depressive symptoms in women with depression and reduce the prevalence of depression in a given population. Evidence for pregnant women was sparser but was consistent with the evidence for postpartum women regarding the benefits of screening, the benefits of treatment, and screening instrument accuracy.

O'Connor PJ, **Sperl-Hillen JM**, **Fazio CJ**, **Averbeck BM**, **Rank BH**, **Margolis KL**. Outpatient diabetes clinical decision support: current status and future directions [review article]. *Diabet Med*. 2016 Jun;33(6):734-41. Project: A09-096 Priorities.

Outpatient clinical decision support systems have had an inconsistent impact on key aspects of diabetes care. A principal barrier to success has been low use rates in many settings. Here, we identify key aspects of clinical decision support system design, content and implementation that are related to sustained high use rates and positive impacts on glucose, blood pressure and lipid management. Current diabetes clinical decision support systems may be improved by prioritizing care recommendations, improving communication of treatment-relevant information to patients, using such systems for care coordination and case management and integrating patient-reported information and data from remote devices into clinical decision algorithms and interfaces.

**O'Halloran KP**, Coale M, Costales T, Zerhusen T, Jr., Castillo RC, Nascone JW, O'Toole RV. Will my tibial fracture heal? Predicting nonunion at the time of definitive fixation based on commonly available variables. *Clin Orthop Relat Res*. 2016 Jun;474(6):1385-95. PMC4868164.

**BACKGROUND:** Accurate prediction of tibial nonunions has eluded researchers. Reliably predicting tibial nonunions at the time of fixation could change management strategies and stimulate further research. **QUESTIONS/PURPOSES:** We asked (1) whether data from medical records, fracture characteristics, and radiographs obtained at the time of fixation would identify features predictive of tibial fracture nonunion; and (2) whether this information could be used to create a model to assess the chance of nonunion at the time of intramedullary (IM) nail fixation of the tibia. **METHODS:** We retrospectively reviewed all tibial shaft fractures treated at our center from 2007 to 2014. We conducted a literature review and collected data on 35 factors theorized to contribute to delayed bone healing. Patients were followed to fracture healing or surgery for nonunion. Patients with planned prophylactic nonunion surgery were excluded because their nonunions were anticipated and our focus was on unanticipated nonunions. Our cohort consisted of 382 patients treated with IM nails for tibial shaft fractures (nonunion, 56; healed, 326). Bivariate and multivariate regression techniques and stepwise modeling approaches examined the relationship between variables available at definitive fixation. Factors were included in our model if they were identified as having a modest to large effect size (odds ratio > 2) at the  $p < 0.05$  level. **RESULTS:** A multiple variable logistic regression model was developed, including seven factors ( $p < 0.05$ ; odds ratio > 2.0). With these factors, we created the Nonunion Risk Determination (NURD) score. The NURD score assigns 5 points for flaps, 4 points for compartment syndrome, 3 points for chronic condition(s), 2 points for open fractures, 1 point for male gender, and 1 point per grade of American Society of Anesthesiologists Physical Status and percent cortical contact. One point each is subtracted for spiral fractures and for low-energy injuries, which were found to be predictive of union. A NURD score of 0 to 5 had a 2% chance of nonunion; 6 to 8, 22%; 9 to 11, 42%; and > 12, 61%. **CONCLUSIONS:** The proposed nonunion prediction model (NURDS) seems to have potential to allow clinicians to better determine which patients have a higher risk of nonunion. Future work should be directed at prospectively validating and enhancing this model.

Owens DK, Whitlock EP, Henderson J, Pignone MP, Krist AH, Bibbins-Domingo K, Curry SJ, Davidson KW, Ebell M, Gillman MW, Grossman DC, Kemper AR, Kurth AE, **Maciosek MV**, Siu AL, LeFevre ML, U.S. Preventive Services Task Force. Use of decision models in the development of evidence-based clinical preventive services recommendations: methods of the U.S. Preventive Services Task Force. *Ann Intern Med*. 2016 Oct 4;165(7):501-8.

The U.S. Preventive Services Task Force (USPSTF) develops evidence-based recommendations about preventive care based on comprehensive systematic reviews of the best available evidence. Decision models provide a complementary, quantitative approach to support the USPSTF as it deliberates about the evidence and develops recommendations for clinical and policy use. This article describes the rationale for using modeling, an approach to selecting topics for modeling, and how modeling may inform recommendations about clinical preventive services. Decision modeling is useful when clinical questions remain about how to target an empirically established clinical preventive service at the individual or program level or when complex determinations of magnitude of net benefit, overall or among important subpopulations, are required. Before deciding whether to use decision modeling, the USPSTF assesses whether the benefits and harms of the preventive service have been established empirically, assesses whether there are key issues about applicability or implementation that modeling could address, and then defines the decision problem and key questions to address through modeling. Decision analyses

conducted for the USPSTF are expected to follow best practices for modeling. For chosen topics, the USPSTF assesses the strengths and limitations of the systematically reviewed evidence and the modeling analyses and integrates the results of each to make preventive service recommendations.

Owen-Smith A, Stewart C, Green C, Ahmedani BK, Waitzfelder BE, **Rossom RC**, Copeland LA, Simon GE. Adherence to common cardiovascular medications in patients with schizophrenia vs. patients without psychiatric illness. *Gen Hosp Psychiatry*. 2016 Jan-Feb;38:9-14. PMC4698196.

**OBJECTIVE:** The purpose of the study was to examine whether individuals with diagnoses of schizophrenia were differentially adherent to their statin or angiotensin-converting enzyme inhibitor/angiotensin receptor blocker (ACEI/ARB) medications compared to individuals without psychiatric illness. **METHOD:** Using electronic medical record data across 13 Mental Health Research Network sites, individuals with diagnoses of schizophrenia or schizoaffective disorder receiving two or more medication dispensings of a statin or an ACEI/ARB in 2011 (N=710) were identified and matched on age, sex and Medicare status to controls with no documented mental illness and two or more medication dispensings of a statin in 2011 (N=710). Medication adherence, and sociodemographic and clinical characteristics of the study population were assessed. **RESULTS:** Multivariable models indicated that having a schizophrenia diagnosis was associated with increased odds of statin medication adherence; the odds ratio suggested a small effect. After adjustment for medication regimen, schizophrenia no longer showed an association with statin adherence. Having a schizophrenia diagnosis was not associated with ACEI/ARB medication adherence. **CONCLUSIONS:** Compared to patients without any psychiatric illness, individuals with schizophrenia were marginally more likely to be adherent to their statin medications. Given that patterns of adherence to cardioprotective medications may be different from patterns of adherence to antipsychotic medications, improving adherence to the former may require unique intervention strategies.

Paolino AR, McGlynn EA, Lieu TA, **Nelson AF**, Prausnitz SR, Horberg MA, Arterburn DE, Gould MK, Laws RL, Steiner JF. Building a governance strategy for CER: the Patient Outcomes Research to Advance Learning (PORTAL) Network experience. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*. 2016 Mar 28;4(2):1216. PMC4827785.

**INTRODUCTION:** The Patient Outcomes Research to Advance Learning (PORTAL) Network was established with funding from the Patient-Centered Outcomes Research Institute (PCORI) in 2014. The PORTAL team adapted governance structures and processes from past research network collaborations. We will review and outline the structures and processes of the PORTAL governance approach and describe how proactively focusing on priority areas helped us to facilitate an ambitious research agenda. **BACKGROUND:** For years a variety of funders have supported large-scale infrastructure grants to promote the use of clinical datasets to answer important comparative effectiveness research (CER) questions. These awards have provided the impetus for health care systems to join forces in creating clinical data research networks. Often, these scientific networks do not develop governance processes proactively or systematically, and address issues only as problems arise. Even if network leaders and collaborators foresee the need to develop governance approaches, they may underestimate the time and effort required to develop sound processes. The resulting delays can impede research progress. **INNOVATION:** Because the PORTAL sites had built trust and a foundation of collaboration by participating with one another in past research networks, essential elements of effective governance such as guiding principles, decision making processes, project governance, data governance, and stakeholders in governance were familiar to PORTAL investigators. This trust and familiarity enabled the network to rapidly prioritize areas that required sound governance approaches: responding to new research opportunities, creating a culture of trust and collaboration, conducting individual studies, within the broader network, assigning responsibility and credit to scientific investigators, sharing data while protecting privacy/security, and allocating resources. The PORTAL Governance Document, complete with a Toolkit of Appendices is included for reference and for adaptation by other networks. **CREDIBILITY:** As a result of identifying project-based governance priorities (IRB approval, subcontracting, selection of new research including lead PI and participating sites, and authorship) and data governance priorities (reciprocal data use agreement, analytic plan procedures, and other tools for data governance), PORTAL established most of its governance structure by Month 6 of the 18 month project. This allowed science to

progress and collaborators to experience first-hand how the structures and procedures functioned in the remaining 12 months of the project, leaving ample time to refine them and to develop new structures or processes as necessary. **DISCUSSION:** The use of procedures and processes with which participating investigators and their home institutions were already familiar allowed project and regulatory requirements to be established quickly to protect patients, their data, and the health care systems that act as stewards for both. As the project progressed, PORTAL was able to test and adjust the structures it put place, and to make substantive revisions by Month 17. As a result, priority processes have been predictable, transparent and effective. **CONCLUSION/NEXT STEPS:** Strong governance practices are a stewardship responsibility of research networks to justify the trust of patients, health plan members, health care delivery organizations, and other stakeholders. Well-planned governance can reduce the time necessary to initiate the scientific activities of a network, a particular concern when the time frame to complete research is short. Effective network and data governance structures protect patient and institutional data as well as the interests of investigators and their institutions, and assures that the network has built an environment to meet the goals of the research.

Pardey PG, Chan-Kang C, **Dehmer SP**, Beddow JM. Agricultural R&D is on the move. *Nature*. 2016 Sep 16;537(7620):301-3.

Big shifts in where research and development in food and agriculture is carried out will shape future global food production.

**Parker DL, Yamin SC, Xi M**, Brosseau LM, **Gordon R**, Most IG, Stanley R. Findings from the National Machine Guarding Program: a small business intervention: lockout/tagout. *J Occup Environ Med*. 2016 Jan;58(1):61-8. PMC4961089.

**OBJECTIVE:** Failure to implement lockout/tagout (LOTO) procedures adversely affects the rate of work-related fatalities and serious traumatic injury and is one of the most frequently cited Occupational Safety and Health Administration standards. This study assesses the impact of a nationwide intervention to improve LOTO in small metal fabrication businesses. **METHODS:** Insurance safety consultants conducted a standardized and validated evaluation of LOTO programs and procedures. Businesses received a baseline evaluation, two intervention visits, and a 12-month follow-up evaluation. **RESULTS:** The intervention was completed by 160 businesses. The mean LOTO procedure score improved from 8% to 33% ( $P < 0.0001$ ), the mean program score went from 55% to 76% ( $P < 0.0001$ ), and the presence of lockable disconnects went from 88% to 92% ( $P < 0.0001$ ). **CONCLUSIONS:** This nationwide intervention showed substantial improvements in LOTO. It provides a framework for assessing and improving LOTO.

**Parker DL, Yamin SC, Xi M**, Brosseau LM, **Gordon R**, Most IG, Stanley R. Findings from the National Machine Guarding Program—a small business intervention: machine safety. *J Occup Environ Med*. 2016 Sep;58(9):885-91. PMC5010275.

**OBJECTIVES:** The purpose of this nationwide intervention was to improve machine safety in small metal fabrication businesses (3 to 150 employees). The failure to implement machine safety programs related to guarding and lockout/tagout (LOTO) are frequent causes of Occupational Safety and Health Administration (OSHA) citations and may result in serious traumatic injury. **METHODS:** Insurance safety consultants conducted a standardized evaluation of machine guarding, safety programs, and LOTO. Businesses received a baseline evaluation, two intervention visits, and a 12-month follow-up evaluation. **RESULTS:** The intervention was completed by 160 businesses. Adding a safety committee was associated with a 10% point increase in business-level machine scores ( $P < 0.0001$ ) and a 33% point increase in LOTO program scores ( $P < 0.0001$ ). **CONCLUSIONS:** Insurance safety consultants proved effective at disseminating a machine safety and LOTO intervention via management-employee safety committees.

**Parker ED, Kharbanda EO**, Sinaiko AR. Are we measuring blood pressure correctly in children, particularly in obesity [editorial]? *Arch Dis Child*. Nov 2016 Nov;101(11):990-1.

**Parker ED**, Sinaiko AR, **Kharbanda EO, Margolis KL, Daley MF, Trower NK, Sherwood NE**,

Greenspan LC, Lo JC, Magid DJ, **O'Connor PJ**. Change in weight status and development of hypertension. *Pediatrics*. 2016 Mar;137(3):e20151662. PMC4771125. Project: A08-087 Pediatric Hypertension.

**OBJECTIVE:** To examine the association of BMI percentile and change in BMI percentile to change in blood pressure (BP) percentile and development of hypertension (HTN). **METHODS:** This retrospective cohort included 101 606 subjects age 3 to 17 years from 3 health systems across the United States. Height, weight, and BPs were extracted from electronic health records, and BMI and BP percentiles were computed with the appropriate age, gender, and height charts. Mixed linear regression estimated change in BP percentile, and proportional hazards regression was used to estimate risk of incident HTN associated with BMI percentile and change in BMI percentile. **RESULTS:** The largest increases in BP percentile were observed among children and adolescents who became obese or maintained obesity. Over a median 3.1 years of follow-up, 0.3% of subjects developed HTN. Obese children ages 3 to 11 had twofold increased risk of developing HTN compared with healthy weight children. Obese children and adolescents had a twofold increased risk of developing HTN, and severely obese children had a more than fourfold increased risk. Compared with those who maintained a healthy weight, children and adolescents who became obese or maintained obesity had a more than threefold increased risk of incident HTN. **CONCLUSIONS:** We observed a strong, statistically significant association between increasing BMI percentile and increases in BP percentile, with risk of incident HTN associated primarily with obesity. The adverse impact of weight gain and obesity in this cohort over a short period underscores the early need for effective strategies for prevention of overweight and obesity.

**Parker ED**, Sinaiko AR, **O'Connor PJ**, Ekstrom HL, Appana D, Amundson JH, Kharbanda EO. Potential misclassification of blood pressure status in children and adolescents with short or tall stature. *Am J Epidemiol*. 2016 Jan 1;183(1):79-83. PMC4690478. Projects: A11-090 Teen BP Project and A08-087 Pediatric Hypertension.

Blood pressure (BP) is measured in percentiles that are adjusted for sex, age, and height percentile in children and adolescents. Standard tables for the conversion of BP percentiles do not present exact BP percentile cutoffs for extremes in stature, either short (<5th percentile) or tall (>95th percentile). An algorithm can be used to calculate exact BP percentiles across a range of height z scores. We compared values from standard BP tables with exact calculations of BP percentiles to see which were better at identifying hypertension in more than 5,000 children with either short or tall stature. Study subjects were 3- to 17-year-old patients within HealthPartners Medical Group, an integrated health care delivery system in Minnesota, at any time between 2007 and 2012. Approximately half of the subjects who met the criteria for hypertension using exact calculation would be misclassified as normal using available thresholds in the published BP tables instead of the recommended algorithm, which was not included in the tables.

Parrinello CM, Sharrett AR, Maruthur NM, **Bergental RM**, Grams ME, Coresh J, Selvin E. Racial differences in and prognostic value of biomarkers of hyperglycemia. *Diabetes Care*. 2016 Apr;39(4):589-95. PMC4806772.

**OBJECTIVE:** We compared levels and associations of traditional (fasting glucose, HbA1c) and nontraditional (fructosamine, glycated albumin, and 1,5-anhydroglucitol [1,5-AG]) biomarkers of hyperglycemia with incident cardiovascular disease (CVD), incident end-stage renal disease (ESRD), and prevalent retinopathy in black and white adults. **RESEARCH DESIGN AND METHODS:** We included 10,373 participants without (8,096 white, 2,277 black) and 727 with diagnosed diabetes (425 white, 302 black) from the Atherosclerosis Risk in Communities (ARIC) Study. We used Cox proportional hazards models to compare hazards ratios of CVD and ESRD among blacks and whites from baseline (1990-1992) through 2012. We compared the odds ratios (from logistic regression) of retinopathy among blacks and whites. We tested for the interaction of each biomarker with race. **RESULTS:** Median values of biomarkers were higher among blacks versus whites (all  $P < 0.001$ ). Relative risks for each biomarker with incident CVD and ESRD, and odds ratios for each biomarker with prevalent retinopathy, were similar by race (all  $P$  values for interaction by race  $>0.10$ ). **CONCLUSIONS:** The prognostic value of HbA1c, fructosamine, glycated albumin, and 1,5-AG with incident CVD, incident ESRD, and prevalent retinopathy were similar by race. Our results support similar interpretation of HbA1c and nontraditional biomarkers of

hyperglycemia among black and whites with respect to long-term complications.

Pathak RD, Schroeder EB, Seaquist ER, Zeng C, Lafata JE, Thomas A, **Desai JR**, Waitzfelder BE, Nichols GA, Lawrence JM, Karter AJ, Steiner JF, Segal J, **O'Connor PJ**, SUPREME-DM Study Group. Severe hypoglycemia requiring medical intervention in a large cohort of adults with diabetes receiving care in U.S. integrated health care delivery systems: 2005-2011. *Diabetes Care*. 2016 Mar;39(3):363-70. PMC4876672. Project: A13-132 SUPREME DM.

**OBJECTIVE:** Appropriate glycemic control is fundamental to diabetes care, but aggressive glucose targets and intensive therapy may unintentionally increase episodes of hypoglycemia. We quantified the burden of severe hypoglycemia requiring medical intervention in a well-defined population of insured individuals with diabetes receiving care in integrated health care delivery systems across the U.S. **RESEARCH DESIGN AND METHODS:** This observational cohort study included 917,440 adults with diabetes receiving care during 2005 to 2011 at participating SURveillance, PREvention, and ManagEment of Diabetes Mellitus (SUPREME-DM) network sites. Severe hypoglycemia rates were based on any occurrence of hypoglycemia-related ICD-9 codes from emergency department or inpatient medical encounters and reported overall and by age, sex, comorbidity status, antecedent A1C level, and medication use. **RESULTS:** Annual rates of severe hypoglycemia ranged from 1.4 to 1.6 events per 100 person-years. Rates of severe hypoglycemia were higher among those with older age, chronic kidney disease, congestive heart failure, cardiovascular disease, depression, and higher A1C levels, and in users of insulin, insulin secretagogues, or beta-blockers ( $P < 0.001$  for all). Changes in severe hypoglycemia occurrence over time were not clinically significant in the cohort as a whole but were observed in subgroups of individuals with chronic kidney disease, congestive heart failure, and cardiovascular disease. **CONCLUSIONS:** Risk of severe hypoglycemia in clinical settings is considerably higher in identifiable patient subgroups than in randomized controlled trials. Strategies that reduce the risk of hypoglycemia in high-risk patients are needed.

Patow CA, **Bryan DJ**, **Johnson GL**, Canaan E, Oyewo A, Panda M, Walsh E, Zaidan J. Who's in our neighborhood? Healthcare disparities experiential education for residents. *Ochsner J*. 2016 Spring;16(1):41-4. PMC4795499.

**BACKGROUND:** Residents and fellows frequently care for patients from diverse populations but often have limited familiarity with the cultural preferences and social determinants that contribute to the health of their patients and communities. Faculty physicians at academic health centers are increasingly interested in incorporating the topics of cultural diversity and healthcare disparities into experiential education activities; however, examples have not been readily available. In this report, we describe a variety of experiential education models that were developed to improve resident and fellow physician understanding of cultural diversity and healthcare disparities. **METHODS:** Experiential education, an educational philosophy that infuses direct experience with the learning environment and content, is an effective adult learning method. This report summarizes the experiences of multiple sponsors of Accreditation Council for Graduate Medical Education-accredited residency and fellowship programs that used experiential education to inform residents about cultural diversity and healthcare disparities. The 9 innovative experiential education activities described were selected to demonstrate a wide range of complexity, resource requirements, and community engagement and to stimulate further creativity and innovation in educational design. **RESULTS:** Each of the 9 models is characterized by residents' active participation and varies in length from minutes to months. In general, the communities in which these models were deployed were urban centers with diverse populations. Various formats were used to introduce targeted learners to the populations and communities they serve. Measures of educational and clinical outcomes for these early innovations and pilot programs are not available. **CONCLUSION:** The breadth of the types of activities described suggests that a wide latitude is available to organizations in creating experiential education programs that reflect their individual program and institutional needs and resources.

**Pawloski PA**, **Asche SE**, **Trower NK**, **Bergdall AR**, **Dehmer SP**, **Maciosek MV**, **Nyboer RA**, **O'Connor PJ**, **Speri-Hillen JM**, Green BB, **Margolis KL**. A substudy evaluating treatment intensification on medication adherence among hypertensive patients receiving home blood pressure telemonitoring and

pharmacist management. *J Clin Pharm Ther.* 2016 Oct;41(5):493-8. Project: A07-116 Hyperlink.

**WHAT IS KNOWN AND OBJECTIVE:** Hypertension is a leading cause of death and major contributor to heart attacks, strokes, heart and kidney failure. Antihypertensive (HTN medication) non-adherence contributes to uncontrolled hypertension. Effective initiatives to improve uncontrolled hypertension include a team-based approach with home blood pressure (BP) monitoring. Our study objective was to evaluate whether objectively measured medication adherence was influenced by home BP telemonitoring and pharmacist management. **METHODS:** We analyzed HTN medication adherence in 240 patients who received home BP telemonitoring and pharmacist intervention (TI). Adherence was measured based on prescription fills and the proportion of days covered (PDC). HTN medications continued pre- to post-baseline were similar for telemonitoring intervention (TI) and usual care (UC) patients (rate ratio = 1.00, P = 0.90). **RESULTS AND DISCUSSION:** More HTN medications were discontinued pre- to post-baseline in TI patients (rate ratio = 1.38, P = 0.04). Similarly, more HTN medications were added in TI patients (rate ratio = 2.46, P < 0.001). The proportion with a mean PDC  $\geq$  0.8 for HTN medications added after baseline and overall adherence did not differ between groups. **WHAT IS NEW AND CONCLUSION:** Medication adherence was high in both groups; however, medication adherence was not significantly altered by the intervention. There were more medication modifications and greater medication intensification among TI patients.

**Pawloski PA, Larsen M, Thoresen AA, Giordana MD.** Pegfilgrastim use and bone pain: a cohort study of community-based cancer patients. *J Oncol Pharm Pract.* 2016 Jun;22(3):423-9. Project: A13-092 CSF Chart Review.

**PURPOSE:** Bone pain is a common adverse effect of the granulocyte colony-stimulating factors filgrastim and pegfilgrastim. However, the incidence of reported bone pain varies and therapies to mitigate this adverse effect are limited to case reports and one randomized controlled trial. The purpose of this study was to describe pegfilgrastim use, the incidence and treatment of bone pain, and rate of severe or febrile neutropenia among cancer patients receiving pegfilgrastim at a metropolitan, hospital-based, community cancer center. **METHODS:** This retrospective chart review included the first 100 adult oncology patients who received at least one dose of pegfilgrastim from 1 January 2012 to 31 December 2012. Descriptive analyses were used to evaluate the primary and secondary outcomes. **RESULTS:** Of the identified cases, 69 cancer patients were evaluable. Most patients (74%) received pegfilgrastim for primary prophylaxis. Pegfilgrastim-associated bone pain occurred in 19% and loratadine was the most common medication used to treat it. Among the patients who received pegfilgrastim for primary prophylaxis, 8% were hospitalized for febrile neutropenia. Among those hospitalized for febrile neutropenia, 64% had not received pegfilgrastim for primary prophylaxis. **CONCLUSIONS:** Pegfilgrastim is commonly used for primary prophylaxis during the first cycle of chemotherapy. Hospitalizations for febrile neutropenia occurred most commonly among patients without primary prophylaxis. Pegfilgrastim-associated bone pain occurred in a similar percentage, as reported in randomized controlled trials but less than that reported by survey. Loratadine was the most commonly employed medication to mitigate this adverse effect.

Penny P, Swords M, Heisler J, Cien A, Sands A, **Cole PA.** Ability of modern distal tibia plates to stabilize comminuted pilon fracture fragments: Is dual plate fixation necessary? *Injury.* 2016;47(8):1761-9.

**OBJECTIVES:** The purpose of this study was to examine the screw trajectory of ten commercially available distal tibia plates and compare them to common fracture patterns seen in OTA C type pilon fractures to determine their ability to stabilize the three most common fracture fragments while buttressing anterolateral zones of comminution. **HYPOTHESIS:** We hypothesized that a single plate for the distal tibia would fail to adequately stabilize all three main fracture fragments and zones of comminution in complex pilon fractures. **METHODS:** Ten synthetic distal tibia sawbones models were used in conjunction with ten different locking distal tibia plate designs from three manufacturers (Depuy Synthes, J&J Co, Paoli, PA; Smith & Nephew, Memphis, TN; and Stryker, Mawa, NJ). Both medial and anterolateral plates from each company were utilized and separately applied to an individual sawbone model. Three implants allowing variable angle screw placement were used. The location of the locking screws and buttress effect 1cm above the articular surface was noted for each implant using axial computed tomography (CT). The images were then compared to a recently published "pilon fracture map" using an overlay technique to

establish the relationship between screw location and known common fracture lines and areas of comminution. Each of the three main fragments was considered "captured" by a screw if it was purchased by at least two screws thereby controlling rotational forces on each fragment. RESULTS: Three of four anterolateral plates lacked stable fixation in the medial fragment. Of the 4 anterolateral plates used, only the variable angle anterolateral plate by Depuy Synthes captured the medial fragment with two screws. All four anterolateral plates buttressed the area of highest comminution and had an average of 1.25 screws in the medial fragment and an average of 3 screws in the posterolateral fragment. All five direct medial plates had variable fixation within anterolateral and posterolateral fragments with an average of 1.8 screws in the anterolateral fragment and an average of 1.3 screws in the posterolateral fragment. The Depuy Synthes variable angle anterolateral plate allowed for fixation of the medial fragment with two screws while simultaneously buttressing the zone of highest comminution and capturing both the anterolateral and posterolateral fragments with five and three screws respectively. The variable angle anteromedial plate by Depuy Synthes captured all three main fracture fragments but it did not buttress the anterolateral zone of comminution. CONCLUSION: In OTA 43C type pilon fractures, 8 out of 10 studied commercially available implants precontoured for the distal tibia, do not adequately stabilize the three primary fracture fragments typically seen in these injuries. Anterolateral plates were superior in addressing the coronal primary fracture line across the apex of the plafond, and buttressing the zone of comminution. None of the available plates can substitute for an understanding of the fracture planes and fragments typically seen in complex intra-articular tibia fractures and the addition of a second plate is necessary for adequate stability.

Pestka DL, **Frail CK**, Palombi LC, Von Hoff BA, Conway JM, Sorensen TD. Strategies and steps fostering the success of medication management services in community pharmacies. *J Am Pharm Assoc* (2003). 2016 Sep-Oct;56(5):504-12. [Components of this work were presented as a poster on October 20th, 2015 at the 2015 American College of Clinical Pharmacy Global Conference on Clinical Pharmacy in San Francisco, CA, and are available as a technical report titled "A Prescription for Healthy Communities: Carrying Out Successful Medication Management Services in Community Pharmacies" through the Minnesota Department of Health.]

OBJECTIVES: To identify and describe the steps and strategies that community pharmacies with established medication management services have used to integrate medication management services into their practice settings. DESIGN: Qualitative case study with semi-structured interviews and focus groups. SETTING: Community pharmacy organizations in Minnesota. PARTICIPANTS: Pharmacists and pharmacy leadership from 4 different pharmacy organizations including independent, chain, and health system pharmacies. INTERVENTION: Not applicable. MAIN OUTCOME MEASURES: Qualitative case study analysis of community pharmacy management and pharmacists' perceptions of the factors that led to the establishment and sustainability of their medication management programs. RESULTS: Focus groups and interviews were undertaken with 25 pharmacists and pharmacy leaders from 4 distinct community pharmacy organizations from April to June 2015. Five themes emerged, representing specific implementation and continuation stages of medication management services in community practice: Deciding to Act, Setting the Stage, Executing the Service, Sticking to It, and Continuing to Grow. CONCLUSION: This study sheds light on key stages that have commonly occurred across community pharmacies that are delivering medication management services. The results of this work may serve as a road map for other community pharmacies looking to integrate medication management services into their own practice settings.

Pigg M, **Nixdorf DR**, Nguyen RH, Law AS, National Dental Practice-Based Research Network (DPBRN) Collaborative Group. Validity of preoperative clinical findings to identify dental pulp status: A National Dental Practice-Based Research Network study. *J Endod*. 2016 Jun;42(6):935-42. PMC4884138.

INTRODUCTION: Endodontic diagnostic tests are often used clinically to assess pulp status as a basis for the diagnosis and determination of whether root canal treatment (RCT) is indicated. Response to cold and pain on percussion are 2 common tests, yet their validity in identifying nonvital pulp in regular dental practice has not been reported. METHODS: We assessed the validity of cold and percussion tests to identify nonvital pulp in teeth requiring RCT in a dental practice setting performed by 46 general dentists and 16 endodontists in the National Dental Practice-Based Research Network. The influence of patient-,

tooth-, and dentist-related characteristics was investigated. Observed bleeding from the pulp chamber was the clinical reference. Sensitivity (SN), specificity (SP), overall test accuracy (TA), positive (PPV) and negative (NPV) predictive values, and likelihood and diagnostic odds ratios (LR+, LR-, dORs) were calculated for each single test and the combined cold and percussion tests. RESULTS: Seven hundred eight patient teeth were included. Cold test showed high validity to identify a nonvital pulp status (SN = 89%, SP = 80%, TA = 84%, PPV = 81%, NPV = 88%, LR+ = 4.35, LR- = 0.14, dOR = 31.4), whereas pain on percussion had lower validity (SN = 72%, SP = 41%, TA = 56%, PPV = 54%, NPV = 60%, LR+ = 1.22, LR- = 0.69, dOR = 1.78). Combining the 2 tests did not increase validity, whereas preoperative pain, medication intake, patient age and sex, and dentist training level affected test validity significantly. CONCLUSIONS: In regular dental practice, the cold test exhibits higher validity to discriminate between vital and nonvital pulp than the tooth percussion test.

Pittenger AL, Chapman SA, **Frail CK**, Moon JY, Undeberg MR, Orzoff JH. Entrustable professional activities for specialty pharmacy practice [editorial]. *Am J Pharm Educ.* 2016 Dec 25;80(10):178. PMC5289734.

Pittenger AL, Chapman SA, **Frail CK**, Moon JY, Undeberg MR, Orzoff JH. Entrustable professional activities for pharmacy practice [review article]. *Am J Pharm Educ.* 2016 May 25;80(4):57. PMC4891855.

The profession of pharmacy is facing a shifting health system context that holds both opportunity and risk. If the profession of pharmacy is to advance, pharmacists must be recognized as a consistent member of the health care team in all clinical settings, contributing at the fullest extent of licensure and education. One part of achieving this broad goal is to implement a new way of defining and assessing pharmacy practice skills, such as entrustable professional activities (EPA). Assessment of professional tasks and practice activities with EPAs has been successfully implemented in medical education for assessing trainee preparation for practice. This EPA model is being applied to pharmacy education to develop an assessment framework across the advanced pharmacy practice experience (APPE) curriculum. The APPE course directors, practice faculty members, and the Office of Experiential Education collaboratively defined a set of universal EPAs critical for pharmacists in any practice setting and would be assessed in all practice experience types.

Polgreen LE, Vehe RK, Rudser KD, **Kunin-Batson AS**, Utz JJ, Dickson P, Shapiro EG, Whitley CB. Elevated TNF-alpha is associated with pain and physical disability in mucopolysaccharidosis types I, II, and VI. *Mol Genet Metab.* 2016 Apr;117(4):427-30. PMC4851859.

BACKGROUND: Children and adults with the lysosomal storage diseases mucopolysaccharidosis (MPS) types I, II and VI live shortened lives permeated by chronic pain and physical disability. Current treatments do not alleviate these problems. Thus there is a critical need to understand the mechanism of chronic pain and disability in MPS in order to improve the way we treat patients. A potential target is inflammation. HYPOTHESIS: We hypothesized that excessive inflammation mediated by the tumor necrosis factor-alpha (TNF-alpha) inflammatory pathway is the fundamental cause of much of the chronic pain and physical disability in MPS. METHODS: 55 patients with MPS I, II, or VI were enrolled over the course of a 5-year prospective longitudinal natural history study and evaluated annually for 2-5 years. 51 healthy controls were enrolled in a separate cross-sectional study of bone and energy metabolism. TNF-alpha was measured by ELISA. Pain and physical disability were measured by the Children's Health Questionnaire - Parent Form 50 (CHQ-PF50). Differences in log-transformed TNF-alpha levels and associations with CHQ domains were evaluated using a linear mixed effects model with random intercept. RESULTS: TNF-alpha levels were measured in 48 MPS (age: 5-17 years; 35% female) and 51 controls (age: 8-17 years; 53% female). Among MPS, 22 (46%) were treated with hematopoietic cell transplantation (HCT) alone, 24 (50%) with enzyme replacement therapy (ERT) alone, and 2 (4%) with both HCT and ERT. TNF-alpha levels are higher in MPS compared to healthy controls ( $p < 0.001$ ). Higher TNF-alpha levels are associated with increased pain and decreased physical function, social limitations due to physical health, and physical summary score (all  $p < 0.05$ ). TNF-alpha levels were not significantly associated with the general health score. TNF-alpha levels did not change significantly over time in MPS. CONCLUSIONS: Higher TNF-alpha levels are implicated in the pain and decreased physical function present in individuals with MPS despite treatment with ERT and/or HCT, suggesting that TNF-alpha inhibition

could potentially be a useful adjunctive therapy. Further investigation into the role of TNF-alpha inhibition in MPS to decrease pain and improve physical function is indicated.

**Powers MA.** 2016 Health Care & Education presidential address: if DSME were a pill, would you prescribe it? *Diabetes Care.* 2016 Dec;39(12):2101-7.

This address was delivered by Margaret A. Powers, PhD, RD, CDE, President, Health Care & Education, of the American Diabetes Association (ADA), at the ADA's 76th Scientific Sessions in New Orleans, LA, on 11 June 2016. Dr. Powers conducts research and has a clinical practice as a registered dietitian and diabetes educator at the International Diabetes Center at Park Nicollet in Minneapolis. Her research focuses on improving diabetes outcomes including factors that affect the clinical, psychosocial, and behavioral aspects of diabetes. Dr. Powers has been an ADA volunteer for more than 25 years, including serving as a founding editor of *Diabetes Spectrum*. She is the lead author of the 2015 joint Position Statement on Diabetes Self-management Education and Support published by the ADA, American Association of Diabetes Educators, and Academy of Nutrition and Dietetics. She is the recipient of the ADA's Outstanding Educator in Diabetes Award and has published research, authored numerous articles and chapters, published five books, and is an international presenter. Dr. Powers holds a doctorate in education with a focus on performance improvement from Capella University. She received her Master of Science from the University of Illinois at Chicago and her Bachelor of Science from Michigan State University. She completed her dietetic internship at Cook County Hospital in Chicago.

**Powers MA, Bardsley J, Cypress M, Duker P, Funnell MM, Fischl AH, Maryniuk MD, Siminerio L, Vivian E.** Diabetes self-management education and support in type 2 diabetes: A joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *Clin Diabetes.* 2016 Apr;34(2):70-80. PMC4833481.

**Powers MA, Marrero DG.** Response to Comment on Powers et al. Diabetes self-management education and support in type 2 diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics [editorial]. *Diabetes Care.* 2016 Jan;39(1):e17. [Comment on: *Diabetes Care.* 2015 Jul;38(7):1372-82.]

**Powers MA, Richter SA, Ackard DM, Craft CE.** Development and validation of the Screen for Early Eating Disorder Signs (SEEDS) in persons with type 1 diabetes. *Eat Disord.* 2016 May-Jun;24(3):271-88.

This study's objective was to develop and validate an instrument to identify those at risk of developing an eating disorder (ED) in persons with type 1 diabetes. The Screen for Early Eating Disorder Signs (SEEDS) instrument was developed using a multi-phase process including focus groups, cognitive interviews, and mailed questionnaires. Factor analysis revealed 20 items across 3 factors (Body Image, Feelings, Quality of Life) demonstrating strong psychometric properties. Scoring guidelines and interpretation are provided. SEEDS is a brief (20-item; 2 to 5 minutes to complete), self-administered, screen designed for use in clinical practice or research to identify or confirm suspicions of ED risk and does not include weight-control behavior items.

**Powers MA, Richter SA, Ackard DM, Cronmeyer CL.** Eating disorders in persons with type 1 diabetes: a focus group investigation of early eating disorder risk. *J Health Psychol.* 2016 Dec;21(12):2966-76.

Through focus groups, we examined the development and maintenance of an eating disorder in 16 females with type 1 diabetes and an eating disorder. The quotes and qualitative data summaries provide rich insights into understanding why those with type 1 diabetes are at increased risk for eating disorders. Content analyses revealed five themes pertinent to the dual diagnosis (feeling different, difficulty with control/coping, body image, feelings, and quality of life) of which four themes were relevant to eating disorder development. Findings support early identification of those at risk and inform interventions to mitigate development of an eating disorder.

**Pronk NP.** Structured diet and physical activity programs provide strong evidence of effectiveness for

type 2 diabetes prevention and improvement of cardiometabolic health. *Evid Based Med*. 2016 Feb;21(1):18. [Comment on: Balk EM, et al. Combined diet and physical activity promotion programs to prevent type 2 diabetes among persons at increased risk: a systematic review for the community preventive services task force [review article]. *Ann Intern Med*. 2015 Sep 15;163(6):437-51.]

**Pronk NP**. Obesity and its related chronic diseases from a corporate perspective. *MetroDoctors*. 2016 Mar-Apr;25-6.

**Pronk NP**, member of the Community Preventive Services Task Force. Alcohol electronic screening and brief intervention: Recommendation of the Community Preventive Services Task Force. *Am J Prev Med*. 2016 Nov;51(5):812-3.

**Pronk NP**, American College of Occupational and Environmental Medicine, American Council on Exercise, American Heart Association, Bravo Wellness, Health Enhancement Research Organization, HealthFitness, HealthPartners, Healthways, Interactive Health, Johnson & Johnson Services Inc, Optum, Performance pH, Population Health Alliance, StayWell, Truven Health Analytics. A response to proposed Equal Employment Opportunity Commission regulations on employer-sponsored health, safety, and well-being initiatives. *J Occup Environ Med*. 2016 Mar;58(3):e103-10.

**OBJECTIVE:** The aim of this study was to identify areas of consensus in response to proposed Equal Employment Opportunity Commission Americans with Disabilities Act of 1990 and Genetic Information Nondiscrimination Act of 2008 regulations on employer-sponsored health, safety, and well-being initiatives. **METHODS:** The consensus process included review of existing and proposed regulations, identification of key areas where consensus is needed, and a methodical consensus-building process. **RESULTS:** Stakeholders representing employees, employers, consulting organizations, and wellness providers reached consensus around 5 areas, including adequate privacy notice on how medical data are collected, used, and protected; effective, equitable use of inducements that influence participation in programs; observance of reasonable alternative standards; what constitutes reasonably designed programs; and the need for greater congruence between federal agency regulations. **CONCLUSION:** Employee health and well-being initiatives that are in accord with federal regulations are comprehensive, evidence-based, and are construed as voluntary by employees and regulators alike.

**Pronk NP**, Bender EG, **Katz AS**. Health, function, and performance benefits of workplace strength training programs. *ACSMs Health Fitness J*. 2016 Sep-Oct;20(5):69-71.

Physical activity has long been a mainstay for workplace health programs. Many companies have implemented walking campaigns, 10,000 Steps programs, exercise facilities and corporate gyms, and incentives for employees to engage in ongoing activities that allow them to adopt and maintain healthy levels of physical activity. The purpose of a physical activity program in the workplace traditionally has been about prevention and optimal management of chronic conditions such as heart disease, diabetes, and various forms of cancer. Hence, the emphasis has been on aerobic types of activity. However, one of the most prevalent conditions that affect workers is musculoskeletal disorders. Although general types of activity and exercise may prove helpful in addressing such chronic health issues, strength training has emerged as an effective tool to address a variety of health issues that burden workers. In particular, it seems to be helpful in alleviating musculoskeletal pain and may even be successful in reducing productivity loss while enhancing indicators of physical and emotional function.

**Pronk NP, Kottke TE, Lowry MJ, Katz AS, Gallagher JM, Knudson SM, Rauri SJ, Tillema JO**. Concordance between life satisfaction and six elements of well-being among respondents to a health assessment survey, HealthPartners Employees, Minnesota, 2011. *Prev Chronic Dis*. 2016 Dec 22;13:E173. PMC5201156.

**INTRODUCTION:** We assessed and tracked perceptions of well-being among employees of member companies of HealthPartners, a nonprofit health care provider and health insurance company in Bloomington, Minnesota. The objective of our study was to determine the concordance between self-reported life satisfaction and a construct of subjective well-being that comprised 6 elements of well-being:

emotional and mental health, social and interpersonal status, financial status, career status, physical health, and community support. **METHODS:** We analyzed responses of 23,268 employees (of 37,982 invitees) from 6 HealthPartners companies who completed a health assessment in 2011. We compared respondents' answers to the question, "How satisfied are you with your life?" with their indicators of well-being where "high life satisfaction" was defined as a rating of 9 or 10 on a scale of 0 (lowest) to 10 (highest) and "high level of well-being" was defined as a rating of 9 or 10 for 5 or 6 of the 6 indicators of well-being. **RESULT:** We found a correlation between self-reported life satisfaction and the number of well-being elements scored as high (9 or 10) ( $r = 0.62$ ,  $P < .001$ ); 73.6% of the respondents were concordant (high on both or high on neither). Although 82.9% of respondents with high overall well-being indicated high life satisfaction, only 34.7% of those indicating high life satisfaction reported high overall well-being. **CONCLUSION:** The correlation between self-reported life satisfaction and our well-being measure was strong, and members who met our criterion of high overall well-being were likely to report high life satisfaction. However, many respondents who reported high life satisfaction did not meet our criterion for high overall well-being, which suggests that either they adapted to negative life circumstances or that our well-being measure did not identify their sources of life satisfaction.

**Pronk NP**, McLellan DL, McGrail MP, **Olson SM**, **McKinney ZJ**, Katz JN, Wagner GR, Sorensen G. Measurement tools for integrated worker health protection and promotion: lessons learned from the SafeWell Project. *J Occup Environ Med.* 2016 Jul;58(7):651-8.

**OBJECTIVES:** To describe (a) a conceptual approach, (b) measurement tools and data collection processes, (c) characteristics of an integrated feedback report and action plan, and (d) experiences of three companies with an integrated measurement approach to worker safety and health. **METHODS:** Three companies implemented measurement tools designed to create an integrated view of health protection and promotion based on organizational- and individual-level assessments. Feedback and recommended actions were presented following assessments at baseline and 1-year follow-up. Measurement processes included group dialogue sessions, walk-through, online surveys, and focus groups. **RESULTS:** The approach and measurement tools generated actionable recommendations and documented changes in the physical (eg, safety hazards) and psychosocial (eg, health and safety culture) work environment between baseline and 1-year follow-up. **CONCLUSIONS:** The measurement tools studied were feasible, acceptable, and meaningful to companies in the SafeWell study.

**Pronk NP**, Narayan KM. The application of systems science to addressing obesity at the workplace: tapping into unexplored potential. *J Occup Environ Med.* 2016 Feb;58(2):123-6.

**OBJECTIVE:** The aim of the study was to address the need for explicit recognition that obesity is complex in its biological, social, psychological, and societal determinants and ramifications, and that applications of programs to address obesity at the workplace need to recognize this setting as a complex social environment. Efforts to address this complexity more meaningfully demand intentional application of systems science principles and approaches. **METHOD:** Along with several relevant examples, a description of systems sciences and the application of its principles to obesity and the workplace setting are presented. **CONCLUSIONS:** Systems science provides a method to explore large proportions of unexplored potential and unexplained variation in obesity research as applied to the workplace.

**Pronk NP**, member of the Community Preventive Services Task Force. Reducing children's recreational sedentary screen time: recommendation of the Community Preventive Services Task Force. *Am J Prev Med.* 2016 Mar;50(3):416-8.

Ramsey Buchanan L, Rooks-Peck CR, Finnie RK, Wethington HR, Jacob V, Fulton JE, Johnson DB, Kahwati LC, Pratt CA, Ramirez G, Glanz K, **Pronk NP**, Community Preventive Services Task Force. Reducing recreational sedentary screen time: a Community Guide systematic review [review article]. *Am J Prev Med.* 2016 Mar;50(3):402-15.

**CONTEXT:** Sedentary time spent with screen media is associated with obesity among children and adults. Obesity has potentially serious health consequences, such as heart disease and diabetes. This Community Guide systematic review examined the effectiveness and economic efficiency of behavioral

interventions aimed at reducing recreational (i.e., neither school- nor work-related) sedentary screen time, as measured by screen time, physical activity, diet, and weight-related outcomes. **EVIDENCE ACQUISITION:** For this review, an earlier ("original") review (search period, 1966 through July 2007) was combined with updated evidence (search period, April 2007 through June 2013) to assess effectiveness of behavioral interventions aimed at reducing recreational sedentary screen time. Existing Community Guide systematic review methods were used. Analyses were conducted in 2013-2014. **EVIDENCE SYNTHESIS:** The review included 49 studies. Two types of behavioral interventions were evaluated that either (1) focus on reducing recreational sedentary screen time only (12 studies); or (2) focus equally on reducing recreational sedentary screen time and improving physical activity or diet (37 studies). Most studies targeted children aged  $\leq 13$  years. Children's composite screen time (TV viewing plus other forms of recreational sedentary screen time) decreased 26.4 (interquartile interval= -74.4, -12.0) minutes/day and obesity prevalence decreased 2.3 (interquartile interval= -4.5, -1.2) percentage points versus a comparison group. Improvements in physical activity and diet were reported. Three study arms among adults found composite screen time decreased by 130.2 minutes/day. **CONCLUSIONS:** Among children, these interventions demonstrated reduced screen time, increased physical activity, and improved diet- and weight-related outcomes. More research is needed among adolescents and adults.

Ramsey GW, Johnson PE, **O'Connor PJ**, **Sperl-Hillen JM**, **Rush WA**, Blitz G. Examining failure in a dynamic decision environment: strategies for treating patients with a chronic disease. *Ann Inform Syst*. 2016;19:103-24.

In this paper we investigate the dynamic decision-making task of primary care physicians treating patients with type 2 diabetes to achieve a blood glucose goal. The focus of the study is on developing and testing an information processing theory that can explain why some physicians more often succeed and others more often fail to achieve desirable clinical goals. The developed theory is represented in the form of two types of computational models, one employing a feedback decision-making strategy and the other a feedforward strategy. The models were implemented in software and tested using data from a previously reported experiment where physicians treated simulated patients with type 2 diabetes. The physician data were scored for a defined set of treatment errors. Computational processes were systematically examined to identify and specify processes to perturb in order to generate the observed errors. Models were created for each physician by introducing perturbations in computational processes based on errors that each physician committed during the experiment. These models treated the same simulated patients that the physicians treated; results from each model treating the patients were compared with the represented physician's results to test the sufficiency of the models to explain observed errors. Process perturbations which explained observed errors took two characteristic forms, both of which resulted in delayed treatment action: (1) elevated thresholds for triggering action and (2) overestimating delayed effects of medications. Physician models made predictions for types and timing of subjects' treatment errors: physician models generated 79 % of the same types of treatment errors as committed by physicians. As demonstrated by this study, developing task specific information processing theories (expressed as computational models) are useful for investigating patterns of decision making that lead to errors of performance. Studies of this nature can support the design of decision support systems intended to reduce errors associated with dynamic tasks, such as treating a chronic disease.

Reich J, **Li RW**, **Hartigan AS**. Massive bleeding from an odd location. *Gastroenterology*. 2016 Jun;150(7):e11-12.

**Reiner AM**, Gerberich SG, Ryan AD, Mandel J. Large machinery-related agricultural injuries across a five-state region in the midwest. *J Occup Environ Med*. 2016 Feb;58(2):154-61.

**OBJECTIVE:** High agricultural injury related mortality and morbidity rates persist. This study addressed a knowledge gap regarding large machinery-related injury magnitude, consequences, and risk factors. **METHODS:** From randomly selected Midwestern agricultural operations in 1999 and 2001, 7420 eligible households participated. Demographic, exposure, and injury data collected for four 6-month periods used a computer-assisted telephone interview. An a priori causal model enabled survey development, data analysis, and interpretation. Directed acyclic graphs, developed from this model, facilitated potential confounder identification for specific exposures in multivariate analyses. **RESULTS:** The injury rate was

12.82 events per 1000 persons per year. Increased risk was associated with male gender, increasing age, state of residence, history of prior injury, and increasing hours worked per week. **CONCLUSIONS:** Large machinery-related agricultural injuries can result in significant consequences. Associated increased injury risks require further investigation and targeting of relevant interventions.

Riddle MC, Bolli GB, Home PD, **Bergental RM**, Ziemien M, Muehlen-Bartmer I, Wardecki M, Vinet L, Jeandidier N, Yki-Jarvinen H. Efficacy and safety of flexible versus fixed dosing intervals of insulin glargine 300 U/mL in people with type 2 diabetes. *Diabetes Technol Ther*. 2016 Apr;18(4):252-7. PMC4827283.

**BACKGROUND:** Insulin glargine 300 U/mL (Gla-300) has a more constant and prolonged action profile than insulin glargine 100 U/mL and in clinical studies is associated with similar glycemic control but less hypoglycemia. Whether its effects are altered by variability of injection time was examined in two 3-month substudies. **MATERIALS AND METHODS:** Eligible participants completing 6 months of optimized treatment with Gla-300 in EDITION 1 (n = 109) and EDITION 2 (n = 89), having a mean hemoglobin A1c (HbA1c) level of 7.3% (SD 1.0%), were randomized (1:1) to groups advised to increase variability of between-injection intervals to 24 +/- up to 3 h or to maintain fixed 24-h intervals for 3 months. Changes of HbA1c level and other efficacy and safety measures were assessed. **RESULTS:** In the fixed-dosing group, 64% of participants reported all intervals within the 23-25-h range, compared with 15% of those advised flexible dosing. In the fixed- and flexible-dosing groups, 12% and 41%, respectively, of between-injection intervals were outside the 23-25-h range, and 2% and 16%, respectively, were outside the 21-27-h range. Least squares mean between-group difference in HbA1c change from baseline was 0.05 % (95% confidence interval [CI], -0.13 to 0.23); for fasting plasma glucose, 2.7 mg/dL (95% CI, -9.0 to 14.4); and for daily basal insulin dose, 0.00 U/kg (95% CI, -0.02 to 0.03). Frequencies of hypoglycemia and adverse events did not differ between groups. **CONCLUSIONS:** The efficacy and safety of Gla-300 demonstrated in EDITION 1 and EDITION 2 are maintained in substudies when the insulin was injected up to 3 h before or after the usual time of administration.

**Rosenbloom MH**, Borson S, **Barclay TR**, **Hanson LR**, **Werner AM**, **Stuck LH**, McCarten J. Routine cognitive screening in a neurology practice: effect on physician behavior. *Neurol Clin Pract*. 2016 Feb;6(1):16-21. PMC4753831.

**BACKGROUND:** Alzheimer disease is one of the most prevalent and costly neurologic disorders. American Academy of Neurology guidelines call for diagnosis and treatment when dementia is present, but provide no specific instruction relating to cognitive screening. **METHODS:** Our center piloted a cognitive screening initiative using the Mini-Cog, which was administered to all neurology patients aged  $\geq 70$  years without a history of a cognitive disorder. **RESULTS:** There was a 37.4% screen positive rate on the Mini-Cog. The percentage of patients with subjective memory complaints did not differ between patients screening positive vs negative on the Mini-Cog. Prospective analysis over an 18-month postscreening period showed that individuals screening positive for cognitive impairment were 10 times more likely to have follow-up cognitive assessment by the provider ( $p < 0.0001$ ), almost 3 times more likely to be referred for neuropsychological testing ( $p = 0.003$ ), and 3 times more likely to receive a diagnosis of cognitive impairment or dementia ( $p < 0.0001$ ) compared to those screening negative. Diagnosis of a cognitive disorder, referral to a cognitive specialty clinician, and prescription of cognitive-enhancing medications were no more frequent than was observed in a randomized trial of screening in primary care, and evidence of neurologists' actions relevant to cognitive impairment was found in a minority of individuals screening positive. **CONCLUSION:** Further studies are needed to better understand factors influencing neurologist actions in the evaluation and treatment of cognitive impairment.

Rosenstock J, Blevins TC, **Bergental RM**, Morrow LA, Qu Y, Jacober SJ. Reduction in short-acting insulin requirement accompanies improved glycemic control with basal insulin peglispro compared with insulin glargine in patients with type 1 diabetes. *J Diabetes*. 2016 Jan;8(1):166-9.

Rosenthal PJ, Hill DR, Bausch DG, Goralesski KA, Higgs S, **Walker PF**, Plowe CV. The (International) American Society of Tropical Medicine and Hygiene [editorial]. *Am J Trop Med Hyg*. 2016 Nov

2;95(5):980-2. PMC5094245.

**Rossom RC**, Shortreed SM, Coleman KJ, Beck AL, Waitzfelder BE, Stewart C, Ahmedani BK, Zeber JE, Simon GE. Antidepressant adherence across diverse populations and healthcare settings. *Depress Anxiety*. 2016 Aug;33(8):765-74. Project: A10-003 MHRN Infrastructure.

**BACKGROUND:** Early adherence is key to successful depression treatment, but nearly 60% of patients discontinue antidepressants within 3 months. Our study aimed to determine factors associated with poor early adherence to antidepressants in a large diverse sample of patients. **METHODS:** Six Mental Health Research Network healthcare systems contributed data for adults with depression and a new antidepressant start, defined by a washout period of at least 270 days, between January 1, 2010 and December 31, 2012. Pharmacy fill and self-reported race/ethnicity data were obtained from the electronic medical record. Patients had early adherence if they had a second antidepressant fill within 180 days of the first. We used logistic regression to investigate the relationship between early adherence and patient characteristics. **RESULTS:** A total of 177,469 adult patients had 184,967 new episodes of depression with a filled antidepressant prescription. Patients refilled their antidepressants within 180 days in 71% of episodes. Race/ethnicity was a strong predictor of early adherence, with patients from racial/ethnic minorities other than Native Americans/Alaskan Natives less likely (adjusted odd ratios 0.50-0.59) to refill their antidepressants than non-Hispanic whites. Age, neighborhood education, comorbidity burden, provider type and engagement in psychotherapy were also associated with adherence. Other apparent predictors of early adherence, including neighborhood income, gender, and prior mental health hospitalizations, were no longer significant in the fully adjusted model. **CONCLUSIONS:** Race/ethnicity was a robust predictor of early antidepressant adherence, with minority groups other than Native Americans/Alaskan Natives less likely to be adherent. Further research is needed to determine whether early nonadherence in specific minority populations is intentional, due to side effects or patient preference, or unintentional and appropriate for targeted interventions to improve adherence.

**Rossom RC**, Simon GE, Beck AL, Ahmedani BK, Steinfeld B, **Trangle MA**, **Solberg LI**. Facilitating action for suicide prevention by learning health care systems. *Psychiatr Serv*. 2016 Aug 1;67(8):830-2. PMC4969117. Project: A13-151 MHRN II.

The Mental Health Research Network (MHRN), funded by the National Institute of Mental Health to serve as a national laboratory to improve mental health care, includes researchers embedded in 13 health systems in 15 states. This column describes practice changes and effectiveness and exploratory research undertaken by MHRN partners when they found a sustained elevated risk of suicide attempts among patients who reported suicidal ideation on the nine-item Patient Health Questionnaire. Challenges described include finding common ground between what health care systems and funding agencies find compelling, choosing study designs that balance research and clinical tensions, and implementing studies in ways that minimize disruption to health systems. The authors conclude that the greatest benefit to working collaboratively with care system partners is the opportunity to improve care and to simultaneously measure the impact of change.

**Rossom RC**, **Solberg LI**, **Parker ED**, **Crain AL**, **Whitebird RR**, **Maciosek MV**, **Molitor BA**, **Trangle MA**, Unutzer J. A statewide effort to implement collaborative care for depression: reach and impact for all patients with depression. *Med Care*. 2016 Nov;54(11):992-7. PMC5065378. Project: DIAMOND.

**BACKGROUND:** Little is known about the reach and impact of collaborative care for depression outside of clinical trials. **OBJECTIVE:** The objective of this study was to examine the effect of a collaborative care intervention for depression on the rates of depression diagnosis, use of specific depression codes, and treatment intensification. **RESEARCH DESIGN:** Evaluation of a staggered, multiple baseline implementation initiative. **SUBJECTS:** Patients receiving depression care in primary care clinics throughout Minnesota from February 2008 through March 2011. **MEASURES:** Data regarding depression diagnosis rates and codes, and measures of antidepressant intensification were provided by health insurers. **RESULTS:** Depression Improvement Across Minnesota: Offering a New Direction (DIAMOND) affected neither rates of depression recognition nor use of depression diagnostic codes, and the overall reach of DIAMOND was disappointingly small. Patients in DIAMOND had more episodes of treatment

intensification than non-DIAMOND patients, but we were unable to account for depression severity in our analysis. **CONCLUSIONS:** DIAMOND did not affect depression recognition or diagnostic coding, but may have affected treatment intensification. Our results suggest that even strongly evidence-based interventions may have little contamination effects on patients not enrolled in the new care model.

**Rossom RC, Solberg LI, Vazquez-Benitez G, Crain AL, Beck AL, Whitebird RR, Glasgow RE.** The effects of patient-centered depression care on patient satisfaction and depression remission. *Fam Pract.* 2016 Dec;33(6):649-55. PMC5161489.

**BACKGROUND:** While health systems are striving for patient-centered care, they have little evidence to guide them on how to engage patients in their care, or how this may affect patient experiences and outcomes. **OBJECTIVE:** To explore which specific patient-centered aspects of care were best associated with depression improvement and care satisfaction. **METHODS:** Design: observational. **SETTING:** 83 primary care clinics across Minnesota. **SUBJECTS:** Primary care patients with new prescriptions for antidepressants for depression were recruited from 2007 to 2009. **OUTCOME MEASURES:** Patients completed phone surveys regarding demographics and self-rated health status and depression severity at baseline and 6 months. Patient centeredness was assessed via a modified version of the Patient Assessment of Chronic Illness Care. Differences in rates of remission and satisfaction between positive and negative responses for each care process were evaluated using chi-square tests. **RESULTS:** At 6 months, 37% of 792 patients ages 18-88 achieved depression remission, and 79% rated their care as good-to-excellent. Soliciting patient preferences for care and questions or concerns, providing treatment plans, utilizing depression scales and asking about suicide risk were patient-centered measures that were positively associated with depression remission in the unadjusted model; these associations were mildly weakened after adjustment for depression severity and health status. Nearly all measures of patient centeredness were positively associated with care ratings. **CONCLUSION:** The patient centeredness of care influences how patients experience and rate their care. This study identified specific actions providers can take to improve patient satisfaction and depression outcomes.

**Rossom RC, Solberg LI, Vazquez-Benitez G, Whitebird RR, Crain AL, Beck AL, Unutzer J.** Predictors of poor response to depression treatment in primary care. *Psychiatr Serv.* 2016 Dec;67(12):1362-7. PMC5133141.

**OBJECTIVE:** Depression is pervasive and costly, and the majority of depression is treated in primary care. The objective of this study was to identify patient characteristics predictive of poor depression outcomes in primary care clinics. **METHODS:** This observational study followed 792 patients receiving usual care for depression in 83 clinics across Minnesota for at least six months between 2008 and 2010. The primary outcome was an ordinal outcome of remission or response without remission ("response") six months after the start of treatment. The outcome was assessed via telephone administration of the Patient Health Questionnaire-9. Associations of patient characteristics with the primary outcome were assessed by using ordinal logistic regression. **RESULTS:** The majority of patients were female, Caucasian, and employed, and most had some college education and good, very good, or excellent self-rated health. At baseline, 32% had mild depression, 40% moderate depression, 20% moderately severe depression, and 8% severe depression. One-third of patients had psychotherapy or psychiatric care in addition to antidepressant medications. At six months, only 47% of patients obtained depression remission or response. Patients were significantly less likely to experience remission or response if they rated their health as poor or fair or if they were unemployed and were more likely to achieve remission or response if they were younger or had mild depression. **CONCLUSIONS:** Patients with poor or fair health or who were unemployed were less likely to respond to usual depression care and may be good candidates for limited, but potentially more effective, intensive treatment resources for depression.

Ruedinger E, **Mathews BK**, Olson APJ. Decision - diagnosis: an introduction to diagnostic error and medical decision-making. *MedEdPORTAL Publications.* 2016 Apr;12:Publication ID 10378.

Despite the importance and ubiquity of the diagnostic process, diagnostic errors are common and costly, with respect to both health care spending and patient morbidity and mortality. An estimated 10% to 15% of inpatient diagnoses and 5% of outpatient encounters involve diagnostic error, defined as a missed,

delayed, or incorrect diagnosis. Diagnostic errors also have a marked impact on health care providers, and the emotional effects of diagnostic error can be long-lasting and harmful. Medical educators then have a duty to address diagnostic errors as part of their quality improvement and patient safety curricula. Given these challenges and the existing educational gap, we created a curriculum in diagnostic reasoning and diagnostic error. This educational activity provides a robust introduction to the topic as well as an opportunity for structured self-reflection about learners' own experience with diagnostic errors. The educational outcomes were developed not only to give learners the knowledge and skills they need to improve the diagnostic process and decrease diagnostic error but also to cultivate and demonstrate attitudes of humility and openness about diagnostic reasoning and error for learners and faculty. This educational activity was well received by learners and can serve as an introduction for a larger curriculum or as a stand-alone educational activity. It was effective at improving learner knowledge about medical decision-making and cognitive biases and is an important contribution to implementing focused educational interventions about diagnostic error and medical decision-making.

Saba R, Alsayed A, Zacny JP, **Dudek AZ**. The role of Forkhead box protein M1 in breast cancer progression and resistance to therapy. *Int J Breast Cancer*. 2016;2016:9768183. PMC4752991.

The Forkhead box M1 (FOXM1) is a transcription factor that has been implicated in normal cell growth and proliferation through control of cell cycle transition and mitotic spindle. It is implicated in carcinogenesis of various malignancies where it is activated by either amplification, increased stability, enhanced transcription, dysfunction of regulatory pathways, or activation of PI3K/AKT, epidermal growth factor receptor, Raf/MEK/MAPK, and Hedgehog pathways. This review describes the role of FOXM1 in breast cancer. This includes how FOXM1 impacts on different subtypes of breast cancer, that is, luminal/estrogen receptor positive (ER+), expressing human epidermal growth factor receptor 2 (HER2), basal-like breast cancer (BBC), and triple negative breast cancer (TNBC). The review also describes different tested preclinical therapeutic strategies targeting FOXM1. Developing clinically applicable therapies that specifically inhibit FOXM1 activity is a logical next step in biomarker-driven approaches against breast cancer but will not be without its challenges due to the unique properties of this transcription factor.

Sadowski DJ, **Butcher MJ**, Kohler TS. A review of pathophysiology and management options for delayed ejaculation [review article]. *Sex Med Rev*. 2016 Apr;4(2):167-76.

**INTRODUCTION:** Delayed ejaculation (DE) is a poorly defined disorder that entails the delay or absence of orgasm that results in personal distress. Numerous causes of DE exist, and management must be tailored to the specific etiology to maximize treatment success. Management strategies include psychological and sexual therapy, pharmacotherapy, and penile vibratory stimulation. **AIM:** This article intends to review the pathophysiology and treatment options for DE discussed in the literature to date. **METHODS:** A review of the literature was performed to identify and evaluate the existing data on treatment success for the various forms of DE management. **MAIN OUTCOME MEASURES:** Each treatment option was evaluated for method of administration, data supporting its success for DE, and potential risks or side effects. **RESULTS:** Different psychosexual therapy strategies have been described for DE but with limited data to describe efficacy. There is no medication for DE approved by the United States Food and Drug Administration. The quality of evidence supporting the off-label use of medications for DE is low. However, there are numerous medications reported in the literature suggested to treat the condition. Cabergoline and bupropion are the two most commonly used. In addition, penile vibratory stimulation has been described as an adjunct treatment option for DE. **CONCLUSION:** There are different treatment options reported for DE, all with limited evidence supporting their efficacy. Identifying the etiology of the DE is important to appropriately target therapy. A multimodal approach combining psychosexual therapy with medications and/or penile vibratory stimulation will likely provide the best outcomes.

**Sanchez-Ramirez JP, Gakhal R, Oakman SA.** Addiction psychiatry in PGY-3: use of the intensive outpatient treatment setting to train senior residents. *Acad Psychiatry*. 2016 Jun;40(3):517-9.

Santos RS, Moraes L, Samary CS, Santos CL, Ramos MB, Vasconcellos AP, Horta LF, Morales MM,

Capelozzi VL, Garcia CS, **Marini JJ**, Gama de Abreu M, Pelosi P, Silva PL, Rocco PR. Fast versus slow recruitment maneuver at different degrees of acute lung inflammation induced by experimental sepsis. *Anesth Analg*. 2016 Apr;122(4):1089-100.

**BACKGROUND:** Large tidal volume (VT) breaths or "recruitment maneuvers" (RMs) are used commonly to open collapsed lungs, but their effectiveness may depend on how the RM is delivered. We hypothesized that a stepped approach to RM delivery ("slow" RM) compared with a nonstepped ("fast" RM), when followed by decremental positive end-expiratory pressure (PEEP) titration to lowest dynamic elastance, would (1) yield a more homogeneous inflation of the lungs, thus reducing the PEEP obtained during post-RM titration; (2) produce less lung morphofunctional injury, regardless of the severity of sepsis-induced acute lung inflammation; and (3) result in less biological damage in severe, but not in moderate, acute lung inflammation. **METHODS:** Sepsis was induced by cecal ligation and puncture surgery in 51 Wistar rats. After 48 hours, animals were anesthetized, mechanically ventilated (VT = 6 mL/kg), and stratified by PO<sub>2</sub>/fraction of inspired oxygen ratio into moderate ( $\geq 300$ ) and severe ( $< 300$ ) acute lung inflammation groups. Each group was then subdivided randomly into 3 subgroups: (1) nonrecruited; (2) RM with continuous positive airway pressure (30 cm H<sub>2</sub>O for 30 seconds; CPAPRM or fast RM); and (3) RM with stepwise airway pressure increase (5 cm H<sub>2</sub>O/step, 8.5 seconds/step, 6 steps, 51 seconds; STEPRM or slow RM), with a maximum pressure hold for 10 seconds. All animals underwent decremental PEEP titration to determine the level of PEEP required to optimize dynamic compliance after RM and were then ventilated for 60 minutes with VT = 6 mL/kg, respiratory rate = 80 bpm, fraction of inspired oxygen = 0.4, and the newly adjusted PEEP for each animal. Respiratory mechanics, hemodynamics, and arterial blood gases were measured before and at the end of 60-minute mechanical ventilation. Lung histology and biological markers of inflammation and damage inflicted to endothelial cells were evaluated at the end of the 60-minute mechanical ventilation. **RESULTS:** Respiratory system mean airway pressure was lower in STEPRM than that in CPAPRM. The total RM time was greater, and the RM rise angle was lower in STEPRM than that in CPAPRM. In both moderate and severe acute lung inflammation groups, STEPRM reduced total diffuse alveolar damage score compared with the score in nonrecruited rats. In moderate acute lung inflammation, STEPRM rats compared with CPAPRM rats had less endothelial cell damage and angiopoietin (Ang)-2 expression. In severe acute lung inflammation, STEPRM compared with CPAPRM reduced hyperinflation, endothelial cell damage, Ang-2, and intercellular adhesion molecule-1 expressions. RM rise angle correlated with Ang-2 expression. **CONCLUSIONS:** Compared with CPAPRM, STEPRM reduced biological markers associated with endothelial cell damage and ultrastructural endothelial cell injury in both moderate and severe sepsis-induced acute lung inflammation.

Sarvas EW, **Schwantes SA**, Karp JM. Preparing the pediatric dentist for palliative and end-of-life care. *Pediatr Dent*. 2016;38(4):295-9.

Pediatric dentists are the primary providers of dental homes for children with life-threatening and complex chronic conditions. These children are increasingly living at home and seeking health care in community-based settings, including dental offices. Pediatric dentists may feel ill prepared to assume the roles and responsibilities of a pediatric palliative care provider due to limited education and training during dental school and residency; however, they should be sensitive to the palliative care needs of children and families. The purpose of this clinical article was to highlight palliative care scenarios in pediatric dentistry and provide actionable resources to empower pediatric dentists to gather health care information, make informed ethical decisions, promote patient- and family-centered care, and prepare dentists and their dental teams for episodes of death and bereavement when providing a dental home to patients with life-threatening and complex chronic conditions.

**Schousboe JT.** Epidemiology of vertebral fractures [review article]. *J Clin Densitom*. 2016 Jan;19(1):8-22.

Vertebral fractures are one of the most common fractures associated with skeletal fragility and can cause as much morbidity as hip fractures. However, the epidemiology of vertebral fractures differs from that of osteoporotic fractures at other skeletal sites in important ways, largely because only one-quarter to one-third of vertebral fractures are recognized clinically at the time of their occurrence and otherwise require

lateral spine imaging to be recognized. This article first reviews the prevalence and incidence of clinical and radiographic vertebral fractures in populations across the globe and secular trends in the incidence of vertebral fracture over time. Next, associations of vertebral fractures with measures of bone mineral density and bone microarchitecture are reviewed followed by associations of vertebral fracture with various textural measures of trabecular bone, including trabecular bone score. Finally, the article reviews clinical risk factors for vertebral fracture and the association of vertebral fractures with morbidity, mortality, and other subsequent adverse health outcomes.

**Schousboe JT.** Computed tomography-based bone density assessment for men with prostate cancer: not ready for prime time [editorial]. *J Clin Densitom.* 2016 Oct;19(4):407-8.

**Schousboe JT, Paudel ML, Taylor BC, Kats AM, Virnig BA, Ensrud KE, Dowd BE.** Estimating true resource costs of outpatient care for Medicare beneficiaries: standardized costs versus Medicare payments and charges. *Health Serv Res.* 2016 Feb;51(1):205-19. PMC4722202.

**OBJECTIVE:** To compare standardized estimates of the true resource costs of outpatient health care to the allowable and billed charges for that care among Medicare Fee for Service (FFS) beneficiaries. **DATA SOURCES/STUDY SETTING:** Medicare Carrier and Outpatient Standard Analytic (SAF) files linked to participant data in the Study of Osteoporotic Fractures from 2004 through 2010. Participants were 3,435 female Medicare Fee for Service enrollees age 80 and older recruited in one rural and three metropolitan areas of the United States. **STUDY DESIGN:** We estimated standardized costs for Carrier and OP-SAF claims using Medicare payment weights, and compared them to allowable and billed charges for those claims. We used semilog linear regression to estimate the associations of age, race, bone mineral density, prior fracture, and geriatric depression scale score with allowable charges, billed charges, and standardized costs. **RESULTS:** Estimated associations of patient characteristics with standardized costs were not statistically different than the associations with allowable charges (chi-squared [chi(2)]: 8.6,  $p = .13$ ) but were different from associations with billed charges (chi(2): 25.5,  $p < .001$ ). **CONCLUSION:** Allowable charges for outpatient utilization in the Carrier file and OP-SAF may be good surrogates for standardized costs that reflect patient medical and surgical acuity.

**Schousboe JT, Richter SA, Beran MS.** Potential clinical impact of abdominal aortic calcification on bone density lateral spine images. *J Clin Densitom.* 2016 Oct;19(4):436-43.

Abdominal aortic calcification (AAC) predicts incident atherosclerotic cardiovascular disease (ASCVD) events and can be accurately identified on densitometric lateral spine images obtained at the time of bone densitometry. Our objective was to estimate the proportion of patients referred for bone densitometry who have a high level of AAC and are not already known to have ASCVD or to be at high risk for ASCVD. AAC was scored on densitometric lateral spine images of 2168 individuals blinded to clinical diagnoses or risk factors using the 24-point Framingham scale. We ascertained preexisting ASCVD diagnoses and risk factors using electronic health record data. We used the risk calculator of the American Heart Association (AHA) and the American College of Cardiology (ACC) to estimate the 10-yr risk of hard ASCVD outcomes (myocardial infarction, death caused by coronary heart disease, or nonfatal or fatal stroke). A high level of AAC (AAC score  $\geq 5$ ) was present in 41 (6.1%, 95% confidence interval [CI]: 4.4%-8.2%) of those aged less than 65 year, in 253 (23.1%, 95% CI: 20.7%-25.7%) of those aged 65-74 year, and in 153 (37.8%, 95% CI: 33.0%-42.7%) of those aged 75-80 year. Among those aged 65-74 year, 16.9% (95% CI: 14.7%-19.3%) had a high level of AAC and no prior clinical diagnosis of ASCVD, but only 2.4% had a high level of AAC and a predicted 10-year risk of hard ASCVD outcomes  $< 7.5\%$ . AAC is common among those aged 65 year and older who were referred for bone densitometry and had no known ASCVD, although these individuals can also be recognized as being at intermediate to high risk using the AHA-ACC ASCVD risk calculator. Further studies regarding the impact of identification of AAC on provider and patient cardiovascular disease risk management choices are warranted.

**Schousboe JT, Vo T, Taylor BC, Cawthon PM, Schwartz AV, Bauer DC, Orwoll ES, Lane NE, Barrett-Connor E, Ensrud KE, Osteoporotic Fractures in Men (MrOS) Study Research Group.** Prediction of incident major osteoporotic and hip fractures by Trabecular Bone Score (TBS) and prevalent radiographic vertebral fracture in older men. *J Bone Miner Res.* 2016 Mar;31(3):690-7. PMC4795988.

Trabecular bone score (TBS) has been shown to predict major osteoporotic (clinical vertebral, hip, humerus, and wrist) and hip fractures in postmenopausal women and older men, but the association of TBS with these incident fractures in men independent of prevalent radiographic vertebral fracture is unknown. TBS was estimated on anteroposterior (AP) spine dual-energy X-ray absorptiometry (DXA) scans obtained at the baseline visit for 5979 men aged  $\geq 65$  years enrolled in the Osteoporotic Fractures in Men (MrOS) Study and its association with incident major osteoporotic and hip fractures estimated with proportional hazards models. Model discrimination was tested with Harrell's C-statistic and with a categorical net reclassification improvement index, using 10-year risk cutpoints of 20% for major osteoporotic and 3% for hip fractures. For each standard deviation decrease in TBS, there were hazard ratios of 1.27 (95% confidence interval [CI] 1.17 to 1.39) for major osteoporotic fracture, and 1.20 (95% CI 1.05 to 1.39) for hip fracture, adjusted for FRAX with bone mineral density (BMD) 10-year fracture risks and prevalent radiographic vertebral fracture. In the same model, those with prevalent radiographic vertebral fracture compared with those without prevalent radiographic vertebral fracture had hazard ratios of 1.92 (95% CI 1.49 to 2.48) for major osteoporotic fracture and 1.86 (95% CI 1.26 to 2.74) for hip fracture. There were improvements of 3.3%, 5.2%, and 6.2%, respectively, of classification of major osteoporotic fracture cases when TBS, prevalent radiographic vertebral fracture status, or both were added to FRAX with BMD and age, with minimal loss of correct classification of non-cases. Neither TBS nor prevalent radiographic vertebral fracture improved discrimination of hip fracture cases or non-cases. In conclusion, TBS and prevalent radiographic vertebral fracture are associated with incident major osteoporotic fractures in older men independent of each other and FRAX 10-year fracture risks, and these data support their use in conjunction with FRAX for fracture risk assessment in older men.

Schrager SM, Arthur KC, Nelson J, **Edwards AR**, Murphy JM, Mangione-Smith R, Chen AY. Development and validation of a method to identify children with social complexity risk factors. *Pediatrics*. 2016 Sep;138(3):e20153787.

**OBJECTIVES:** We sought to develop and validate a method to identify social complexity risk factors (eg, limited English proficiency) using Minnesota state administrative data. A secondary objective was to examine the relationship between social complexity and caregiver-reported need for care coordination. **METHODS:** A total of 460 caregivers of children with noncomplex chronic conditions enrolled in a Minnesota public health care program were surveyed and administrative data on these caregivers and children were obtained. We validated the administrative measures by examining their concordance with caregiver-reported indicators of social complexity risk factors using tetrachoric correlations. Logistic regression analyses subsequently assessed the association between social complexity risk factors identified using Minnesota's state administrative data and caregiver-reported need for care coordination, adjusting for child demographics. **RESULTS:** Concordance between administrative and caregiver-reported data was moderate to high (correlation range 0.31-0.94, all P values  $< .01$ ), with only current homelessness ( $r = -0.01$ ,  $P = .95$ ) failing to align significantly between the data sources. The presence of any social complexity risk factor was significantly associated with need for care coordination before (unadjusted odds ratio = 1.65; 95% confidence interval, 1.07-2.53) but not after adjusting for child demographic factors (adjusted odds ratio = 1.53; 95% confidence interval, 0.98-2.37). **CONCLUSIONS:** Social complexity risk factors may be accurately obtained from state administrative data. The presence of these risk factors may heighten a family's need for care coordination and/or other services for children with chronic illness, even those not considered medically complex.

**Schroder LK, Gauger EM, Gilbertson JA, Cole PA.** Functional outcomes after operative management of extra-articular glenoid neck and scapular body fractures. *J Bone Joint Surg Am*. 2016 Oct 5;98(19):1623-30.

**BACKGROUND:** This study's purpose was to assess patient-based functional outcomes following open reduction and internal fixation (ORIF) of displaced scapular body and glenoid neck fractures. This series represents a 9-year experience at a level-I trauma center and referral destination for this injury. **METHODS:** A database was established to record surgical and functional outcomes of scapular fractures treated with ORIF. For this report, the cases of all patients who had a glenoid neck or scapular body fracture (AO/OTA 14-A3 or 14-C1) without intra-articular involvement were reviewed. Operative indications included medial/lateral displacement of  $\geq 20$  mm, angulation of  $\geq 45$  degrees, medial/lateral

displacement of  $\geq 15$  mm with angulation of  $\geq 30$  degrees, double disruptions of the superior shoulder suspensory complex with both displaced  $\geq 10$  mm, a glenopolar angle of  $\leq 22$  degrees, and an open fracture. The results of clinical testing, including measurements of range of motion and strength and scores on the Disabilities of the Arm, Shoulder and Hand (DASH) and Short Form-36 (SF-36) questionnaires, were recorded at each follow-up appointment. RESULTS: Between 2002 and 2011, 61 patients with an extra-articular scapular fracture were treated surgically within 20 days after the injury; 19 patients (31%) had  $\geq 2$  operative indications. Of the 61 patients, 49 (80%) were followed for  $\geq 1$  year (mean, 33 months; range, 12 to 138 months) following surgery. There was a 100% union rate at the time of final follow-up, with a mean DASH score of 12.1 points (range, 0 to 54 points). For all parameters, the mean SF-36 scores of the study patients were comparable with normative population scores. The range of motion of the operatively treated and contralateral shoulders averaged, respectively, 154 degrees and 159 degrees of forward flexion, 106 degrees and 108 degrees of abduction, and 66 degrees and 70 degrees of external rotation. The strength of the operatively treated and contralateral shoulders averaged, respectively, 20 and 23 lb (89.0 and 102.3 N) of force in forward flexion, 14 and 16 lb (62.3 and 71.2 N) in abduction, and 19 and 23 lb (84.5 and 102.3 N) in external rotation. Complications and/or secondary surgery were recorded for 8 patients (16%). CONCLUSIONS: Displaced scapular body and glenoid neck fractures that meet current published standards for ORIF can be treated operatively with predictably good functional outcomes.

**Schuld JC, Volker ML, Anderson SA, Zwank MD.** Post-splinting x-rays of nondisplaced hand, wrist, ankle, and foot fractures are unnecessary. *Am J Emerg Med.* 2016 Aug;34(8):1625-6.

BACKGROUND: Acute nondisplaced fractures (NDFs) are common in the emergency department (ED), and providers often obtain postsplinting x-rays to identify displacement that potentially occurs during the splinting process. Our objectives are to (1) determine how often x-rays are obtained after splinting of NDFs, (2) identify if postsplinting x-rays change treatment management in the ED, and (3) identify if there are medical complications at follow-up. METHODS: A retrospective chart review of ED patients who were discharged with hand, wrist, ankle, or foot fractures was conducted to determine patients with definite NDFs that were verified by a radiologist, underwent splinting, and either had postsplint x-rays or not. Bone displacement during the splinting procedure was determined by the postsplint x-rays in the ED. Internal movement of bones or management change was also determined for patients who did not undergo postsplint x-rays in the ED but had obtained an x-ray at their follow-up visit (in-network providers only). RESULTS: Our results demonstrate that no patients required further manipulation or operative management due to the splinting that occurred in the ED. These results take into account both patients who had postsplint x-rays conducted in the ED (27 patients) and those who received x-rays in follow-up consults (179 patients). There was minimal incidence of interval movement in the latter group (14 patients), none of which resulted in management change. CONCLUSION: These data conclude that postsplinting x-rays of NDFs are unnecessary. Removal of this procedure from routine practice will help decrease patient and hospital cost, time, and radiation exposure.

Selvin E, Parrinello CM, Daya N, **Bergental RM.** Trends in insulin use and diabetes control in the U.S.: 1988-1994 and 1999-2012 [editorial]. *Diabetes Care.* 2016 Mar;39(3):e33-5. PMC4764038.

**Shapiro AC, Adlis SA,** Robien K, Kirstein MN, Liang S, **Richter SA, Lerner RE.** Randomized, blinded trial of vitamin D3 for treating aromatase inhibitor-associated musculoskeletal symptoms (AIMSS). *Breast Cancer Res Treat.* 2016 Feb;155(3):501-12. PMC5260816. Project: A16-199. [Erratum in: *Breast Cancer Res Treat.* 2016 Jun;157(2):403.]

The purpose of the study was to evaluate the efficacy and safety of vitamin D3 at 4000 IU/day as a treatment option for aromatase inhibitor-associated musculoskeletal symptoms (AIMSS) when compared with the usual care dose of 600 IU D3. We conducted a single site randomized, double-blind, phase 3 clinical trial in women with AIMSS comparing change in symptoms, reproductive hormones and AI pharmacokinetics. Postmenopausal women  $\geq 18$  years with stages I-IIIa breast cancer, taking AI and experiencing AIMSS [breast cancer prevention trial symptom scale-musculoskeletal (BCPT-MS) subscale  $\geq 1.5$ ] were admitted. Following randomization, 116 patients had a run-in period of 1 month on 600 IU D3, then began the randomized assignment to either 600 IU D3 (n = 56) or 4000 IU D3 (n = 57) daily for 6

months. The primary endpoint was a change in AIMSS from baseline (after 1 month run-in) on the BCPT-MS (general MS pain, joint pain, muscle stiffness, range for each question: 0 = not at all to 4 = extremely). Groups had no statistically significant differences demographically or clinically. There were no discernable differences between the randomly allocated treatment groups at 6 months in measures of AIMSS, pharmacokinetics of anastrozole and letrozole, serum levels of reproductive hormones, or adverse events. We found no significant changes in AIMSS measures between women who took 4000 IU D3 daily compared with 600 IU D3. The 4000 IU D3 did not adversely affect reproductive hormone levels or the steady state pharmacokinetics of anastrozole or letrozole. In both groups, serum 25(OH)D remained in the recommended range for bone health ( $\geq 30$  ng/mL) and safety ( $< 50$  ng/mL).

Shapiro EG, Rudser KD, Ahmed A, Steiner RD, Delaney KA, Yund B, King K, **Kunin-Batson AS**, Eisengart J, Whitley CB. A longitudinal study of emotional adjustment, quality of life and adaptive function in attenuated MPS II. *Mol Genet Metab Rep*. 2016 Jun;7:32-9. PMC4832084.

**OBJECTIVES:** The behavioral, adaptive and quality of life characteristics of attenuated mucopolysaccharidosis type II (MPS II) have not been well studied. Understanding changes over time in the attenuated phenotype may assist in helping achieve better outcomes in long-term function. This longitudinal study investigates these outcomes in relation to age, somatic disease burden, and IQ. Specifically, somatic disease burden is a major challenge for these patients, even with treatment with enzyme replacement therapy. **METHODS:** 15 patients, 10 between ages 6 and  $< 12$  and 5 between ages  $\geq 12$  and 18, were selected who had at least 2 yearly visits. The occurrence of physical signs, the Physical Symptom Score, and IQ in these two groups was studied as well as the longitudinal association of age with standardized measures of quality of life, adaptive function, and behavioral symptoms as rated by parents and the child's self-report. Slopes by age across and within patients were calculated for these measures. **RESULTS:** All but one child had hearing loss, most had joint contractures and short stature. Somatic disease burden increased with age. IQ, although normal for most, also improved with age in those under 12 years of age. Physical quality of life decreased while psychosocial quality of life increased with age. Although other adaptive skills were in the broad average range, daily living skills were low at baseline relative to normative data and decreased over time. Behavior ratings indicated improvement in attention and hyperactivity over time. No patient had severe psychopathology, but older children reported an increasing sense of inadequacy and low self-esteem on self-report, presumably due to increasing awareness of differences from peers over time. **CONCLUSIONS:** Attenuated MPS II patients have increasing somatic disease burden and poor physical quality of life as they develop as well as decreasing self-esteem and sense of adequacy. Psychosocial quality of life, adaptive skills, and attention improve. Recognition of and intervention around these issues will be beneficial to MPS II attenuated patients who have the resources to use such assistance to improve their long-term outcomes.

Shaw JE, Punjabi NM, Naughton MT, Willes L, **Bergental RM**, Cistulli PA, Fulcher GR, Richards GN, Zimmet PZ. The effect of treatment of obstructive sleep apnea on glycemic control in type 2 diabetes. *Am J Respir Crit Care Med*. 2016 Aug 15;194(4):486-92.

**RATIONALE:** There is uncertainty about the effects of treating obstructive sleep apnea on glycemic control in patients with type 2 diabetes. **OBJECTIVES:** To determine whether treatment of obstructive sleep apnea in patients with type 2 diabetes improves glycemic control. **METHODS:** In this trial, we randomized patients with type 2 diabetes and no previous diagnosis of obstructive sleep apnea, with a glycosylated hemoglobin level of 6.5-8.5%, and an oxygen desaturation index of 15 or more events per hour to positive airway pressure therapy or to usual care. **MEASUREMENTS AND MAIN RESULTS:** A total of 416 patients met the entry criteria as determined by each site and were randomized. Of the 298 participants who met centrally adjudicated entry criteria, no differences between the study groups were seen for change in glycosylated hemoglobin. Furthermore, there were no between-group differences when analyses were restricted to those with poorer baseline glycemic control, those with more severe sleep apnea, or those who were adherent to therapy. A greater fall in diastolic blood pressure occurred in the positive airway pressure group than in the usual care group ( $-3.5$  mm Hg vs.  $-1.5$  mm Hg;  $P = 0.07$ ). This difference was significant in those who were adherent to positive airway pressure therapy ( $-4.4$  mm Hg vs.  $-1.6$  mm Hg;  $P = 0.02$ ). There was a significant reduction in sleepiness in the positive airway pressure therapy group ( $P < 0.0001$ ). Quality of life assessment revealed improvements in vitality, mental health,

and mental component summary scores in the positive airway pressure therapy group. **CONCLUSIONS:** This trial showed no effect of positive airway pressure therapy on glycemic control in patients with relatively well-controlled type 2 diabetes and obstructive sleep apnea.

**Sherwood NE**, Butryn ML, Forman EM, Almirall D, **Seburg EM**, **Crain AL**, **Kunin-Batson AS**, **Hayes MG**, Levy RL, Jeffery RW. The BestFIT trial: A SMART approach to developing individualized weight loss treatments. *Contemp Clin Trials*. 2016 Mar;47:209-16. PMC4941634. Project: A13-012 BestFIT.

Behavioral weight loss programs help people achieve clinically meaningful weight losses (8-10% of starting body weight). Despite data showing that only half of participants achieve this goal, a "one size fits all" approach is normative. This weight loss intervention science gap calls for adaptive interventions that provide the "right treatment at the right time for the right person." Sequential Multiple Assignment Randomized Trials (SMART), use experimental design principles to answer questions for building adaptive interventions including whether, how, or when to alter treatment intensity, type, or delivery. This paper describes the rationale and design of the BestFIT study, a SMART designed to evaluate the optimal timing for intervening with sub-optimal responders to weight loss treatment and relative efficacy of two treatments that address self-regulation challenges which impede weight loss: 1) augmenting treatment with portion-controlled meals (PCM) which decrease the need for self-regulation; and 2) switching to acceptance-based behavior treatment (ABT) which boosts capacity for self-regulation. The primary aim is to evaluate the benefit of changing treatment with PCM versus ABT. The secondary aim is to evaluate the best time to intervene with sub-optimal responders. BestFIT results will lead to the empirically-supported construction of an adaptive intervention that will optimize weight loss outcomes and associated health benefits.

Shueb SS, Boyer HC, **Nixdorf DR**. Nonodontogenic "tooth pain" of nose and sinus origin. *J Am Dent Assoc*. 2016 Jun;147(6):457-9.

Shulman LM, Armstrong M, Ellis T, Gruber-Baldini A, Horak F, Nieuwboer A, **Parashos SA**, Post B, Rogers M, Siderowf A, Goetz CG, Schrag A, Stebbins GT, Martinez-Martin P. Disability rating scales in Parkinson's disease: Critique and recommendations [review article]. *Movement disorders*. 2016 Oct;31(10):1455-65.

**INTRODUCTION:** PD is associated with impairments that progress over time to disability. A large number of disability scales exist with little information on the best choice in PD. **METHODS:** Following methodology adopted by the International Parkinson and Movement Disorder Society Task Force, a review of disability scales used in PD was completed. Based on prespecified criteria, the review categorized scales into: "Recommended"; "Recommended with Further Validation in PD Required" when well-validated scales have not been specifically tested for clinimetric properties in PD; "Suggested"; and "Listed." **RESULTS:** Twenty-nine disability instruments were identified with nine scales fulfilling criteria for "Recommended" and 7 "Recommended with Further Validation in PD Required." Eight scales are "Suggested" and five scales are "Listed" for use in PD. The nine Recommended scales (Functional Status Questionnaire, Lawton-Brody Activities of Daily Living, Nottingham Activities of Daily Living, Schwab and England Activities of Daily Living, Self-Assessment PD Disability, Short Parkinson's Evaluation Scale/Scales for Outcomes in PD, Unified PD Rating Scale-II: Activities of Daily Living, Movement Disorders Society UPDRS Motor Experiences of Daily Living, PROMIS(R) and Neuro-QoL Physical Function), and the seven Recommended with Further Validation in PD Required are reviewed. **CONCLUSION:** Many disability measures are available and recommended for application in PD. The Task Force does not recommend the development of a new scale. Selection of the most appropriate instrument for a particular objective requires consideration of the characteristics of each scale and the goals of the assessment.

**Sikka RS**, **Kurtenbach C**, **Steubs JT**, **Boyd JL**, **Nelson BJ**. Anterior cruciate ligament injuries in professional hockey players. *Am J Sports Med*. 2016 Feb;44(2):378-83.

**BACKGROUND:** Performance outcomes and return-to-play data have been reported after anterior cruciate ligament (ACL) injuries in professional football and basketball, but they have rarely been reported

in professional hockey. **HYPOTHESIS:** The hypothesis was that performance after ACL reconstruction would be comparable to prior levels of play in a series of National Hockey League (NHL) players. **STUDY DESIGN:** Case series; Level of evidence, 4. **METHODS:** The NHL Injury Surveillance System (ISS) was utilized to identify all players with an ACL injury between 2006 and 2010. Medical staff members for all NHL teams were surveyed regarding these injuries. The medical staff completed a questionnaire for each injury, and statistics were analyzed using multiple analyses of variance to compare outcomes, performance, and the complication rate. A control group was identified and matched based on performance, career length before injury, age, height, and weight. **RESULTS:** There were 47 players identified by the NHL ISS. There were 3 goalies, 8 defensemen, and 36 wings or centers. The average age of these players was 27.69 years. The average length of time played after the injury was 2.8 years, which was less than that of the control group (4.4 years) ( $P = .004$ ). The presence of a meniscal injury was associated with a decreased length of career compared with the control group ( $P = .012$ ) and with patients with an isolated ACL injury ( $P = .002$ ). For wings and centers, the number of games played decreased from 71.2 to 58.2 in the first full season after the injury ( $P = .05$ ) and to 59.29 in the second season ( $P = .03$ ). In the first season after the injury, for forwards and wings, assists and total points decreased from 20.3 and 35.2 to 13.8 ( $P = .005$ ) and 25.9 ( $P = .018$ ), respectively. In the second season after the injury, assists and goals decreased to 10.0 ( $P = .002$ ) and 10.0 ( $P = .013$ ), respectively. Compared with controls, the per-season averages of goals ( $P = .001$ ), assists ( $P = .010$ ), and total points ( $P = .004$ ) decreased. Four players (8.5%) had subsequent failure of reconstruction, and there was a total reoperation rate of 20%. Five players (10.6%) did not return to play, and 4 (8.5%) were unable to return to play for a full season. **CONCLUSION:** Most players are able to return to play in the NHL after an ACL injury. However, career length and performance may be significantly decreased compared with controls. This may represent a more severe initial injury, and more focused return-to-play pathways may identify barriers to return to play.

Simon GE, Beck AL, **Rossom RC**, Richards J, Kirilin B, King D, Shulman L, Ludman EJ, Penfold R, Shortreed SM, Whiteside U. Population-based outreach versus care as usual to prevent suicide attempt: study protocol for a randomized controlled trial. *Trials*. 2016 Sep 15;17(1):452. PMC5025595.

**BACKGROUND:** Suicide remains the 10th-ranked most frequent cause of death in the United States, accounting for over 40,000 deaths per year. Nonfatal suicide attempts lead to over 200,000 hospitalizations and 600,000 emergency department visits annually. Recent evidence indicates that responses to the commonly used Patient Health Questionnaire (PHQ9) can identify outpatients who are at risk of suicide attempt and suicide death and that specific psychotherapy or Care Management programs can prevent suicide attempts in high-risk patients. Motivated by these developments, the NIMH-funded Mental Health Research Network has undertaken a multisite trial of two outreach programs to prevent suicide attempts among outpatients identified by routinely administered PHQ9 questionnaires. **METHODS/DESIGN:** Outpatients who are at risk of suicide attempt are automatically identified using data from electronic health records (EHRs). Following a modified Zelen design, all those identified are assigned to continued usual care (i.e., no contact) or to be offered one of two population-based outreach programs. A Care Management intervention includes systematic outreach to assess suicide risk, EHR-based tools to implement risk-based care pathways, and care management to facilitate recommended follow-up. A Skills Training intervention includes interactive online training in Dialectical Behavior Therapy skills, supported by reminder and reinforcement messages from a skills coach. Each intervention supplements, rather than replaces, usual care; participants may receive any other services normally available. Interventions are delivered primarily by secure messaging through EHR patient portals. Suicide attempts and deaths following randomization are identified using state vital statistics data and health system EHR and insurance claim data. Primary evaluation will compare risk of suicide attempt or death over 18 months according to the initial assignment, regardless of intervention participation. Recruitment is underway in three health systems (Group Health Cooperative, HealthPartners, and Kaiser Permanente Colorado). Over 2500 participants have been randomized as of 1 March 2016, with enrollment averaging approximately 100 per week. **DISCUSSION:** Assessing the effectiveness of population-based suicide prevention requires adherence to the principles of pragmatic trials: population-based enrollment, accepting variable treatment participation, assessing outcomes using health record data, and analyses based on intent-to-treat.

Simon GE, Coleman KJ, **Rossum RC**, Beck AL, Oliver M, Johnson E, Whiteside U, Operskalski B, Penfold RB, Shortreed SM, Rutter C. Risk of suicide attempt and suicide death following completion of the Patient Health Questionnaire depression module in community practice. *J Clin Psychiatry*. 2016 Feb;77(2):221-7. PMC4993156. Project: A10-003 MHRN Infrastructure.

**OBJECTIVE:** To examine the association between thoughts of death or self-harm reported on item 9 of the Patient Health Questionnaire (PHQ) depression module and the risk of suicide attempt or suicide death over the following 2 years. **METHOD:** In 4 health care systems participating in the Mental Health Research Network, electronic records identified 509,945 adult outpatients completing 1,228,308 PHQ depression questionnaires during visits to primary care, specialty mental health, and other outpatient providers between January 1, 2007 and December 31, 2012. 9,203 nonfatal suicide attempts were identified using health system records of inpatient or outpatient encounters for self-inflicted injury. 484 suicide deaths were identified using cause-of-death codes from state mortality data. **RESULTS:** Cumulative hazard of suicide attempt during 2 years ranged from approximately 0.5% among those reporting thoughts of death or self-harm "not at all" to 3.5% among those reporting such thoughts "nearly every day." Cumulative hazard of suicide death during 2 years ranged from approximately 0.04% among those responding "not at all" to 0.19% among those responding "nearly every day." The excess hazard associated with thoughts of death or self-harm declined with time, but remained 2- to 5-fold higher for at least 18 months. Nevertheless, 39% of suicide attempts and 36% of suicide deaths within 30 days of completing a PHQ occurred among those responding "not at all" to item 9. **CONCLUSIONS:** In community practice, response to PHQ item 9 is a strong predictor of suicide attempt and suicide death over the following 2 years. For patients reporting thoughts of death or self-harm, suicide prevention efforts must address this enduring vulnerability.

Singh JA, Saag KG, Bridges SL, Jr., Akl EA, Bannuru RR, Sullivan MC, Vaysbrot E, McNaughton C, Osani M, Shmerling RH, Curtis JR, Furst DE, Parks D, Kavanaugh A, O'Dell J, King C, Leong A, Matteson EL, **Schousboe JT**, Drevlow B, Ginsberg S, Grober J, St Clair EW, Tindall E, Miller AS, McAlindon T, American College of Rheumatology. 2015 American College of Rheumatology guideline for the treatment of rheumatoid arthritis [review article]. *Arthritis Rheumatol*. 2016 Jan;68(1):1-26. [Comment in: *Nat Rev Rheumatol*. 2016 Mar;12(3):135-6. *Ann Intern Med*. 2016 Mar 15;164(6):JC27.]

**OBJECTIVE:** To develop a new evidence-based, pharmacologic treatment guideline for rheumatoid arthritis (RA). **METHODS:** We conducted systematic reviews to synthesize the evidence for the benefits and harms of various treatment options. We used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology to rate the quality of evidence. We employed a group consensus process to grade the strength of recommendations (either strong or conditional). A strong recommendation indicates that clinicians are certain that the benefits of an intervention far outweigh the harms (or vice versa). A conditional recommendation denotes uncertainty over the balance of benefits and harms and/or more significant variability in patient values and preferences. **RESULTS:** The guideline covers the use of traditional disease-modifying antirheumatic drugs (DMARDs), biologic agents, tofacitinib, and glucocorticoids in early (<6 months) and established ( $\geq$ 6 months) RA. In addition, it provides recommendations on using a treat-to-target approach, tapering and discontinuing medications, and the use of biologic agents and DMARDs in patients with hepatitis, congestive heart failure, malignancy, and serious infections. The guideline addresses the use of vaccines in patients starting/receiving DMARDs or biologic agents, screening for tuberculosis in patients starting/receiving biologic agents or tofacitinib, and laboratory monitoring for traditional DMARDs. The guideline includes 74 recommendations: 23% are strong and 77% are conditional. **CONCLUSION:** This RA guideline should serve as a tool for clinicians and patients (our two target audiences) for pharmacologic treatment decisions in commonly encountered clinical situations. These recommendations are not prescriptive, and the treatment decisions should be made by physicians and patients through a shared decision-making process taking into account patients' values, preferences, and comorbidities. These recommendations should not be used to limit or deny access to therapies.

Singh JA, Saag KG, Bridges SL, Jr., Akl EA, Bannuru RR, Sullivan MC, Vaysbrot E, McNaughton C, Osani M, Shmerling RH, Curtis JR, Furst DE, Parks D, Kavanaugh A, O'Dell J, King C, Leong A, Matteson EL, **Schousboe JT**, Drevlow B, Ginsberg S, Grober J, St Clair EW, Tindall E, Miller AS,

McAlindon T, American College of Rheumatology. 2015 American College of Rheumatology guideline for the treatment of rheumatoid arthritis [review article]. *Arthritis Care Res (Hoboken)*. 2016 Jan;68(1):1-25.

**OBJECTIVE:** To develop a new evidence-based, pharmacologic treatment guideline for rheumatoid arthritis (RA). **METHODS:** We conducted systematic reviews to synthesize the evidence for the benefits and harms of various treatment options. We used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology to rate the quality of evidence. We employed a group consensus process to grade the strength of recommendations (either strong or conditional). A strong recommendation indicates that clinicians are certain that the benefits of an intervention far outweigh the harms (or vice versa). A conditional recommendation denotes uncertainty over the balance of benefits and harms and/or more significant variability in patient values and preferences. **RESULTS:** The guideline covers the use of traditional disease-modifying antirheumatic drugs (DMARDs), biologic agents, tofacitinib, and glucocorticoids in early (<6 months) and established ( $\geq$ 6 months) RA. In addition, it provides recommendations on using a treat-to-target approach, tapering and discontinuing medications, and the use of biologic agents and DMARDs in patients with hepatitis, congestive heart failure, malignancy, and serious infections. The guideline addresses the use of vaccines in patients starting/receiving DMARDs or biologic agents, screening for tuberculosis in patients starting/receiving biologic agents or tofacitinib, and laboratory monitoring for traditional DMARDs. The guideline includes 74 recommendations: 23% are strong and 77% are conditional. **CONCLUSION:** This RA guideline should serve as a tool for clinicians and patients (our two target audiences) for pharmacologic treatment decisions in commonly encountered clinical situations. These recommendations are not prescriptive, and the treatment decisions should be made by physicians and patients through a shared decision-making process taking into account patients' values, preferences, and comorbidities. These recommendations should not be used to limit or deny access to therapies.

Smith E, **Narang PD**, Enja M, Lippmann SB. Pharmacotherapy for insomnia in primary care. *Prim Care Companion CNS Disord*. 2016 Mar 17;18(2). PMC4956432.

Pharmacotherapy for insomnia in primary care settings can be challenging. Frequently, there are multiple coexisting medical and psychiatric conditions, drug interactions, concern regarding use of habit-forming sleep aids, and paucity of time in office visits to discuss management of sleep difficulties. This article reports the results of a literature search related to pharmacotherapy for insomnia and presents 4 clinical vignettes with corresponding treatment options.

Snyder ME, **Frail CK**, Gernant SA, Bacci JL, Coley KC, Colip LM, Ferreri SP, Hagemeyer NE, McGivney MS, Rodis JL, Smith MG, Smith RB. Fellowships in community pharmacy research: Experiences of five schools and colleges of pharmacy. *J Am Pharm Assoc (2003)*. 2016 May-Jun;56(3):316-22.

**OBJECTIVE:** To describe common facilitators, challenges, and lessons learned in 5 schools and colleges of pharmacy in establishing community pharmacy research fellowships. **SETTING:** Five schools and colleges of pharmacy in the United States. **PRACTICE DESCRIPTION:** Schools and colleges of pharmacy with existing community partnerships identified a need and ability to develop opportunities for pharmacists to engage in advanced research training. **PRACTICE INNOVATION:** Community pharmacy fellowships, each structured as 2 years long and in combination with graduate coursework, have been established at the University of Pittsburgh, Purdue University, East Tennessee State University, University of North Carolina at Chapel Hill, and The Ohio State University. **EVALUATION:** Program directors from each of the 5 community pharmacy research fellowships identified common themes pertaining to program structure, outcomes, and lessons learned to assist others planning similar programs. **RESULTS:** Common characteristics across the programs include length of training, prerequisites, graduate coursework, mentoring structure, and immersion into a pharmacist patient care practice. Common facilitators have been the existence of strong community pharmacy partnerships, creating a fellowship advisory team, and networking. A common challenge has been recruitment, with many programs experiencing at least one year without filling the fellowship position. All program graduates (n = 4) have been successful in securing pharmacy faculty positions. **CONCLUSION:** Five schools and colleges of pharmacy share similar experiences in implementing community pharmacy research fellowships. Early outcomes show promise for this training pathway in growing future

pharmacist-scientists focused on community pharmacy practice.

**Solberg LI.** Theory vs practice: should primary care practice take on social determinants of health now? No. *Ann Fam Med.* 2016 Mar;14(2):102-3. PMC4781511.

Sorensen G, McLellan DL, Sabbath EL, Dennerlein JT, Nagler EM, Hurtado DA, **Pronk NP**, Wagner GR. Integrating worksite health protection and health promotion: A conceptual model for intervention and research. *Prev Med.* 2016 Oct;91:188-96. PMC5050152.

There is increasing recognition of the value added by integrating traditionally separate efforts to protect and promote worker safety and health. This paper presents an innovative conceptual model to guide research on determinants of worker safety and health and to inform the design, implementation and evaluation of integrated approaches to promoting and protecting worker health. This model is rooted in multiple theories and the premise that the conditions of work are important determinants of individual safety and health outcomes and behaviors, and outcomes important to enterprises such as absence and turnover. Integrated policies, programs and practices simultaneously address multiple conditions of work, including the physical work environment and the organization of work (e.g., psychosocial factors, job tasks and demands). Findings from two recent studies conducted in Boston and Minnesota (2009-2015) illustrate the application of this model to guide social epidemiological research. This paper focuses particular attention on the relationships of the conditions of work to worker health-related behaviors, musculoskeletal symptoms, and occupational injury; and to the design of integrated interventions in response to specific settings and conditions of work of small and medium size manufacturing businesses, based on a systematic assessment of priorities, needs, and resources within an organization. This model provides an organizing framework for both research and practice by specifying the causal pathways through which work may influence health outcomes, and for designing and testing interventions to improve worker safety and health that are meaningful for workers and employers, and responsive to that setting's conditions of work.

Sorensen TD, Pestka DL, Brummel AR, **Rehrauer DJ**, **Ekstrand MJ.** Seeing the forest through the trees: improving adherence alone will not optimize medication use. *J Manag Care Spec Pharm.* 2016 May;22(5):598-604.

Medication adherence is a problem that has received widespread attention in the medical literature and health policy circles. With the increased emphasis on recognizing and rewarding quality in the U.S. health care system, medication adherence measures are increasingly being adopted to assess quality of medication use. However, when adherence is discussed in the literature or evaluated via quality measures, there is rarely any dialogue surrounding adherence in the context of patient-centered issues such as clinical status, individualized medication needs, or personal expectations and social situation. When nonadherence is identified via a comprehensive assessment of all of a patient's medication-related issues, it typically is recognized as only the third most frequent type of medication-related problem. Issues such as requiring a medication that has not been prescribed or receiving a medication prescribed at a dose too low to achieve the intended clinical goal are more frequently experienced. Furthermore, if a patient is nonadherent to a medication because of adverse effects or if the medication prescribed is not appropriate considering the patient's individual clinical situation, promoting adherence can create unintended harm. Therefore, achieving medication adherence as typically evaluated via existing quality metrics such as proportion of days covered is only valid if the medication is first deemed to be indicated, effective, and safe for the patient. Medications are the most common medical intervention for chronic illnesses. As a result, success in achieving the Triple Aim of health care is highly dependent on optimizing medication use. When quality measures for medication use narrowly focus on measuring adherence, the resulting programs of payers and providers will likely ignore the most frequent types of medication problems that prevent improved health, create unnecessary costs, and could negatively impact patients' experience with the health care system. Strong leadership and advocacy on the part of agencies in the position to influence the quality measurement landscape in the U.S. health care system will be critical to achieve widespread awareness of medication nonadherence in the context of the full scope of medication-related problems in health care.

**Spoonheim JB, Pronk NP.** Wellness Champions Networks: a best practice resource for workplace wellness programs. *ACSMs Health Fitness J.* 2016 May-Jun;20(3):36-9.

A recent article in ACSM's Health & Fitness Journal presented a set of nine best practice design principles for worksite wellness programs (4). These nine design principles were based on 44 best practices identified through a review of scientific articles, industry reports, consensus statements, and expert perspectives. Furthermore, the nine design principles were subsequently associated with highly successful programs. An in-depth presentation of the 10-year journey that propelled the Turck Corporation in Minneapolis to one of the healthiest companies in the United States showed alignment of their LifeWorks@Turck program with these design principles (5). Slippery Rock University in Pennsylvania deployed the nine best practice design principles and, in a 3-year period, went from having no coordinated wellness program to being recognized as one of the top 100 healthiest employers in the United States. The wellness program leaders concluded that the use of the best practice design principles allowed for quick success and accelerated progress toward the envisioned future of a culture that embraces wellness as an essential facet of life (3). Workplace wellness leaders at Indiana University deliberately and prospectively applied the best practice design principles to a fundamental "redesign" of Indiana University's worksite wellness program. The newly designed "Healthy Change" program documented 15% risk reduction in its second year and was so well received by employees that the evaluation noted a 100% "would recommend to others" satisfaction rating (2). These observations provide further support for the use of best practice program design principles. This article is focused on one of those best practices, namely, Wellness Champion Networks.

**Spratt JR, Bretzman PA, Lafferty PM, McGonigal MD.** Gluteal compartment syndrome: successful management with combined angioembolization and surgical decompression. *Minn Med.* 2016 May-Jun;99(3):51-2.

Sprung CL, Cohen R, **Marini JJ.** Excellence in intensive care medicine [review article]. *Crit Care Med.* 2016 Jan;44(1):202-6. [Comment in: *Crit Care Med.* 2016 Jan;44(1):1-2.]

**OBJECTIVE:** Excellence is an important goal for all physicians. Unfortunately, it is hard to define, evaluate, and achieve. To provide a concise interpretive review of excellence in intensive care medicine, with a focus on those key characteristics that excellent physicians possess but are seldom discussed. **DATA SOURCES:** Electronic search of the PubMed database using the search terms "excellence," "role models," "compassion," "commitment," "dedication," and "passion." **STUDY SELECTION:** Publications or studies of excellence, role models, compassion, commitment, dedication, and passion. Two reviewers evaluated each term. **DATA EXTRACTION:** Publications or studies were abstracted independently and in duplicate. **DATA SYNTHESIS:** Excellence in critical care can be achieved through deliberate practice, feedback, and effective evaluation. Excellence embodies numerous characteristics, which include compassion, commitment, and passion. **CONCLUSIONS:** Awareness of the fundamental characteristics of excellence can help young students and doctors determine what they should strive for to become excellent physicians as well as encourage experienced doctors to rekindle the spark that initially motivated them to become physicians.

Stevens VJ, **Solberg LI,** Bailey SR, Kurtz SE, McBurnie MA, Priest EL, Puro JE, Williams RJ, Fortmann SP, Hazlehurst BL. Assessing trends in tobacco cessation in diverse patient populations. *Nicotine Tob Res.* 2016 Mar;18(3):275-80. PMC5013819. Project: A10-018 PROSPECT (SUPREME).

**INTRODUCTION:** This study examined change in tobacco use over 4 years among the general population of patients in six diverse health care organizations using electronic medical record data. **METHODS:** The study cohort (N = 34 393) included all patients age 18 years or older who were identified as smokers in 2007, and who then had at least one primary care visit in each of the following 4 years. **RESULTS:** In the 4 years following 2007, this patient cohort had a median of 13 primary care visits, and 38.6% of the patients quit smoking at least once. At the end of the fourth follow-up year, 15.4% had stopped smoking for 1 year or more. Smokers were more likely to become long-term quitters if they were 65 or older (OR = 1.32, 95% CI = [1.16, 1.49]), or had a diagnoses of cancer (1.26 [1.12, 1.41]), cardiovascular disease (1.22 [1.09, 1.37]), asthma (1.15 [1.06, 1.25]), or diabetes (1.17 [1.09, 1.27]).

Characteristics associated with lower likelihood of becoming a long-term quitter were female gender (0.90 [0.84, 0.95]), black race (0.84 [0.75, 0.94]) and those identified as non-Hispanic (0.50 [0.43, 0.59]).

CONCLUSIONS: Among smokers who regularly used these care systems, 1 in 7 had achieved long-term cessation after 4 years. This study shows the practicality of using electronic medical records for monitoring patient smoking status over time. Similar methods could be used to assess tobacco use in any health care organization to evaluate the impact of environmental and organizational programs.

Stoneking LR, Waterbrook AL, Garst Orozco JG, Johnston D, Bellafiore A, Davies C, Nuño T, Fatás-Cabeza J, Beita O, Ng V, **Grall KH**, Adamas-Rappaport W. Does Spanish instruction for emergency medicine resident physicians improve patient satisfaction in the emergency department and adherence to medical recommendations? *Adv Med Educ Pract.* 2016 Aug;7:467-73. PMC4981169.

BACKGROUND: After emergency department (ED) discharge, Spanish-speaking patients with limited English proficiency are less likely than English-proficient patients to be adherent to medical recommendations and are more likely to be dissatisfied with their visit. Objectives: To determine if integrating a longitudinal medical Spanish and cultural competency curriculum into emergency medicine residency didactics improves patient satisfaction and adherence to medical recommendations in Spanish-speaking patients with limited English proficiency. METHODS: Our ED has two Emergency Medicine Residency Programs, University Campus (UC) and South Campus (SC). SC program incorporates a medical Spanish and cultural competency curriculum into their didactics. Real-time Spanish surveys were collected at SC ED on patients who self-identified as primarily Spanish-speaking during registration and who were treated by resident physicians from both residency programs. Surveys assessed whether the treating resident physician communicated in the patient's native Spanish language. Follow-up phone calls assessed patient satisfaction and adherence to discharge instructions. RESULTS: Sixty-three patients self-identified as primarily Spanish-speaking from August 2014 to July 2015 and were initially included in this pilot study. Complete outcome data were available for 55 patients. Overall, resident physicians spoke Spanish 58% of the time. SC resident physicians spoke Spanish with 66% of the patients versus 45% for UC resident physicians. Patients rated resident physician Spanish ability as very good in 13% of encounters – 17% for SC versus 5% for UC. Patient satisfaction with their ED visit was rated as very good in 35% of encounters – 40% for SC resident physicians versus 25% for UC resident physicians. Of the 13 patients for whom Spanish was the language used during the medical encounter who followed medical recommendations, ten (77%) of these encounters were with SC resident physicians and three (23%) encounters were with UC resident physicians. CONCLUSION: Preliminary data suggest that incorporating Spanish language and cultural competency into residency training has an overall beneficial effect on patient satisfaction and adherence to medical recommendations in Spanish-speaking patients with limited English proficiency.

Sullivan MG. Aspirin and diabetes [interview with Dr. Lauren Crain, PhD]. *Intern Med News.* 2016 Oct 15;49(17):1,10.

Key clinical point: Many diabetes patients who should be taking aspirin for cardiovascular risk reduction are not doing so, and many who should not be taking it are. Major finding: Aspirin was underused in 21% of diabetes patients and overused in 57% of patients. Data source: A randomized study of 11,000 patients.

Sun Y, Brauckmann O, **Nixdorf DR**, Kentgens A, Garwood M, Idiyatullin D, Heerschap A. Imaging human teeth by phosphorus magnetic resonance with nuclear Overhauser enhancement. *Sci Rep.* 2016 Aug 8;6:30756. PMC4976379.

Three-dimensional phosphorus MR images ( $^{31}\text{P}$  MRI) of teeth are obtained at a nominal resolution of 0.5 mm in less than 15 minutes using acquisition pulse sequences sensitive to ultra-short transversal relaxation times. The images directly reflect the spatially resolved phosphorus content of mineral tissue in dentin and enamel; they show a lack of signal from pulp tissue and reduced signal from de-mineralized carious lesions. We demonstrate for the first time that the signal in  $^{31}\text{P}$  MR images of mineralized tissue is enhanced by a  $(1)\text{H}$ - $(31)\text{P}$  nuclear Overhauser effect (NOE). Using teeth as a model for imaging mineralized human tissue, graded differences in signal enhancement are observed that correlate well with

known mineral content. From solid-state NMR experiments we conclude that the NOE is facilitated by spin diffusion and that the NOE difference can be assigned to a higher water content and a different micro-structure of dentin. Thus, a novel method for imaging mineral content without ionizing radiation is proposed. This method has potential use in the assessment of de-mineralization states in humans, such as caries of teeth and osteoporosis of bones.

Tansil KA, Esser MB, Sandhu P, Reynolds JA, Elder RW, Williamson RS, Chattopadhyay SK, Bohm MK, Brewer RD, McKnight-Eily LR, Hungerford DW, Toomey TL, Hingson RW, Fielding JE, **Pronk NP**, member of the Community Preventive Services Task Force. Alcohol electronic screening and brief intervention: A Community Guide systematic review [review article]. *Am J Prev Med*. 2016 Nov;51(5):801-11. PMC5082433.

CONTEXT: Excessive drinking is responsible for one in ten deaths among working-age adults in the U.S. annually. Alcohol screening and brief intervention is an effective but underutilized intervention for reducing excessive drinking among adults. Electronic screening and brief intervention (e-SBI) uses electronic devices to deliver key elements of alcohol screening and brief intervention, with the potential to expand population reach. EVIDENCE ACQUISITION: Using Community Guide methods, a systematic review of the scientific literature on the effectiveness of e-SBI for reducing excessive alcohol consumption and related harms was conducted. The search covered studies published from 1967 to October 2011. A total of 31 studies with 36 study arms met quality criteria and were included in the review. Analyses were conducted in 2012. EVIDENCE SYNTHESIS: Twenty-four studies (28 study arms) provided results for excessive drinkers only and seven studies (eight study arms) reported results for all drinkers. Nearly all studies found that e-SBI reduced excessive alcohol consumption and related harms: nine study arms reported a median 23.9% reduction in binge-drinking intensity (maximum drinks/binge episode) and nine study arms reported a median 16.5% reduction in binge-drinking frequency. Reductions in drinking measures were sustained for up to 12 months. CONCLUSIONS: According to Community Guide rules of evidence, e-SBI is an effective method for reducing excessive alcohol consumption and related harms among intervention participants. Implementation of e-SBI could complement population-level strategies previously recommended by the Community Preventive Services Task Force for reducing excessive drinking (e.g., increasing alcohol taxes and regulating alcohol outlet density).

Tate DF, Lytle LA, **Sherwood NE**, Haire-Joshu D, Matheson D, Moore SM, Loria CM, Pratt C, Ward DS, Belle SH, Michie S. Deconstructing interventions: approaches to studying behavior change techniques across obesity interventions [review article]. *Transl Behav Med*. 2016 Jun;6(2):236-243. PMC4927444.

Deconstructing interventions into the specific techniques that are used to change behavior represents a new frontier in behavioral intervention research. This paper considers opportunities and challenges in employing the Behavior Change Techniques Taxonomy (BCTTv1) developed by Michie and colleagues, to code the behavior change techniques (BCTs) across multiple interventions addressing obesity and capture dose received at the technique level. Numerous advantages were recognized for using a shared framework for intervention description. Coding interventions at levels of the social ecological framework beyond the individual level, separate coding for behavior change initiation vs. maintenance, fidelity of BCT delivery, accounting for BCTs mode of delivery, and tailoring BCTs, present both challenges and opportunities. Deconstructing interventions and identifying the dose required to positively impact health-related outcomes could enable important gains in intervention science.

Ten Cate O, Hart D, **Ankel FK**, Busari J, Englander R, Glasgow N, Holmboe E, Iobst W, Lovell E, Snell LS, Touchie C, Van Melle E, Wycliffe-Jones K, International Competency-Based Medical Education Collaborators. Entrustment decision making in clinical training [review article]. *Acad Med*. 2016 Feb;91(2):191-8.

The decision to trust a medical trainee with the critical responsibility to care for a patient is fundamental to clinical training. When carefully and deliberately made, such decisions can serve as significant stimuli for learning and also shape the assessment of trainees. Holding back entrustment decisions too much may hamper the trainee's development toward unsupervised practice. When carelessly made, however, they jeopardize patient safety. Entrustment decision-making processes, therefore, deserve careful analysis.

Members (including the authors) of the International Competency-Based Medical Education Collaborative conducted a content analysis of the entrustment decision-making process in health care training during a 2-day summit in September 2013 and subsequently reviewed the pertinent literature to arrive at a description of the critical features of this process, which informs this article. The authors discuss theoretical backgrounds and terminology of trust and entrustment in the clinical workplace. The competency-based movement and the introduction of entrustable professional activities force educators to rethink the grounds for assessment in the workplace. Anticipating a decision to grant autonomy at a designated level of supervision appears to align better with health care practice than do most current assessment practices. The authors distinguish different modes of trust and entrustment decisions and elaborate five categories, each with related factors that determine when decisions to trust trainees are made: the trainee, supervisor, situation, task, and the relationship between trainee and supervisor. The authors' aim in this article is to lay a theoretical foundation for a new approach to workplace training and assessment.

Thumbigere-Math V, Michalowicz BS, Hughes PJ, Basi DL, **Tsai ML, Swenson KK, Rockwell L, Gopalakrishnan R.** Serum markers of bone turnover and angiogenesis in patients with bisphosphonate-related osteonecrosis of the jaw after discontinuation of long-term intravenous bisphosphonate therapy. *J Oral Maxillofac Surg.* 2016 Apr;74(4):738-46. PMC4909718.

**PURPOSE:** To analyze serum markers of bone turnover, angiogenesis, endocrine function, and inflammation in patients with bisphosphonate-related osteonecrosis of the jaw (BRONJ) who discontinued long-term intravenous bisphosphonate (BP) therapy. **PATIENTS AND METHODS:** Serum samples were obtained from 25 BRONJ patients who had discontinued long-term intravenous BP therapy for an average of 11.4 +/- 8.7 months and 48 non-BRONJ controls who continued receiving intravenous BP therapy. Samples were analyzed for total alkaline phosphatase, bone-specific alkaline phosphatase, osteocalcin, C-telopeptide, vascular endothelial growth factor, triiodothyronine, thyroxine, thyroid-stimulating hormone, 25-hydroxyvitamin D, and C-reactive protein. **RESULTS:** The mean number of BP infusions was significantly higher in BRONJ patients compared with controls (38.4 +/- 26.3 infusions vs 18.8 +/- 7.2 infusions,  $P < .0001$ ); however, the duration of BP therapy was not significantly different between the groups ( $P = .23$ ). Overall, there were no significant differences in any of the markers between BRONJ patients and controls (all  $P$  values  $\geq .16$ ). In a subgroup analysis that matched BRONJ patients and controls according to mean age and number of BP infusions (10 BRONJ patients and 48 controls), log<sub>10</sub> vascular endothelial growth factor (2.9 +/- 0.4 pg/mL vs 2.4 +/- 0.4 pg/mL,  $P < .001$ ) and C-reactive protein (34 +/- 26 mg/L vs 13 +/- 8 mg/L,  $P < .01$ ) levels were significantly higher in BRONJ patients compared with controls. Within BRONJ patients, none of the serum markers were correlated with duration of BP discontinuation. **CONCLUSIONS:** Levels of bone turnover and endocrine markers in BRONJ patients who discontinue long-term intravenous BP therapy are similar to those in non-BRONJ controls receiving intravenous BP therapy. However, levels of angiogenesis and inflammation markers are higher in BRONJ patients who discontinue long-term intravenous BP therapy. The prolonged skeletal half-life of BPs may suppress bone turnover markers in BRONJ patients for several years after discontinuation of intravenous BP therapy, suggesting an extended effect on bone homeostasis.

**Torchia MT, Schroder LK, Hill BW, Cole PA.** A patient follow-up program for short-term surgical mission trips to a developing country. *J Bone Joint Surg Am.* 2016 Feb 3;98(3):226-32.

**BACKGROUND:** We describe a follow-up program for patients undergoing surgical procedures with documented results from short-term surgical mission trips to the developing world. The surgical procedures were all performed at a government hospital in Pucallpa, Peru, a remote city in the Amazon. **METHODS:** Between July 2007 and January 2012, 10 surgical mission trips were completed with a mean time of 6 days on location and a mean number of 2.3 surgeons (range, 2 to 5 surgeons) per trip. A Peruvian general surgeon conducted postoperative visits at time intervals of 2 to 4 weeks, 5 to 16 weeks, 4 to 7 months, and 8 to 12 months. Each visit included the completion of a patient outcome form, radiographs, and functional range-of-motion photographs. Patient demographic characteristics; type of surgical procedure; completed follow-up; complications including infection, malunion, or nonunion; and clinical results were analyzed. **RESULTS:** Of the 127 patients eligible for analysis, 23 patients were lost to follow-up, leaving a follow-up rate of 81.9% (104 of 127 patients). Patients were predominantly male

(63.5%) and had a mean age of 37.0 years (range, 10 months to 93.4 years). The mean length of follow-up was 11.8 months, with a mean number of 3.7 postoperative encounters. Orthopedic trauma fixation was the predominant surgical procedure (57%), with 42 procedures (40%) being open reduction and internal fixation. In the 104 patients, successful wound-healing occurred in 101 (97%) and 100 (96%) had a functional outcome deemed to be good or fair by the in-country physician. The infection rate was 2.9% (3 patients), with 97% (57 of 59) of fractures united. There was 1 nerve injury in a pediatric patient treated for supracondylar humeral malunion, and 2 cases of prominent implant necessitating removal. The mean direct cost of the follow-up program was \$20,041 in U.S. dollars per year. CONCLUSIONS: It is possible to develop a sustainable surgical patient follow-up program with robust results and to achieve acceptable outcomes for orthopaedic conditions, even in an austere medical environment.

Tran TH, Wing D, Davis A, Bergstrom J, **Schousboe JT**, Nichols JF, Kado DM. Correlations among four measures of thoracic kyphosis in older adults. *Osteoporos Int.* 2016 Mar;27(3):1255-9. PMC5332161.

There are many ways to measure thoracic kyphosis ranging from simple clinical to more complex assessments. We evaluated the correlation among four commonly used kyphosis measures: Cobb angle, Debrunner kyphometer, kyphotic index, and the blocks method. Each measure was correlated with the others, confirming high clinical and research applicability. INTRODUCTION: The purpose of this study was to assess the associations among four commonly used measures of thoracic kyphosis in older adults. METHODS: Seventy two men and women aged 65-96 were recruited from the San Diego community. Four kyphosis measures were assessed in the same person during a baseline clinic visit. Two measures were done in the lying (L) and 2 in the standing (ST) position: (1) Cobb angle calculated from dual X-Ray absorptiometry (DXA) images (L), (2) Debrunner kyphometer (DK) angle measured by a protractor (ST), (3) kyphotic index (KI) calculated using an architect's flexicurve ruler (ST), and (4) the blocks method involving counting the number of 1.7 cm-thick blocks required to achieve a neutral head position while lying flat on the DXA table (L). Spearman rank correlation coefficients were used to determine the strength of the association between each kyphosis measure. RESULTS: Using the Cobb angle as the gold standard, the blocks method demonstrated the lowest correlation ( $r_s = 0.63$ ,  $p < 0.0001$ ), the Debrunner method had a moderate correlation ( $r_s = 0.65$ ,  $p < 0.0001$ ), and the kyphotic index had the highest correlation ( $r_s = 0.68$ ,  $p < 0.0001$ ). The correlation was strongest between the kyphotic index and the Debrunner kyphometer ( $r_s = 0.76$ ,  $p < 0.0001$ ). CONCLUSION: In older men and women, all four measures of thoracic kyphosis were significantly correlated with each other, whether assessed in the lying or standing position. Thus, any of these measures demonstrate both potential clinical and research utility.

Tzabazis A, Mechanic J, Miller J, Klukinov M, Pascual C, Manering N, Carson DS, Jacobs A, Qiao Y, Cuellar J, **Frey WH, 2nd**, Jacobs D, Angst M, Yeomans DC. Oxytocin receptor: Expression in the trigeminal nociceptive system and potential role in the treatment of headache disorders. *Cephalalgia.* 2016 Sep;36(10):943-50.

AIMS: Our studies investigated the location of oxytocin receptors in the peripheral trigeminal sensory system and determined their role in trigeminal pain. METHODS: Oxytocin receptor expression and co-localization with calcitonin gene-related peptide was investigated in rat trigeminal ganglion using immunohistochemistry. Enzyme-linked immunosorbent assay was used to determine the effects of facial electrocutaneous stimulation and adjuvant-induced inflammation of the temporomandibular joint on oxytocin receptor expression in the trigeminal ganglion. Finally, the effects of oxytocin on capsaicin-induced calcitonin gene-related peptide release from dural nociceptors were investigated using isolated rat dura mater. RESULTS: Oxytocin receptor immunoreactivity was present in rat trigeminal neurons. The vast majority of oxytocin receptor immunoreactive neurons co-expressed calcitonin gene-related peptide. Both electrocutaneous stimulation and adjuvant-induced inflammation led to a rapid upregulation of oxytocin receptor protein expression in trigeminal ganglion neurons. Oxytocin significantly and dose-dependently decreased capsaicin-induced calcitonin gene-related peptide release from dural nociceptors. CONCLUSION: Oxytocin receptor expression in calcitonin gene-related peptide containing trigeminal ganglion neurons, and the blockade of calcitonin gene-related peptide release from trigeminal dural afferents suggests that activation of these receptors may provide therapeutic benefit in patients with migraine and other primary headache disorders.

**Vadala CJ, Ward CM.** Dorsal approach decreases operative time for complex metacarpophalangeal dislocations. *J Hand Surg Am.* 2016 Sep;41(9):e259-62.

**PURPOSE:** Complex metacarpophalangeal (MCP) dislocations require open surgical reduction, but surgeons disagree about the best surgical approach. We hypothesized that a dorsal approach would require less operative time than would a volar approach and result in a decreased need for a secondary approach. **METHODS:** We performed a retrospective chart review of all isolated irreducible dorsal MCP dislocations treated at 2 level 1 trauma centers between 2005 and 2015. We recorded the initial surgical approach (volar or dorsal), total operative time, and whether the surgeon used a second surgical approach. Operative times for initial volar approach versus initial dorsal approach, hand surgeon versus non-hand surgeon, and thumb versus other digits were compared using the 2-tailed Student's t test. We used Fisher's exact test to compare the need for a second approach between the volar and dorsal approach groups. **RESULTS:** A total of 21 patients (22 digits) with MCP dislocations required surgical reduction. Average operative time was longer for the 14 patients who underwent the initial volar approach (70 minutes) than for the 7 who underwent an initial dorsal approach (45 minutes). Six of the 14 MCP joints approached volarly (42%) required a second dorsal approach. None of the 7 patients in the dorsal group required a second approach. **CONCLUSIONS:** Using a dorsal approach to reduce complex MCP dislocations reduces operative time and decreases the need for a secondary approach.

Vasquez A, **Sherwood NE**, Larson N, Story MT. A novel dietary improvement strategy: examining the potential impact of community-supported agriculture membership. *Public Health Nutr.* 2016 Oct;19(14):2618-28.

**OBJECTIVE:** To investigate the use of community-supported agriculture (CSA) as an employer-based health promotion intervention. **DESIGN:** Quasi-experimental study using a convenience sample of employees at three employers. **SETTING:** Participants and controls from 3 Minnesota employers completed baseline and follow-up health assessments and surveys about their experiences with CSA. **SUBJECTS:** A total of 324 participants purchased a CSA share and were eligible for study inclusion. Study participants were matched by age, sex, employer and occupation to a non-randomized control group of individuals who did not purchase a CSA share but completed health assessments during the same time frame as the study participants. **RESULTS:** The majority of participants were female, white, middle-aged and highly educated. The most common reason for purchasing a CSA share was a desire for fresh food, and the majority of participants were satisfied with their experience. Participants reported a significant increase in the number of vegetables present in the household and the frequency of family meals. The frequency of eating out decreased significantly, especially at fast-food restaurants. Participants also reported an increase in the amount and variety of produce consumed. However, health assessment data did not show significant changes in dietary intake, health status or BMI. **CONCLUSIONS:** CSA participation was associated with improvement in some aspects of the household environment and dietary behaviors. Further research is needed to determine whether employer-based CSA interventions may also lead to improvements in dietary intake and health.

**Vazquez-Benitez G, Kharbanda EO**, Naleway AL, Lipkind H, Sukumaran L, McCarthy NL, Omer SB, Qian L, Xu S, Jackson ML, Vijayadev V, Klein NP, **Nordin JD.** Risk of preterm or small-for-gestational-age birth after influenza vaccination during pregnancy: caveats when conducting retrospective observational studies. *Am J Epidemiol.* 2016 Aug 1;184(3):176-86. PMC5003116. [Won 2016 Article of the Year Award from *The American Journal of Epidemiology.*]

Vaccines are increasingly targeted toward women of reproductive age, and vaccines to prevent influenza and pertussis are recommended during pregnancy. Preliminary clinical trials typically have not included pregnant women, and when they are included, trials cannot detect rare events. Thus, postmarketing vaccine safety assessments are necessary. However, analysis of observational data requires detailed assessment of potential biases. Using data from 8 Vaccine Safety Datalink sites in the United States, we analyzed the association of monovalent H1N1 influenza vaccine (MIV) during pregnancy with preterm birth (<37 weeks) and small-for-gestational-age birth (birth weight < 10th percentile). The cohort included 46,549 pregnancies during 2009-2010 (40% of participants received the MIV). We found potential biases

in the vaccine-birth outcome association that might occur due to variable access to vaccines, the time-dependent nature of exposure to vaccination within pregnancy (immortal time bias), and confounding from baseline differences between vaccinated and unvaccinated women. We found a strong protective effect of vaccination on preterm birth (relative risk = 0.79, 95% confidence interval: 0.74, 0.85) when we ignored potential biases and no effect when accounted for them (relative risk = 0.91; 95% confidence interval: 0.83, 1.0). In contrast, we found no important biases in the association of MIV with small-for-gestational-age birth. Investigators conducting studies to evaluate birth outcomes after maternal vaccination should use statistical approaches to minimize potential biases.

**Verchota GM**, Sawin KJ. Testing components of a self-management theory in adolescents with type 1 diabetes mellitus. *Nursing research*. 2016 Nov-Dec;65(6):487-95.

**BACKGROUND:** The role of self-management in adolescents with type 1 diabetes mellitus is not well understood. **PURPOSE:** The purpose of the research was to examine the relationship of key individual and family self-management theory, context, and process variables on proximal (self-management behaviors) and distal (hemoglobin A1c and diabetes-specific health-related quality of life) outcomes in adolescents with type 1 diabetes. **METHODS:** A correlational, cross-sectional study was conducted to identify factors contributing to outcomes in adolescents with Type 1 diabetes and examine potential relationships between context, process, and outcome variables delineated in individual and family self-management theory. Participants were 103 adolescent-parent dyads (adolescents ages 12-17) with Type 1 diabetes from a Midwest, outpatient, diabetes clinic. The dyads completed a self-report survey including instruments intended to measure context, process, and outcome variables from individual and family self-management theory. **RESULTS:** Using hierarchical multiple regression, context (depressive symptoms) and process (communication) variables explained 37% of the variance in self-management behaviors. Regimen complexity-the only significant predictor-explained 11% of the variance in hemoglobin A1c. Neither process variables nor self-management behaviors were significant. For the diabetes-specific health-related quality of life outcome, context (regimen complexity and depressive symptoms) explained 26% of the variance at step 1; an additional 9% of the variance was explained when process (self-efficacy and communication) variables were added at step 2; and 52% of the variance was explained when self-management behaviors were added at Step 3. In the final model, three variables were significant predictors: depressive symptoms, self-efficacy, and self-management behaviors. **CONCLUSIONS:** The individual and family self-management theory can serve as a cogent theory for understanding key concepts, processes, and outcomes essential to self-management in adolescents and families dealing with Type 1 diabetes mellitus.

**Vesely JM, Pronk NP, Kottke TE, Marshall PS.** Obesity treatment at HealthPartners: adaptation of clinical guidelines into systems for practice operations [review article]. *Curr Obes Rep*. 2016 Sep;5(3):312-9.

The purpose of this paper is to describe how HealthPartners health system in Minneapolis, MN, has translated a clinical guideline for obesity among adults into an efficient care delivery practice operations system. Based on a foundation provided by the physician-led Institute of Clinical Systems Improvement (ICSI)-developed Prevention and Management of Obesity for Adults Health Care Guideline, HealthPartners adapted the guideline into an electronic health record-based "Smart Set" that provides frontline physicians with the information, treatment options, and referral steps necessary to care for their patients with obesity. Additional context is provided in terms of insurance coverage and systems-based resources designed to prevent and treat obesity for adults.

Vieillard-Baron A, Matthay M, Teboul JL, Bein T, Schultz M, Magder S, **Marini JJ.** Experts' opinion on management of hemodynamics in ARDS patients: focus on the effects of mechanical ventilation [review article]. *Intensive Care Med*. 2016 May;42(5):739-49.

**RATIONALE:** Acute respiratory distress syndrome (ARDS) is frequently associated with hemodynamic instability which appears as the main factor associated with mortality. Shock is driven by pulmonary hypertension, deleterious effects of mechanical ventilation (MV) on right ventricular (RV) function, and associated-sepsis. Hemodynamic effects of ventilation are due to changes in pleural pressure (Ppl) and

changes in transpulmonary pressure (TP). TP affects RV afterload, whereas changes in Ppl affect venous return. Tidal forces and positive end-expiratory pressure (PEEP) increase pulmonary vascular resistance (PVR) in direct proportion to their effects on mean airway pressure (mPaw). The acutely injured lung has a reduced capacity to accommodate flowing blood and increases of blood flow accentuate fluid filtration. The dynamics of vascular pressure may contribute to ventilator-induced injury (VILI). In order to optimize perfusion, improve gas exchange, and minimize VILI risk, monitoring hemodynamics is important.

**RESULTS:** During passive ventilation pulse pressure variations are a predictor of fluid responsiveness when conditions to ensure its validity are observed, but may also reflect afterload effects of MV. Central venous pressure can be helpful to monitor the response of RV function to treatment. Echocardiography is suitable to visualize the RV and to detect acute cor pulmonale (ACP), which occurs in 20-25% of cases. Inserting a pulmonary artery catheter may be useful to measure/calculate pulmonary artery pressure, pulmonary and systemic vascular resistance, and cardiac output. These last two indexes may be misleading, however, in cases of West zones 2 or 1 and tricuspid regurgitation associated with RV dilatation. Transpulmonary thermodilution may be useful to evaluate extravascular lung water and the pulmonary vascular permeability index. To ensure adequate intravascular volume is the first goal of hemodynamic support in patients with shock. The benefit and risk balance of fluid expansion has to be carefully evaluated since it may improve systemic perfusion but also may decrease ventilator-free days, increase pulmonary edema, and promote RV failure. ACP can be prevented or treated by applying RV protective MV (low driving pressure, limited hypercapnia, PEEP adapted to lung recruitability) and by prone positioning. In cases of shock that do not respond to intravascular fluid administration, norepinephrine infusion and vasodilators inhalation may improve RV function. Extracorporeal membrane oxygenation (ECMO) has the potential to be the cause of, as well as a remedy for, hemodynamic problems. Continuous thermodilution-based and pulse contour analysis-based cardiac output monitoring are not recommended in patients treated with ECMO, since the results are frequently inaccurate. Extracorporeal CO<sub>2</sub> removal, which could have the capability to reduce hypercapnia/acidosis-induced ACP, cannot currently be recommended because of the lack of sufficient data.

Vock DM, Wolfson J, Bandyopadhyay S, Adomavicius G, Johnson PE, **Vazquez-Benitez G, O'Connor PJ**. Adapting machine learning techniques to censored time-to-event health record data: A general-purpose approach using inverse probability of censoring weighting. *J Biomed Inform.* 2016 Jun;61:119-31. PMC4893987.

Models for predicting the probability of experiencing various health outcomes or adverse events over a certain time frame (e.g., having a heart attack in the next 5 years) based on individual patient characteristics are important tools for managing patient care. Electronic health data (EHD) are appealing sources of training data because they provide access to large amounts of rich individual-level data from present-day patient populations. However, because EHD are derived by extracting information from administrative and clinical databases, some fraction of subjects will not be under observation for the entire time frame over which one wants to make predictions; this loss to follow-up is often due to disenrollment from the health system. For subjects without complete follow-up, whether or not they experienced the adverse event is unknown, and in statistical terms the event time is said to be right-censored. Most machine learning approaches to the problem have been relatively ad hoc; for example, common approaches for handling observations in which the event status is unknown include (1) discarding those observations, (2) treating them as non-events, (3) splitting those observations into 2 observations: 1 where the event occurs and 1 where the event does not. In this paper, we present a general-purpose approach to account for right-censored outcomes using inverse probability of censoring weighting (IPCW). We illustrate how IPCW can easily be incorporated into a number of existing machine learning algorithms used to mine big health care data including Bayesian networks, k-nearest neighbors, decision trees, and generalized additive models. We then show that our approach leads to better calibrated predictions than the three ad hoc approaches when applied to predicting the 5-year risk of experiencing a cardiovascular adverse event, using EHD from a large U.S. Midwestern healthcare system.

Waldrop R, **Wood W, Cunningham BP**, McLemore R, McLaren A. Oblique terminal screw placement: does it improve fixation in plate osteosynthesis? *J Orthop Trauma.* 2016 Nov;30(11):e375-6.

The technique of placing an oblique screw in the terminal hole of a plate to increase screw pullout strength is widely taught in the operating room. The origin of this technique is unclear; however, it may have been used simply as a means to identify radiographs and misinterpreted to have some biomechanical benefit. The objective of this study was to measure the structural effect of oblique terminal screw placement (OTSP) during plate osteosynthesis. Foam blocks and limited contact dynamic compression plates and screws were used along with a custom fixture device. The terminal screw was placed in either an oblique (30-degree angle outward) or perpendicular fashion. A load was applied perpendicular to the plate in cantilever bending until failure. The oblique screw construct was significantly weaker than the perpendicular screw construct (399N vs. 465N,  $P < 0.001$ ), independent of the block of material used. Post hoc analysis showed that the screw angle ( $P < 0.001$ ) was a significant determinant of the load required to cause screw pullout. OTSP led to a decrease in pullout strength compared with a perpendicular screw in a deformable foam medium similar in density to osteoporotic bone. In patients with poor bone quality, OTSP may create a suboptimal fracture fixation construct.

**Ward CM, Larsen MC, Bohm KC, Rizkala AR.** Outcomes of nonoperative treatment of Salter-Harris II distal radius fractures: a systematic review [review article]. *Hand.* 2016 Mar;11(1):29-35.

**BACKGROUND:** Despite the frequent occurrence of these injuries, we know little about the natural history of Salter-Harris II (SH II) distal radius fractures. We conducted a systematic review of studies examining the radiographic and clinical outcomes of nonoperatively managed SH II distal radius fractures. **METHODS:** Systematic searches of the MEDLINE and Cochrane computerized literature databases and manual searches of bibliographies were performed. We reviewed both descriptive and quantitative data. **RESULTS:** Seven studies including 434 SH II fractures were reviewed. Two studies reported clinical outcomes based on patient age, but neither study described a statistical correlation between patient age and outcome. Two studies discussed the effect of age on radiographic outcome and reported higher rates of anatomic remodeling in children 10 years or younger. Two studies with long-term (average follow-up greater than 8 years) clinical results reported complication rates of 5%. Long-term follow-up of radiographic outcomes appeared in 4 studies with variable results. Five studies reported the frequency of premature physal arrest after SH II fractures, with results ranging from 0% to 4.3%. **CONCLUSIONS:** Based on this review, no recommendations can be made as to what defines an acceptable reduction or which fractures would benefit from surgical intervention. Angular deformity seems to correct to an acceptable alignment in patients less than 10 years of age, but these younger patients seem to be at higher risk for symptomatic shortening if a growth arrest occurs. Redisplacement after reduction is fairly common, and other more severe complications such as pain, loss of motion, and nerve injury can occur.

Waterbrook AL, Pritchard TG, Lane AD, Stoneking LR, Koch B, McAtee R, **Grall KH**, Min AA, Prior J, Farrell I, McNulty HG, Stolz U. Development of a novel sports medicine rotation for emergency medicine residents. *Adv Med Educ Pract.* 2016 Apr 21;7:249-55.

**ABSTRACT:** Musculoskeletal complaints are the most common reason for patients to visit a physician, yet competency in musculoskeletal medicine is invariably reported as a deficiency in medical education in the USA. Sports medicine clinical rotations improve both medical students' and residents' musculoskeletal knowledge. Despite the importance of this knowledge, a standardized sports medicine curriculum in emergency medicine (EM) does not exist. Hence, we developed a novel sports medicine rotation for EM residents to improve their musculoskeletal educational experience and to improve their knowledge in musculoskeletal medicine by teaching the evaluation and management of many common musculoskeletal disorders and injuries that are encountered in the emergency department. The University of Arizona has two distinct EM residency programs, South Campus (SC) and University Campus (UC). The UC curriculum includes a traditional 4-week orthopedic rotation, which consistently rated poorly on evaluations by residents. Therefore, with the initiation of a new EM residency at SC, we replaced the standard orthopedic rotation with a novel sports medicine rotation for EM interns. This rotation includes attendance at sports medicine clinics with primary care and orthopedic sports medicine physicians, involvement in sport event coverage, assigned reading materials, didactic experiences, and an on-call schedule to assist with reductions in the emergency department. We analyzed postrotation surveys completed by residents, postrotation evaluations of the residents completed by primary care sports medicine faculty and orthopedic chief residents, as well as the total number of dislocation reductions

performed by each graduating resident at both programs over the last 5 years. While all residents in both programs exceeded the ten dislocation reductions required for graduation, residents on the sports medicine rotation had a statistically significant higher rate of satisfaction of their educational experience when compared to the traditional orthopedics rotation. All SC residents successfully completed their sports medicine rotation, had completed postrotation evaluations by attending physicians, and had no duty hour violations while on sports medicine. In our experience, a sports medicine rotation is an effective alternative to the traditional orthopedics rotation for EM residents.

Weinstock RS, DuBose SN, **Bergental RM**, Chaytor NS, Peterson C, Olson BA, Munshi MN, Perrin AJ, Miller KM, Beck RW, Liljenquist DR, Aleppo G, Buse JB, Kruger D, Bhargava A, Goland RS, Edelen RC, Pratley RE, Peters AL, Rodriguez H, Ahmann AJ, Lock JP, Garg SK, Rickels MR, Hirsch IB, T1D Exchange Severe Hypoglycemia in Older Adults with Type 1 Diabetes Study Group. Risk factors associated with severe hypoglycemia in older adults with type 1 diabetes. *Diabetes Care*. 2016 Apr;39(4):603-10.

**OBJECTIVE:** Severe hypoglycemia is common in older adults with long-standing type 1 diabetes, but little is known about factors associated with its occurrence. **RESEARCH DESIGN AND METHODS:** A case-control study was conducted at 18 diabetes centers in the T1D Exchange Clinic Network. Participants were  $\geq 60$  years old with type 1 diabetes for  $\geq 20$  years. Case subjects ( $n = 101$ ) had at least one severe hypoglycemic event in the prior 12 months. Control subjects ( $n = 100$ ), frequency-matched to case subjects by age, had no severe hypoglycemia in the prior 3 years. Data were analyzed for cognitive and functional abilities, social support, depression, hypoglycemia unawareness, various aspects of diabetes management, C-peptide level, glycated hemoglobin level, and blinded continuous glucose monitoring (CGM) metrics. **RESULTS:** Glycated hemoglobin (mean 7.8% vs. 7.7%) and CGM-measured mean glucose (175 vs. 175 mg/dL) were similar between case and control subjects. More case than control subjects had hypoglycemia unawareness: only 11% of case subjects compared with 43% of control subjects reported always having symptoms associated with low blood glucose levels ( $P < 0.001$ ). Case subjects had greater glucose variability than control subjects ( $P = 0.008$ ) and experienced CGM glucose levels  $< 60$  mg/dL for  $\geq 20$  minutes on 46% of days compared with 33% of days in control subjects ( $P = 0.10$ ). On certain cognitive tests, case subjects scored worse than control subjects. **CONCLUSIONS:** In older adults with long-standing type 1 diabetes, greater hypoglycemia unawareness and glucose variability are associated with an increased risk of severe hypoglycemia. A study to assess interventions to prevent severe hypoglycemia in high-risk individuals is needed.

Werner BC, Wong AC, Mahony GT, **Craig EV**, Dines DM, Warren RF, Gulotta LV. Causes of poor postoperative improvement after reverse total shoulder arthroplasty. *J Shoulder Elbow Surg*. 2016 Aug;25(8):e217-22.

**BACKGROUND:** Although reverse total shoulder arthroplasty (RTSA) has been successful in improving pain and function in most patients, some patients fail to improve clinically. The present study used a large registry of RTSA patients to evaluate associations between patient-related factors and poor postoperative improvement after RTSA. **MATERIALS AND METHODS:** A prospectively collected shoulder arthroplasty registry was queried for consecutive patients who underwent RTSA from 2007 to 2013. Patients with baseline and minimum 2-year postoperative American Shoulder and Elbow Surgeons (ASES) scores were included. Poor postoperative improvement was defined as a change in the ASES of less than 12 points. Multivariate logistic regression analysis was used to identify independent risk factors. **RESULTS:** A total of 150 patients met inclusion and exclusion criteria. Logistic regression revealed that male sex (adjusted odds ratio [OR], 7.9;  $P = .004$ ), presence of an intact rotator cuff at the time of surgery (adjusted OR, 4.8;  $P = .025$ ), depression (adjusted OR, 11.2;  $P = .005$ ), a higher baseline ASES score ( $P < .001$ ), and higher total number of medical comorbidities ( $P = .035$ ) were associated with poor postoperative improvement after RTSA. **CONCLUSIONS:** Surrogates for better preoperative function after RTSA, such as a higher baseline ASES score and intact rotator cuff at the time of surgery, correlated with poor postoperative improvement. In addition, male sex, depression, and total number of medical comorbidities also correlated with poor postoperative improvement. Interestingly, factors such as patient age and indication for surgery were not found to correlate with poor improvement after RTSA.

Whelton PK, Einhorn PT, Muntner P, Appel LJ, Cushman WC, Diez Roux AV, Ferdinand KC, Rahman M, Taylor HA, Ard J, Arnett DK, Carter BL, Davis BR, Freedman BI, Cooper LA, Cooper R, Desvigne-Nickens P, Gavini N, Go AS, Hyman DJ, Kimmel PL, **Margolis KL**, Miller ER, 3rd, Mills KT, Mensah GA, Navar AM, Ogedegbe G, Rakotz MK, Thomas G, Tobin JN, Wright JT, Yoon SS, Cutler JA, National Heart, Lung and Blood Institute, Working Group on Research Needs to Improve Hypertension Treatment and Control in African-Americans. Research needs to improve hypertension treatment and control in African-Americans. *Hypertension*. 2016 Nov;68(5):1066-72. PMC5063700.

White WB, Kupfer S, Zannad F, Mehta CR, Wilson CA, Lei L, Bakris GL, Nissen SE, Cushman WC, Heller SR, **Bergental RM**, Fleck PR, Cannon CP, EXAMINE Investigators. Cardiovascular mortality in patients with type 2 diabetes and recent acute coronary syndromes from the EXAMINE Trial. *Diabetes Care*. 2016 Jul;39(7):1267-73.

**OBJECTIVE:** We evaluated the risk of cardiovascular (CV) death in all Examination of Cardiovascular Outcomes with Alogliptin versus Standard of Care (EXAMINE) study participants and in those who experienced an on-study, major nonfatal CV event. **RESEARCH DESIGN AND METHODS:** The study randomly assigned 5,380 patients with type 2 diabetes to alogliptin or placebo within 15 to 90 days of an acute coronary syndrome (ACS). Deaths and nonfatal CV events (myocardial infarction [MI], stroke, hospitalized heart failure [HHF], and hospitalization for unstable angina [UA]) were adjudicated. Patients were monitored until censoring or death, regardless of a prior post-randomized nonfatal CV event. Time-updated multivariable Cox models were used to estimate the risk of death in the absence of or after each nonfatal event. **RESULTS:** Rates of CV death were 4.1% for alogliptin and 4.9% for placebo (hazard ratio [HR] 0.85; 95% CI 0.66, 1.10). A total of 736 patients (13.7%) experienced a first nonfatal CV event (5.9% MI, 1.1% stroke, 3.0% HHF, and 3.8% UA). Compared with patients not experiencing a nonfatal event, the adjusted HR (95% CI) for death was 3.12 after MI (2.13, 4.58;  $P < 0.0001$ ) 4.96 after HHF (3.29, 7.47;  $P < 0.0001$ ), 3.08 after stroke (1.29, 7.37;  $P = 0.011$ ), and 1.66 after UA (0.81, 3.37;  $P = 0.164$ ). Mortality rates after a nonfatal event were comparable for alogliptin and placebo. **CONCLUSIONS:** In patients with type 2 diabetes and a recent ACS, the risk of CV death was higher after a post-randomization, nonfatal CV event, particularly heart failure, compared with those who did not experience a CV event. The risk of CV death was similar between alogliptin and placebo.

White WB, Wilson CA, Bakris GL, **Bergental RM**, Cannon CP, Cushman WC, Heller SK, Mehta CR, Nissen SE, Zannad F, Kupfer S, EXAMINE Investigators. Angiotensin-converting enzyme inhibitor use and major cardiovascular outcomes in type 2 diabetes mellitus treated with the dipeptidyl peptidase 4 inhibitor alogliptin. *Hypertension*. 2016 Sep;68(3):606-13.

Activation of the sympathetic nervous system when there is dipeptidyl peptidase 4 inhibition in the presence of high-dose angiotensin-converting enzyme (ACE) inhibition has led to concerns of potential increases in cardiovascular events when the 2 classes of drugs are co-administered. We evaluated cardiovascular outcomes from the EXAMINE (Examination of Cardiovascular Outcomes With Alogliptin versus Standard of Care) trial according to ACE inhibitor use. Patients with type 2 diabetes mellitus and a recent acute coronary syndrome were randomly assigned to receive the dipeptidyl peptidase 4 inhibitor alogliptin or placebo added to existing antihyperglycemic and cardiovascular prophylactic therapies. Risks of adjudicated cardiovascular death, nonfatal myocardial infarction and stroke, and hospitalized heart failure were analyzed using a Cox proportional hazards model in patients according to ACE inhibitor use and dose. There were 3323 (62%) EXAMINE patients treated with an ACE inhibitor (1681 on alogliptin and 1642 on placebo). The composite rates of cardiovascular death, nonfatal myocardial infarction, and nonfatal stroke were comparable for alogliptin and placebo with ACE inhibitor (11.4% versus 11.8%; hazard ratio, 0.97; 95% confidence interval, 0.79-1.19;  $P=0.76$ ) and without ACE inhibitor use (11.2% versus 11.9%; hazard ratio, 0.94; 95% confidence interval, 0.73-1.21;  $P=0.62$ ). Composite rates for cardiovascular death and heart failure in patients on ACE inhibitor occurred in 6.8% of patients on alogliptin versus 7.2% on placebo (hazard ratio, 0.93; 95% confidence interval, 0.72-1.2;  $P=0.57$ ). There were no differences for these end points nor for blood pressure or heart rate in patients on higher doses of ACE inhibitor. Cardiovascular outcomes were similar for alogliptin and placebo in patients with type 2 diabetes mellitus and coronary disease treated with ACE inhibitors.

Williams JAR, Schult TM, Nelson CC, Caban-Martinez AJ, Katz JN, Wagner GR, **Pronk NP**, Sorensen G, McLellan DL. Validation and dimensionality of the Integration of Health Protection and Health Promotion Score: evidence from the PULSE Small Business and VA Medical Center surveys. *J Occup Environ Med*. 2016 May;58(5):499-504. PMC4872632.

**OBJECTIVE:** To conduct validation and dimensionality analyses for an existing measure of the integration of worksite health protection and health promotion approaches. **METHODS:** A survey of small to medium size employers located in the United States was conducted between October 2013 and March 2014 (N = 115). A survey of Department of Veterans Affairs (VA) administrative parents was also conducted from June to July 2014 (N = 140). Exploratory factor analysis (EFA) was used to determine the dimensionality of the Integration Score in each sample. **RESULTS:** Using EFA, both samples indicated the presence of one unified factor. The VA survey indicated that customization improves the relevance of the Integration Score for different types of organizations. **CONCLUSIONS:** The Integration Score is a valid index for assessing the integration of worksite health protection and health promotion approaches and is customizable based on industry. **CLINICAL SIGNIFICANCE:** The Integration Score may be used as a single metric for assessing the integration of worksite health protection and health promotion approaches in differing work contexts.

**Williamson T, Sikka RS, Tompkins MA, Nelson BJ.** Use of the knee injury and osteoarthritis outcome score in a healthy United States population. *Am J Sports Med*. 2016 Feb;44(2):440-6.

**BACKGROUND:** Patient-reported outcome instruments are frequently used for assessing clinical outcomes after injury and surgery. Previously reported normative data for the Knee injury and Osteoarthritis Outcome Score (KOOS) are limited to a narrow subset of ages and demographics or have not included patients who do not participate in sporting activities. **PURPOSE:** To provide normative data for the KOOS in an 18- to 64-year-old population in the United States. **STUDY DESIGN:** Cross-sectional study; Level of evidence, 3. **METHODS:** The KOOS was administered to 999 patients or accompanying family members seen in July 2014 at an outpatient orthopaedic clinic in a suburban metropolitan city for an orthopaedic issue unrelated to their knee. Participants were eligible if they self-reported a medical history negative for knee, ankle, or hip surgery and if they did not have a current issue with their knee, ankle, or hip. Means, SDs, medians, ranges, interquartile ranges, and percentiles on the KOOS were calculated by sex, age range, laterality, and history of knee injuries in the past year. Nonparametric statistical analysis and regression analysis were used to evaluate differences in KOOS values between 5 age ranges and between those with a history of knee injuries compared with uninjured participants. **RESULTS:** There were 402 men and 597 women in the final study cohort. Men scored lower on the Symptoms subscale compared with other subscales (median score: 96.4 for Symptoms, 100.0 for all other subscales) in all age cohorts except the 56- to 64-year age group. Women also reported lower scores in the Symptoms subscale (median score: 96.4 for women aged 18-55 years, 92.9 for women aged 56-64 years). Median scores for the Pain and Knee-related Quality of Life subscales were lower in the 56- to 64-year female cohort (97.2 and 93.8, respectively), compared with the 18- to 55-year female cohort. The Symptoms, Pain, and Knee-related Quality of Life subscales showed the greatest variability for patients of both sexes, particularly in the youngest and oldest cohorts. Three percent of all participants reported a history of knee injuries in the past year, and all KOOS results were significantly lower ( $P < .05$ ) in this population compared with uninjured participants. **CONCLUSION:** This study provides normative reference values for the KOOS in an 18- to 64-year-old metropolitan United States population. Study findings can aid surgeons in counseling patients and in developing expectations after the treatment of injuries.

Wills AA, Elm JJ, Ye R, Chou KL, **Parashos SA**, Hauser RA, Bodis-Wollner I, Hinson VK, Christine CW, Schneider JS, Ninds Net-Pd Investigators. Cognitive function in 1736 participants in NINDS Exploratory Trials in PD Long-term Study-1. *Parkinsonism Relat Disord*. 2016 Dec;33:127-33.

**INTRODUCTION:** Clinical cohort studies suggest that mild cognitive impairment (MCI) is common in early Parkinson's disease (PD). The objectives of this paper were to describe cognitive function in a large clinical trial of early treated PD patients at baseline and over time using two brief cognitive screening tests. **METHODS:** In total 1741 participants were enrolled in the NINDS Exploratory Trials in Parkinson's

disease (NET-PD) Long-term Study-1 (LS-1). The Symbol Digit Modalities Test (SDMT) was collected annually. The Scales for Outcomes in Parkinson's disease-COGnition (SCOPA-COG) was collected at baseline and at year 5. The trial was stopped early based on a planned interim analysis after half the cohort completed 5 years of follow-up. The median length of follow-up was 4 years (range 3-6 years). Predictors of cognitive change were examined using cross sectional (baseline) and longitudinal multivariable linear regression. RESULTS: The mean (SD) change from baseline to 5 years was -1.9 (5.1) for the SCOPA-COG and -2.1 (11.1) for the SDMT. Age and baseline UPDRS motor scores were associated with a more rapid decline in SDMT scores and 5-year SCOPA-COG scores. Male gender was associated with more rapid decline in SDMT. Self-reported income was a novel predictor of baseline cognitive function, even adjusted for educational status, although not significantly associated with change over time. CONCLUSION: This large prospective cohort study demonstrated mild cognitive decline in early treated Parkinson's disease. The study identified income level as a novel predictor of cognitive function.

Woods GN, Huang MH, Cawthon PM, Laughlin GA, **Schousboe JT**, McDaniels-Davidson C, Cauley JA, Orwoll E, Barrett-Connor E, Kado DM, Osteoporotic Fractures in Men (MrOS) Study Research Group. SHBG, sex steroids, and kyphosis in older men: The MrOS Study. *J Bone Miner Res.* 2016 Dec;31(12):2123-8. PMC5279779.

Accentuated kyphosis is associated with adverse health outcomes, including falls and fractures. Low bone density is a risk factor for hyperkyphosis, and each vertebral fracture adds roughly 4 degrees to forward spine curvature. Sex steroids, in particular low bioavailable estradiol and high sex hormone-binding globulin (SHBG), are associated with bone loss and high SHBG is associated with vertebral fractures in older men. We, therefore, hypothesized that low bioavailable estradiol and high SHBG would be associated with worse kyphosis. To test this hypothesis, we examined the cross-sectional associations between individual bioavailable sex hormones and SHBG with radiographically assessed kyphosis. Participants included 1500 men aged 65 and older from the Osteoporotic Fractures in Men (MrOS) Study, in whom baseline measures of kyphosis and sex hormones were available. Modified Cobb angle of kyphosis, calculated from T4 through T12, was assessed from supine lateral spine radiographs. Serum total estradiol and total testosterone were measured by mass spectrometry, and bioavailable sex steroids were calculated from mass action equations. After adjustment for age and other confounding variables, no association was found between bioavailable estradiol or testosterone and Cobb angle, either when kyphosis was analyzed as a continuous variable or dichotomized into highest versus lower three quartiles. In linear regression models adjusted for age and clinic site, there was a significant association between SHBG and kyphosis (parameter estimate = 0.76 per SD increase,  $p = 0.01$ ). In the fully adjusted model, this association was weakened and of only borderline statistical significance (parameter estimate = 0.61 per SD,  $p = 0.05$ ). Logistic models demonstrated similar findings. Although associated with bone loss, we did not demonstrate that low bioavailable estradiol translates into worse kyphosis in older men. High SHBG is associated with bone loss and vertebral fractures. Our results suggest that high SHBG may also be a risk factor for hyperkyphosis.

Wu AC, Li L, Fung V, **Kharbanda EO**, Larkin EK, Butler MG, Galbraith A, Miroshnik I, Davis RL, Horan K, Lieu TA. Mismatching among guidelines, providers, and parents on controller medication use in children with asthma. *J Allergy Clin Immunol Pract.* 2016 Sep-Oct;4(5):910-6. PMC5010487.

BACKGROUND: Underuse of controller medicines among children with asthma remains widespread despite national guidelines. OBJECTIVES: To (1) assess provider prescribing patterns for asthma controller medications; (2) assess how frequently parents' reports of their child's asthma controller medicine use were mismatched with their provider's recommendations; and (3) evaluate parent attitudes and demographic characteristics associated with these mismatches. METHODS: In this cross-sectional study, we conducted linked surveys of parents and providers of children with probable persistent asthma in a Medicaid program and 4 commercial health plans in 2011. Probable persistent asthma was defined as a diagnosis of asthma and 1 or more controller medication dispensing. RESULTS: This study included 740 children (mean age, 8.6 years). Providers for 50% of the children reported prescribing controller medications for daily year-round use, 41% for daily use during active asthma months, and 9% for intermittent use for relief. Among parents, 72% knew which class of controller medication the provider

prescribed and 49% knew the administration frequency and the medication class. Parents were less likely to report the same controller medication type as the provider, irrespective of dose and frequency, if they were Latino (odds ratio [OR], 0.23; CI, 0.057-0.90), had a household smoker (OR, 2.87; CI, 0.42-19.6), or believed the controller medicine was not helping (OR, 0.15; CI, 0.048-0.45). **CONCLUSIONS:** Mismatches between parent reports and providers intentions regarding how the child was supposed to use inhaled steroids occurred for half of the children. Efforts should focus on ways to reduce mismatches between parent and provider intentions regarding controller medication use.

**Yamin SC, Bejan A, Parker DL, Xi M, Brosseau LM.** Analysis of workers' compensation claims data for machine-related injuries in metal fabrication businesses. *Am J Ind Med.* 2016 Aug;59(8):656-64.

**BACKGROUND:** Metal fabrication workers are at high risk for machine-related injury. Apart from amputations, data on factors contributing to this problem are generally absent. **METHODS:** Narrative text analysis was performed on workers' compensation claims in order to identify machine-related injuries and determine work tasks involved. Data were further evaluated on the basis of cost per claim, nature of injury, and part of body. **RESULTS:** From an initial set of 4,268 claims, 1,053 were classified as machine-related. Frequently identified tasks included machine operation (31%), workpiece handling (20%), setup/adjustment (15%), and removing chips (12%). Lacerations to finger(s), hand, or thumb comprised 38% of machine-related injuries; foreign body in the eye accounted for 20%. Amputations were relatively rare but had highest costs per claim (mean \$21,059; median \$11,998). **CONCLUSIONS:** Despite limitations, workers' compensation data were useful in characterizing machine-related injuries. Improving the quality of data collected by insurers would enhance occupational injury surveillance and prevention efforts.

Yannopoulos D, Bartos JA, Martin C, Raveendran G, Missov E, Conterato M, **Frascone RJ**, Trembley A, Sipprell K, John R, George S, Carlson K, Brunsvold ME, Garcia S, Aufderheide TP. Minnesota Resuscitation Consortium's advanced perfusion and reperfusion cardiac strategy for out-of-hospital refractory ventricular fibrillation. *J Am Heart Assoc.* 2016 Jun 13;5(6):e003732. PMC4937292.

**BACKGROUND:** In 2015, the Minnesota Resuscitation Consortium (MRC) implemented an advanced perfusion and reperfusion life support strategy designed to improve outcome for patients with out-of-hospital refractory ventricular fibrillation/ventricular tachycardia (VF/VT). We report the outcomes of the initial 3-month period of operations. **METHODS AND RESULTS:** Three emergency medical services systems serving the Minneapolis-St. Paul metro area participated in the protocol. Inclusion criteria included age 18 to 75 years, body habitus accommodating automated Lund University Cardiac Arrest System (LUCAS) cardiopulmonary resuscitation (CPR), and estimated transfer time from the scene to the cardiac catheterization laboratory of  $\leq 30$  minutes. Exclusion criteria included known terminal illness, Do Not Resuscitate/Do Not Intubate status, traumatic arrest, and significant bleeding. Refractory VF/VT arrest was defined as failure to achieve sustained return of spontaneous circulation after treatment with 3 direct current shocks and administration of 300 mg of intravenous/intraosseous amiodarone. Patients were transported to the University of Minnesota, where emergent advanced perfusion strategies (extracorporeal membrane oxygenation; ECMO), followed by coronary angiography and primary coronary intervention (PCI), were performed, when appropriate. Over the first 3 months of the protocol, 27 patients were transported with ongoing mechanical CPR. Of these, 18 patients met the inclusion and exclusion criteria. ECMO was placed in 83%. Seventy-eight percent of patients had significant coronary artery disease with a high degree of complexity and 67% received PCI. Seventy-eight percent of patients survived to hospital admission and 55% (10 of 18) survived to hospital discharge, with 50% (9 of 18) achieving good neurological function (cerebral performance categories 1 and 2). No significant ECMO-related complications were encountered. **CONCLUSIONS:** The MRC refractory VF/VT protocol is feasible and led to a high functionally favorable survival rate with few complications.

Yelenich-Huss MJ, Boyer H, **Alpern JD, Stauffer WM, Schmidt DJ.** Ozena in immigrants of differing backgrounds. *Am J Trop Med Hyg.* 2016 Jul 6;95(1):35-7. PMC4944704.

Ozena, or atrophic rhinitis, is a chronic nasal process seen in Africa, India, and the Middle East. It is marked by the triad of fetid nasal discharge, crusting, and atrophy, and is often associated with *Klebsiella*

infection. We present cases of ozena with nasal *Klebsiella* in three unrelated patients, including two east African children and one Saudi adult. All three patients grew *Klebsiella* species in culture and required prolonged treatment with multiple methodologies, including antibiotics, saline rinses, and surgical debridement. They differed greatly in time from presentation to diagnosis, and demonstrated various stages of the disease process. Ozena is rarely seen in the United States, and when it is seen, it is often misdiagnosed. Lack of prompt, adequate treatment can lead to long-term sequelae such as obliteration of nasal architecture, anosmia, sinus and skull base destruction, and social disenfranchisement due to the extreme foul smell of the nasal discharge. Clinicians should maintain a high index of suspicion for primary atrophic rhinitis when presented with its classic symptoms. Culture-directed and prolonged therapy with appropriate follow-up is a necessary component of a successful treatment plan.

Yoon HH, Bendell JC, Braiteh FS, Firdaus I, Philip PA, Cohn AL, Lewis N, **Anderson DM**, Arrowsmith E, Schwartz JD, Gao L, Hsu Y, Xu Y, Ferry D, Alberts SR, Wainberg ZA. Ramucirumab combined with FOLFOX as front-line therapy for advanced esophageal, gastroesophageal junction, or gastric adenocarcinoma: a randomized, double-blind, multicenter Phase II trial. *Ann Oncol*. 2016 Dec;27(12):2196-203.

**BACKGROUND:** We report the first randomized, Phase II trial of ramucirumab, an anti-vascular endothelial growth factor receptor-2 monoclonal antibody, as front-line therapy in patients with advanced adenocarcinoma of the esophagus or gastric/gastroesophageal junction (GEJ). **PATIENTS AND METHODS:** Patients from the USA with advanced esophageal, gastric, or GEJ adenocarcinoma randomly received (1:1) mFOLFOX6 plus ramucirumab (8 mg/kg) or mFOLFOX6 plus placebo every 2 weeks. The primary end point was progression-free survival (PFS) with 80% power to detect a hazard ratio (HR) of 0.71 (one-sided alpha = 0.15). Secondary end points included evaluation of response and overall survival (OS); an exploratory ramucirumab exposure-response analysis was undertaken. **RESULTS:** Of 168 randomized patients, 52% of tumors were located in the stomach/GEJ and 48% in the esophagus. The trial did not meet the primary end point of PFS [6.4 versus 6.7 months, HR 0.98 (95% confidence interval 0.69-1.37)] or the secondary end point of OS (11.7 versus 11.5 months) in the intent-to-treat (ITT) population. Objective response rates (45.2% versus 46.4%) were similar between arms. Most Grade  $\geq$ 3 toxicities did not differ significantly between arms, yet premature discontinuation of FOLFOX and ramucirumab (for reasons other than progressive disease) was more common among ramucirumab-versus placebo-treated patients. In an exploratory analysis that censored for premature discontinuation, the HR for PFS favored the ramucirumab arm (HR 0.76), particularly in patients with gastric/GEJ cancer. An exploratory exposure-response analysis indicated that patients with higher ramucirumab exposure had longer OS. **CONCLUSION:** The addition of ramucirumab to front-line mFOLFOX6 did not improve PFS in the ITT population.

Young DR, Waitzfelder BA, Arterburn DE, Nichols GA, Ferrara A, Koebnick C, Yamamoto A, Daley MF, **Sherwood NE**, Horberg MA, Cromwell L, Lewis KH. The Patient Outcomes Research to Advance Learning (PORTAL) network adult overweight and obesity cohort: development and description. *JMIR Res Protoc*. 2016 Jun;5(2):e87. PMC4927804.

**BACKGROUND:** The Patient-Centered Outcomes Research Institute (PCORI) created a new national network infrastructure to enable large-scale observational comparative effectiveness research across diverse clinical care settings. As part of testing the feasibility of this effort, each clinical data research network (CDRN) was required to construct cohorts of patients, including one of patients with overweight and obesity. **OBJECTIVE:** The aim of this paper is to report on the development of the Patient Outcomes Research to Advance Learning (PORTAL) overweight and obese cohort, which includes patients from 10 health plans located across the United States. **METHODS:** Information was gathered from each plan's electronic health records (EHR). Eligibility included 18 years of age or older, a valid height and weight in 2012 or 2013, and body mass index (BMI) greater than 22.9 kg/m<sup>2</sup>. Pre-diabetes and diabetes status was defined using the American Diabetes Association (ADA) criteria, using lab values of glycated hemoglobin (HbA1c) or fasting glucose available in the EHR. Hypertension was identified from the International Classification of Diseases (ICD) diagnosis codes. Individuals were classified into BMI categories: healthy weight (23.0-24.9 kg/m<sup>2</sup>), overweight (25.0-29.9 kg/m<sup>2</sup>), obese class 1 (30.0-34.9 kg/m<sup>2</sup>), obese class 2 (35.0-39.9 kg/m<sup>2</sup>), obese class 3 (40.0-49.0 kg/m<sup>2</sup>), and obese class 4 (>50.0 kg/m<sup>2</sup>).

kg/m<sup>2</sup>). RESULTS: A cohort of 5,293,458 non-pregnant adults was created. Weight status was 20.39% (1,079,289/5,293,458) healthy weight, 40.40% (2,138,520/5,293,458) overweight, 22.78% (1,205,866/5,293,458) obese class 1, 9.86% (521,872/5,293,458) obese class 2, 5.59% (295,786/5,293,458) obese class 3, and 0.98% (52,125/5,293,458) obese class 4. Race/ethnicity was 49.02% (2,594,776/5,293,458) non-Hispanic white, 22.89% (1,211,677/5,293,458) Hispanic, 10.40% (550,608/5,293,458) Asian, 10.83% (573,506/5,293,458) black, and 6.59% (348,830/5,293,458) other. About 34.33% (1,817,438/5,293,458) met the definition of hypertension, 20.49% (1,660,940/5,293,458) of individuals met the criteria for pre-diabetes, and 14.98% (793,069/5,293,458) met criteria for diabetes. Prevalence of pre-diabetes and diabetes varied across health plans to a greater extent than expected based on hypertension prevalence and BMI status variability. CONCLUSIONS: This large, race, ethnic, and geographically diverse cohort will be useful for future studies of rare exposures or outcomes and differences in health care practices.

Yun K, Matheson J, Payton C, Scott KC, Stone BL, Song L, **Stauffer WM**, Urban K, Young J, Mamo B. Health profiles of newly arrived refugee children in the United States, 2006-2012. *Am J Public Health*. 2016 Jan;106(1):128-35. PMC4695941.

OBJECTIVES: We conducted a large-scale study of newly arrived refugee children in the United States with data from 2006 to 2012 domestic medical examinations in 4 sites: Colorado; Minnesota; Philadelphia, Pennsylvania; and Washington State. METHODS: Blood lead level, anemia, hepatitis B virus (HBV) infection, tuberculosis infection or disease, and Strongyloides seropositivity data were available for 8148 refugee children (aged < 19 years) from Bhutan, Burma, Democratic Republic of Congo, Ethiopia, Iraq, and Somalia. RESULTS: We identified distinct health profiles for each country of origin, as well as for Burmese children who arrived in the United States from Thailand compared with Burmese children who arrived from Malaysia. Hepatitis B was more prevalent among male children than female children and among children 5 years and older. The odds of HBV, tuberculosis, and Strongyloides decreased over the study period. CONCLUSIONS: Medical screening remains an important part of health care for newly arrived refugee children in the United States, and disease risk varies by population.

Yun K, Urban K, Mamo B, Matheson J, Payton C, Scott KC, Song L, **Stauffer WM**, Stone BL, Young J, Lin H. Increasing hepatitis B vaccine prevalence among refugee children arriving in the United States, 2006-2012. *Am J Public Health*. 2016 Aug;106(8):1460-2. PMC4940643.

OBJECTIVES: To determine whether the addition of hepatitis B virus (HBV) vaccine to national immunization programs improved vaccination rates among refugee children, a marginalized population with limited access to care. METHODS: The sample included 2291 refugees younger than 19 years who completed HBV screening after arrival in the United States. Children were categorized by having been born before or after the addition of the 3-dose HBV vaccine to their birth country's national immunization program. The outcome was serological evidence of immunization. RESULTS: The odds of serological evidence of HBV immunization were higher for children born after the addition of HBV vaccine to their birth country's national immunization program (adjusted odds ratio = 2.54; 95% confidence interval = 2.04, 3.15). CONCLUSIONS: National HBV vaccination programs have contributed to the increase in HBV vaccination coverage observed among US-bound refugee children. PUBLIC HEALTH IMPLICATIONS: Ongoing public health surveillance is needed to ensure that vaccine rates are sustained among diverse, conflict-affected, displaced populations.

Zielinski MD, Kuntz M, Zhang X, **Zagar AE**, Khasawneh MA, Zendejas B, Polites SF, Ferrara M, Harmsen WS, Ballman KS, Park MS, Schiller HJ, **Dries DJ**, Jenkins DH. Botulinum toxin A-induced paralysis of the lateral abdominal wall after damage-control laparotomy: a multi-institutional, prospective, randomized, placebo-controlled pilot study. *J Trauma Acute Care Surg*. 2016 Feb;80(2):237-42. PMC4730909.

BACKGROUND: Damage-control laparotomy (DCL) is a lifesaving operation used in critically ill patients; however, interval primary fascial closure remains a challenge. We hypothesized that flaccid paralysis of the lateral abdominal wall musculature induced by botulinum toxin A (BTX) would improve rates of primary fascial closure, decrease duration of hospital stay, and enhance pain control. METHODS: Consenting adults who had undergone a DCL at two institutions were prospectively randomized to

receive ultrasound-guided injections of their external oblique, internal oblique, and transversus abdominus muscles with either BTX (150 mL, 2 U/mL) or placebo (150-mL 0.9% NaCl). Patients were excluded if they had a body mass index of greater than 50, remained unstable or coagulopathic, were home O<sub>2</sub>-dependent, or had an existing neuromuscular disorder. Outcomes were assessed in a double-blinded manner. Univariate and Kaplan-Meier estimates of cumulative probability of abdominal closure were performed. RESULTS: We randomized 46 patients (24 BTX, 22 placebo). There were no significant differences in demographics, comorbidities, and physiologic status. Injections were performed on average 1.8 +/- 2.8 days (range, 0-14 days) after DCL. The 10-day cumulative probability of primary fascial closure was similar between groups: 96% for BTX (95% confidence interval [CI], 72-99%) and 93% for placebo (95% CI, 61-99%) (HR, 1.0; 95% CI, 0.5-1.8). No difference between BTX and placebo groups was observed for hospital length of stay (37 days vs. 26 days, *p* = 0.30) or intensive care unit length of stay (17 days vs. 11 days, *p* = 0.27). There was no difference in median morphine equivalents following DCL. The overall complication rate was similar (63% vs. 68%, *p* = 0.69), with two deaths in the placebo group and none in the BTX group. No BTX or injection procedure complications were observed. CONCLUSION: The use of BTX after DCL was safe but did not seem to affect primary fascial closure, hospital length of stay, or pain modulation after DCL. Given higher-than-expected rates of primary fascial closure, Type II error may have occurred.

**Zwank MD, Bourdon RT.** Risk of a contaminated urine specimen linked to high BMI [editorial]. *J Fam Pract.* 2016 Feb;65(2):84, 139.

## Published Abstracts

Aroda VR, Rosenstock J, Wysham C, Unger J, Bellido D, Gonzalez-Galvez G, Takami A, Guo H, Niemoeller E, Souhami E, **Bergental RM**, LixiLan-L Trial Investigators. Efficacy and safety of the insulin glargine plus lixisenatide fixed-ratio combination vs. insulin glargine in patients with T2DM: the LixiLan-L trial [abstract 238-OR]. *Diabetes.* 2016 Jun;65(Suppl 1):A62-3. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

LixiLan is a fixed-ratio combination of insulin glargine (Gla100) and the GLP-1 RA lixisenatide, currently in development for the management of T2DM. This open-label trial compared the efficacy and safety of LixiLan with Gla100 over 30 weeks. Patients were inadequately controlled on basal insulin, alone, or with up to 2 oral antidiabetic drugs. In a 6-week run-in phase, Gla100 was introduced or optimized. Patients whose HbA1c remained >7% (*n*=736), despite FPG<sub>≤</sub>140 mg/dL after run-in, were then randomized to LixiLan or Gla100. From screening to baseline (post run-in) mean HbA1c fell from 8.5% to 8.1%. At week 30, the LixiLan group showed a statistically superior reduction from baseline HbA1c, compared with Gla100 (-1.1% vs. -0.6%, *p*<0.0001). In total, 55% of LixiLan patients reached HbA1c <7% compared with 30% of Gla100 patients. Body weight decreased by 0.7 kg in the LixiLan group and increased by 0.7 kg in the Gla100 group (difference 1.4 kg, *p*<0.0001). The rate of documented (≤70 mg/dL and <60 mg/dL) symptomatic hypoglycemia was comparable between groups. Both treatments were well tolerated. In conclusion, LixiLan showed superior glycemic control to Gla100 (Table), with a beneficial effect on body weight, no additional risk of hypoglycemia and a low rate of nausea and vomiting in patients with long-standing T2DM uncontrolled on basal insulin. RA lixisenatide, currently in development for the management of T2DM. This open-label trial compared the efficacy and safety of LixiLan with Gla100 over 30 weeks. Patients were inadequately controlled on basal insulin, alone, or with up to 2 oral antidiabetic drugs. In a 6-week run-in phase, Gla100 was introduced or optimized. Patients whose HbA1c remained >7% (*n*=736), despite FPG

**Barclay TR, Forsberg AC, Thomas AJ, Crow JM,** Haley-Franklin H, **Hanson LR.** Outcomes of a dementia resource and education program embedded in a health care system [abstract]. *Alzheimers Dement.* 2016 Jul;12(7 Suppl):P605. [Poster at the *Alzheimer's Association International Conference (AAIC) Annual Meeting*, Vancouver, Canada, Jul 2016.]

BACKGROUND: Health care providers are struggling to meet the needs of patients and families facing dementia. Lack of education and support frequently results in crisis-driven care and hospitalization for

patients, as well as care-related strain, depression, and other negative outcomes for caregivers. Memory PREP (Patient Resource & Education Program) is a 4-month program for patients with dementia and their families that involves meeting with a social worker in person or by phone to cover a curriculum of disease education, support, and connection to community resources. METHODS: Patients with a new diagnosis of dementia and their care partners were recruited from primary care and the HealthPartners Center for Memory and Aging. Dyads were randomized to either an in-person (two in-person visits and three phone calls) or phone-only (five phone calls) intervention. Similar resources and ad hoc phone support were available to both groups. Disease knowledge, mood, social support, health, stress, caregiver burden, and quality of life were evaluated. Changes from baseline were assessed using paired t-tests; ANOVA was used for comparisons. RESULTS: Patients with memory loss who participated in Memory PREP were aged 60-93 (mean 76) and 56% female. Care partners were aged 37-88 (mean 68) and 65% female. Dyads were 99% non-Hispanic white; 62% were recruited from primary care. Notable changes from baseline to post-intervention included an increase in care partners' knowledge about Alzheimer's disease (mean 1.0; 95% CI 0.4 to 1.5;  $p=0.001$ ), Medical Outcomes Social Support (MOSS) (mean 4.7; 95% CI -0.1 to 9.5;  $p=0.06$ ) and satisfaction with care (mean 1.0, 95% CI -0.2 to 2.1;  $p=0.09$ ) as well as a decrease in patients' self-reported depression (PHQ9 mean score -0.7; 95% CI -1.6 to 0.1;  $p=0.07$ ). Care partners reported less use of Alzheimer's-related support groups (odds ratio 0.3; 95% CI 0.1 to 0.6;  $p=0.003$ ). No statistically significant differences were found by treatment arm or recruitment source. CONCLUSIONS: Results suggest that the phone-only program is as beneficial for patients with dementia and their families as the program with an in-person component. We plan to examine longer-term benefits from 8-month follow-up data.

Beck AL, Boggs JM, Clarke AD, Coleman KJ, **Neely C**, Hemmila T, **Ohnsorg KA**, **Solberg LI**. Implementing collaborative care management for depression, diabetes, and cardiovascular disease across eight health care systems [abstract]. *J Patient Cent Res Rev*. 2016 Summer;3(3 Suppl):213. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

BACKGROUND/AIMS: Collaborative care management is effective for improving care of patients with depression and chronic medical conditions. The Care of Mental, Physical, and Substance use Syndromes (COMPASS) project implemented evidence-based core collaborative care management components needed to achieve improvement in patients with both depression (PHQ-9 > 10) and uncontrolled diabetes (hemoglobin A1c > 8.0) or cardiovascular disease (systolic blood pressure > 145 or low-density lipoprotein cholesterol > 100). Components included measurement-based care, use of a care manager and registry, systematic case reviews, treatment intensification when indicated, relapse/exacerbation prevention and data evaluation for quality improvement. Supported by an award from the Centers for Medicare & Medicaid Services, COMPASS was implemented through a collaborative of eight health systems and more than 190 clinics in eight states. We used qualitative data to describe variation in the implementation of core COMPASS components across sites. METHODS: Implementation data across the eight COMPASS sites were obtained from annual site visit reports prepared by the Institute for Clinical Systems Improvement and qualitatively analyzed using Atlas.ti software, yielding emergent themes related to implementation facilitators and impediments. The Consolidated Framework for Implementation Research (CFIR) was used to organize qualitative data from site visits and as a conceptual framework for understanding implementation variation across COMPASS sites. CFIR includes six broad categories of implementation: intervention characteristics, outer setting, inner setting, implementation climate, characteristics of individuals, and process. Each broad category contains three to eight implementation subcategories. RESULTS: Four overarching themes were identified from site visit reports: 1) between-site differences; 2) challenges to implementation; 3) COMPASS learning and impact on health system; and 4) staff (characteristics, turnover issues, training, and background). Nine additional subthemes were identified that were mapped to CFIR implementation categories and that demonstrated considerable cross-site variation: 1) primary care physician engagement; 2) prior experiences with care coordination; 3) length of patient enrollment in COMPASS model; 4) team dynamics; 5) care manager characteristics; 6) quality improvement reports; 7) registry use; 8) patient social needs; and 9) organizational environment where COMPASS was implemented. CONCLUSION: Understanding the sources of variation in large-scale collaborative care management implementation is critical to increase the odds for further successful dissemination of similar models.

**Bergdall AR, Sperl-Hillen JM, O'Connor PJ, Asche SE, Crabtree BF, Smith EA, Nyboer RA, Dehmer SP, Maciosek MV, Pawloski PA, Trower NK, Margolis KL.** Qualitative data from a trial of home blood pressure telemonitoring and pharmacist management (Hyperlink) [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):182. Project: A07-116 Hyperlink. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference, Atlanta, GA, Apr 2016.*]

**BACKGROUND/AIMS:** Hyperlink was a cluster-randomized intervention trial in HealthPartners clinics from 2009 to 2013 with nonintervention follow-up through 2015 (60 months). Participants had uncontrolled hypertension. Telemonitoring intervention patients had improved blood pressure control at 6 months compared with usual care patients (72% vs. 45%,  $P < 0.001$ ). Intervention effects narrowed at 12 (72% vs. 53%,  $P = 0.005$ ) and 18 months (72% vs. 57%,  $P = 0.003$ ); 60-month blood pressure data will be complete in October 2015. We conducted a mixed-methods analysis combining our quantitative results with patient, clinical and other organizational stakeholder perspectives to learn how to optimize the intervention for the most patients and implement this intervention in our care setting. **METHODS:** We collected three sources of qualitative data: seven patient focus groups stratified by six 18-month blood pressure outcomes, four structured interviews with intervention pharmacists, and interviews (currently being collected) with key organizational stakeholders. Focus group and structured interview data were analyzed by a team of five using grounded theory. Initial themes were identified and coded in NVivo10. **RESULTS:** Qualitative data revealed several initial themes. First, patients valued trust in the patient-provider relationship and good communication between providers. Second, patients have varying goals with medications, and successfully initiating/adhering to treatment is better when the provider understands and respects the patient's perspective on medications. Finally, intervention patients benefited from seeing their own blood pressure data (reinforcement) and a trusted provider seeing their data (accountability). Pharmacist interviews agreed with these themes, revealing key insights about intervention design, including: length of intervention, addressing relapse, and meeting individual patients' needs with effective use of data and lifestyle counseling. Results of 60-month blood pressure outcomes will be analyzed in the context of these initial findings, and qualitative findings will be further refined. Stakeholder interview results about implementation are forthcoming. **CONCLUSION:** Findings suggest the need for several adaptations to the intervention before implementation in practice: provision of blood pressure monitors for ongoing use, a shorter duration with ability to re-engage if blood pressure becomes uncontrolled, more tailoring of the intervention to individual needs, and better communication and handoffs between pharmacists and physicians.

**Bergenstal RM, Calabro P, Lutomirsky MM, Von Eynatten M, Mattheus M, Lachin J, Wanner C.** Effect of empagliflozin on nephropathy in subgroups by age: results from EMPA-REG outcome [abstract 1198-P]. *Diabetes.* 2016 Jun;65(Suppl 1):A314. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions, New Orleans, LA, Jun 2016.*]

In the EMPA-REG Outcome trial, empagliflozin (EMPA) given in addition to standard of care significantly reduced the risk of new or worsening nephropathy vs. placebo (PBO) in patients with type 2 diabetes (T2DM) and high CV risk. We investigated the effect of age on the reduction in new or worsening nephropathy with EMPA. Patients in EMPA-REG Outcome were randomized to receive EMPA 10 mg, EMPA 25 mg, or PBO. New or worsening nephropathy (defined as new onset of macroalbuminuria, doubling of serum creatinine, initiation of renal replacement therapy, or death due to renal disease) was analyzed in the pooled EMPA group vs. PBO in subgroups by baseline age (<65, 65 to <75,  $\geq 75$  years). A total of 7020 patients were treated. Median observation time was 3.1 years. At baseline, mean (SD) age was 63.1 (8.6) years and 63.2 (8.8) years in the EMPA and PBO groups, respectively, and mean (SD) HbA1c was 8.07 (0.85)% and 8.08 (0.84)% in the EMPA and PBO groups, respectively. The benefit of EMPA vs. PBO on new or worsening nephropathy was consistent across age categories (Figure). Across age subgroups, reported adverse events were consistent with the known safety profile of EMPA. EMPA, in addition to standard of care, reduced the risk of new or worsening nephropathy in patients with T2DM and high CV risk irrespective of age.

**Boggs JM, Clarke AD, Rohm LM, Beck AL, Rossom RC, Richards J, Dimidjian S, Whiteside U, Segal Z, Simon GE.** Integrating technology into mental health intervention trials [abstract]. *J Patient Cent Res Rev.*

2016 Summer;3(3 Suppl):199. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** Innovative web-based methods of delivering wide-scale mental health interventions in an efficient and sustainable manner have the potential to overcome barriers to care and increase access. Herein we describe lessons learned using an integrated informatics architecture developed to support implementation of two large randomized mental health pragmatic trials that are currently underway at three HCSRN sites. The Strategies for Overcoming Residual Depressive Symptoms (SOAR) study is evaluating the effectiveness of an online mindfulness-based cognitive therapy (MBCT) program in 460 patients. The Suicide Prevention Outreach Trial (SPOT) is evaluating the effectiveness of two separate interventions--an online dialectical behavior therapy skills training program or risk assessment/care management using the Columbia Suicide Severity Rating Scale with secured messaging through Epic in preventing suicide attempt/death in 16,000 patients. Each study integrates software tools for targeted patient outreach, retention and monitoring of suicide risk. **METHODS:** Both studies leverage real-time patient-reported outcomes data from Epic questionnaires for cohort identification and recruitment. Patients are then invited via email to visit websites to learn about the study and provide informed consent. REDCap, DatStat or Epic questionnaires are used to collect follow-up data from participants with real-time, item-level email alerts to notify study staff of suicide risk. An email service delivers study incentives to patients on survey completion. A dashboard was developed in Epic to facilitate population management for a large volume of high-risk patients. **RESULTS:** The integrated informatics architecture allows the study team to enroll patients efficiently and to maintain high patient retention with survey completion rates of 70% in the MBCT study at 6 months. We tested several approaches for suicide risk monitoring using web-based surveys to encourage patients' acceptance of subsequent outreach. Each HCSRN site adapted an Epic dashboard function that alerts care managers to high-risk patients and tracks appointment compliance. **CONCLUSION:** Creative problem solving and effective partnerships among study staff, software and data programmers, care delivery teams, external collaborators and institutional review boards are essential for effective implementation of large pragmatic trials using multiple technologies. The integrated informatics architecture created here is essential to realize scalability, increase efficiency and support effectiveness of the interventions

**Bortz A, Frail CK, Funk KA.** Development of a pharmacist facilitator guide for online and face-to-face diabetes support groups [abstract]. *J Am Pharm Assoc.* 2016 May-Jun;56(3):e28. [Presented at *APhA2016 (American Pharmacists Association)*, Baltimore, MD, Mar 2016.]

**OBJECTIVE:** The objectives of this study are to: (1) identify topics that are most important to be included in a facilitator guide and (2) describe the key considerations in an iterative process used to optimize a facilitator guide for a pharmacist-led combined online and face-to-face support group for African-American men with diabetes in a faith-based setting. **METHODS:** An initial framework was developed to cover face-to-face discussion and online discussion forums over the course of the 12-week study period. A review of the literature uncovered key concepts that were used in the development of an initial framework for the facilitator guide. Participating pharmacists, church leaders, and researchers were consulted based on their relevant expertise. Additionally, input was obtained from experts in community-based participatory research on how to engage community members in the initial development of the facilitator guide. A preliminary guide has been developed that will be continually revised and refined throughout the study period. Feedback from participants, pharmacists, researchers and church leaders will be solicited to support optimization of the guide. **RESULTS:** Three broad domains were decided upon for discussion: education use, diabetes, and health-system navigation. Each domain was further divided into more specific topics, such as adherence, exercise, and community resources. It is anticipated that the guide will be shaped by participants' interests and needs as the support groups commence. Creation and optimization of the facilitator guided with input from this diverse group of stakeholders will likely allow for greater success of future support groups.

**Chu MM, Zhu DW, Lavell KA, House CM.** Management of functional Sprint Fidelis implantable cardioverter-defibrillator leads at cardiac resynchronization therapy-defibrillator generator replacement: An alternative approach for prevention of inappropriate shocks caused by lead failure [abstract]. *J Am Coll Cardiol.* 2016 Apr;67(13 Suppl):705. [Poster at the *American College of Cardiology 65th Annual*

Scientific Session & Expo, Chicago, IL, Apr 2016.]

**BACKGROUND:** Sprint Fidelis defibrillator leads were recalled in 2007 due to a high failure rate. Among the clinical adverse events associated with this lead failure, the most devastating was the delivery of multiple inappropriate shocks during sinus rhythm due to oversensing of make-brake potentials. In patients with a functional Fidelis lead at generator replacement, the manufacturer recommended to either continue to use the existing lead or replace it with a new defibrillator lead. We evaluated an alternative to prevent inappropriate shocks triggered by oversensing from a fractured Fidelis lead after cardiac resynchronization therapy-defibrillator (CRT-D) generator replacement. **METHODS:** Three elderly patients (mean age  $81 \pm 5$  years) with a functional Fidelis lead (6949) and a bipolar left ventricular (LV) lead (4194) underwent CRT-D generator replacement. These patients were not good candidates for defibrillator lead replacement due to the comorbidity and venous access occlusion. During the procedure, the pace/sense IS-1 connector pin of the functional Fidelis lead was intentionally inserted into the LV port of the new CRT-D generator while the existing bipolar LV lead IS-1 connector pin was inserted into the right ventricular (RV) pace/sense port. After such switching, the existing LV bipolar lead was used for pacing/sensing RV, while the Fidelis lead was used for pacing LV only. As the existing Fidelis lead is no longer used for sensing ventricular electrical activities, the oversensing issue has been eliminated even if this lead fails. **RESULTS:** During a follow-up of  $3 \pm 2$  years after CRT-D generator replacement and switching of Fidelis lead pace/sense pin with bipolar LV lead, in-office interrogations and remote monitoring showed normal device function, including biventricular pacing, ventricular tachyarrhythmia detection and appropriate antitachycardia therapy. **CONCLUSIONS:** In CRT-D patients with a functional Fidelis lead and a bipolar LV lead, switching of the Fidelis lead pace/sense pin with a bipolar LV lead during generator replacement did not affect device function. This approach could potentially prevent inappropriate shocks triggered by oversensing due to future lead fracture.

**Crain AL, Sperl-Hillen JM, O'Connor PJ, Desai JR, Margolis KL, Ekstrom HL.** Overuse and underuse of acetylsalicylic acid for primary prevention of cardiovascular disease in people with diabetes [abstract]. *Diabetologia*. 2016 Aug;59(Suppl 1):S38. [Presented at the *European Association for the Study of Diabetes (EASD) 52nd Annual Meeting*, Munich, Germany, Sep 2016.]

**BACKGROUND/AIMS:** Acetylsalicylic acid use is recommended for primary prevention of atherosclerotic vascular disease (ASCVD) for people with and without diabetes when the ASCVD benefit outweighs the risk of gastrointestinal hemorrhage. In a primary care setting, the complexity and time required to assess acetylsalicylic acid benefits and risks can result in inappropriate acetylsalicylic acid use either through overuse or underuse. The objective of this analysis is to assess the appropriateness of acetylsalicylic acid use for primary prevention in diabetes and other high ASCVD-risk patients in a large primary care setting with good electronic health record acetylsalicylic acid documentation. **MATERIALS AND METHODS:** As part of an NIH-funded study to lower ASCVD risk, we successfully implemented electronic clinical decision support (CDS) algorithms to encourage appropriate acetylsalicylic acid use. The algorithms recommended acetylsalicylic acid if ASCVD risk scores were high and consistent with benefit greater than GI bleed risk using criteria from the United States Preventive Services Task Force; and acetylsalicylic acid was not recommended if the ASCVD benefit was low or if major contraindications were identified (anticoagulant use or history of intracerebral hemorrhage). Providers were also alerted to the presence of other potential acetylsalicylic acid risks, including acetylsalicylic acid allergy or intolerance, history of GI bleed risk conditions, and concomitant use of nonsteroidal anti-inflammatory drugs. Baseline study data was collected for whether acetylsalicylic acid was algorithmically recommended for all patients at their first eligible primary care encounter in 20 clinics over 2012-2014. The analysis excluded patients with CHD and included 6065 adults with diabetes (mean age 55.6, mean 10-year ASCVD risk 27.9%) and 10,165 adults meeting pre-specified criteria for high ASCVD risk without diabetes (mean age 58.4, mean 10-year ASCVD risk 24.6%). Overuse and underuse was determined by comparing concordance with (a) acetylsalicylic acid algorithm recommendations and (b) documented acetylsalicylic acid use. **RESULTS:** For the targeted population with high CV risk, the CDS recommended acetylsalicylic acid for 3842 (63.3%) patients with diabetes and 7552 (74.3%) without diabetes. Among patients with acetylsalicylic acid recommended, acetylsalicylic acid was underused in 761 (19.8%) with diabetes and 5638 (74.4%) without diabetes. Among patients for whom the CDS did not recommend acetylsalicylic acid, acetylsalicylic acid was overused in 1322 (59.5%) with diabetes and

883 (33.8%) without diabetes. **CONCLUSION:** In this large primary care setting, acetyl-salicylic acid was more likely to be overused than underused for patients with diabetes. Those with diabetes who were likely to benefit from acetyl-salicylic acid use had higher acetyl-salicylic acid use rates than similar high CV-risk patients without diabetes. However, those with diabetes who were unlikely to benefit from acetyl-salicylic acid (risks greater than benefit) also had higher rates of acetyl-salicylic acid overuse compared to patients without diabetes. Strategies to ensure greater evidence-based use of acetyl-salicylic acid, such as providing electronic clinical decision support, may help providers more accurately assess individualized risks and benefits of acetyl-salicylic acid.

**Crane MM, Jeffery RW, Sherwood NE.** How men and women keep it off: exploring gender differences in weight loss maintenance [abstract]. *Ann Behav Med.* 2016 Mar;50(Suppl 1):S221. [Presented at the *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions: Behavioral Medicine at a Crossroads: 21st Century Challenges and Solutions*, Washington DC, Apr 2016.]

**BACKGROUND:** There is growing attention to the underrepresentation of men in studies of weight loss and weight loss maintenance (e.g., 20% in the National Weight Control Registry). Therefore, the purpose of this study was to explore gender differences within a weight loss maintenance trial prior to entering the program and during and after treatment. **METHODS:** Data for this analysis come from the Keep It Off randomized trial, which tested the effect of an interactive phone-based weight loss maintenance intervention over 24 months for participants who had previously lost a minimum of 10% of their body weight in the prior year. Participants (N=419, 18.4% male, age 47.0±10.8, BMI 28.4±5.0) were asked prior to randomization how they initially achieved their weight loss. At baseline, 12 months, and 24 months, participants reported their current eating patterns (e.g., meals eaten over the prior week), dietary intake (NCI's Diet History Questionnaire), and physical activity (Paffenbarger Physical Activity Questionnaire). **RESULTS:** At study entry, women had lost more weight than men (16.4±5.4 vs. 15.0±4.9%, p=0.03). A greater percentage of women (55.9%) than men (24.7%, p<0.001) used an organized weight loss program as their method for initial weight loss. Women were more likely to report a weight loss motivated by improving issues related to personal esteem than men (51.2 vs. 35.1%, p=0.01) but reported similar health motivators (68.2 vs. 74.0%, p = 0.31). There were few differences in eating patterns at baseline, with similar percentages of men and women reporting eating breakfast (62.1%), lunch (61.8%), and dinner daily (72.5%, p>0.05). Men were more likely than women to report ever eating food purchased at a convenience store (22.1% vs. 13.1%, p = 0.05). Similar results were observed at 12 and 24 months. Calorie intake was higher in men at baseline, 12, and 24 months, while daily self-weighing and physical activity were similar between men and women at each time point. **CONCLUSIONS:** Although men are underrepresented in studies of weight maintenance, it does not appear that they use different behaviors to achieve weight loss maintenance than women. To better involve men in weight loss maintenance interventions, program developers should consider changing the messaging or program format to appeal more to men rather than changing treatment program content.

**Crane MM, Sherwood NE, Ward DS, Lutes LD, Tate DF.** Losing weight like a man: reported weight loss strategies from a men's weight loss intervention [abstract]. *Ann Behav Med.* 2016 Mar;50(Suppl 1):S136. [Presented at the *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions: Behavioral Medicine at a Crossroads: 21st Century Challenges and Solutions*, Washington DC, Apr 2016.]

**BACKGROUND:** Men express preferences for weight loss programs that feature individualization; however, little is currently known about the specific weight loss strategies men prefer to use. The purpose of this study is to describe the weight loss strategies used by men prior to a weight loss program and changes in weight loss strategy utilization during the course of the intervention. **METHODS:** This data comes from a randomized trial testing the efficacy of a men-only weight loss program as compared to a waitlist control group. Participants reported the frequency with which they used 45 weight loss strategies at baseline and 3 months. The list included strategies central to program recommendations (e.g., record weight), strategies mentioned in the program (e.g., reduce high calorie beverages), and strategies not mentioned in the program (e.g., follow a structured meal plan). Participants who reported using a strategy "much of the time" or "always or almost always" were considered to regularly use that strategy. **RESULTS:** At baseline, participants (N=107, 44.2 years, 31.4 kg/m<sup>2</sup>, 76.6% white) reported regularly using 7.3±6.6 of the 45 strategies. The most commonly endorsed strategies were reducing fast-food,

reducing sugar-sweetened beverages, and increasing lifestyle activity. The intervention group increased the number of strategies used to  $19.1 \pm 8.3$  at 3 months versus  $7.1 \pm 6.1$  for the waitlist group ( $p < 0.01$ ). The intervention group reported increased use of all but one of the strategies recommended by the program (5 of 6 strategies) and increased use of one-quarter of the strategies not specifically recommended by the program (4 of 16 strategies). No change in regular use of weight loss strategies between baseline and 3 months was reported by participants in the control group. Participants in the intervention group lost more weight at 3 months compared to waitlist group participants ( $4.7 \pm 4.3$  vs.  $0.6 \pm 2.1$  kg;  $p < 0.01$ ) and this intervention effect was significantly mediated by the number of strategies used at 3 months. **CONCLUSIONS:** This study adds to what is known about men's preference for and use of weight loss prior to and during a formal weight loss program. This information will help future program developers create programs that utilize strategies that appeal to and are effective for men.

Debaty G, Labarere J, **Frascone RJ**, Wayne MA, Swor RA, Mahoney BD, Domeier RM, Olinger ML, O'Neil BJ, Aufderheide TP, Yannopoulos D. Gasping during cardiopulmonary resuscitation is associated with a higher likelihood of one-year survival after cardiac arrest [abstract]. *Circulation*. 2016 Nov 11;134(Suppl 1):A19029. [Poster at the *AHA ReSuscitation Science Symposium*, Anaheim, CA, Nov 2016.]

**INTRODUCTION:** Gasping has been found to be common after cardiac arrest and associated with increased survival to discharge for out-of-hospital cardiac arrests (OHCA). Active compression decompression (ACD) plus an impedance threshold device (ITD) improves brain blood flow and survival to hospital discharge with favorable neurologic function after OHCA compared with standard CPR (S-CPR). **Hypothesis:** We assessed the association of gasping during CPR on 1-year survival. **METHODS:** The ResQTrial data, which compared ACD+ITD versus S-CPR, was used for these analyses. Nearly all one-year survivors had normal brain function. We included all evaluable subjects in the run-in and pivotal phases of the trial. Beginning in January 2007, the original case report forms were modified to include whether or not spontaneous gasping or breathing was observed at any time during CPR. A logistic regression analysis was performed. Odds ratios (OR) were adjusted for ResQTrial study intervention arm, pre-specified prognostic factors, and study site and were expressed for 1 standard deviation increment in patient age, total CPR duration, and epinephrine dosage. P-values  $< 0.05$  were considered statistically significant. **RESULTS:** Overall, 1879 subjects were included, with data available on gasping status. Gasping was reported in 87/910 (9.6%) subjects in the S-CPR group vs. 116/969 (12.0%) in the ACD+ITD CPR group ( $p=0.09$ ). In the combined cohort, one-year survival was significantly increased in patients with gasping during CPR 44/203 (22%) vs. 78/1676 (5%),  $p<0.001$ . In multivariable analysis, gasping during CPR was associated with a 3.49 (95% CI: 1.98-6.15) adjusted OR of 1-year survival. Other factors significantly associated with 1-year survival were: ventricular fibrillation as first recorded rhythm 13.28 (6.61-26.67), pulmonary edema 2.38 (1.16-4.92), age 0.56 (0.43-0.72), total CPR duration 0.28 (0.18-0.44), and epinephrine dosage 0.49 (0.30-0.82). **CONCLUSIONS:** Gasping during CPR is associated with a higher likelihood of one year survival after cardiac arrest. These new findings demonstrate the importance of recognizing gasping during CPR and provide a rationale for not terminating CPR prematurely in patients with ongoing gasping efforts.

**Desai JR**, Taylor G, **Vazquez-Benitez G**, Vine S, **Anderson JD**, Garrett JE, Rinn S, Vue-Her H, **Becker MT**, Schiff J, **O'Connor PJ**. Can financial incentives prevent diabetes in a low-income population? [abstract 268-OR]. *Diabetes*. 2016 Jun;65(Suppl 1):A71. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

The use of incentives to promote healthy behaviors in the Medicaid population is understudied. The We Can Prevent Diabetes study is designed to assess the effect of financial incentives on attendance and weight loss among Medicaid beneficiaries participating in the group-based Diabetes Prevention Program (DPP). We conducted a pragmatic 3-arm cluster-randomized study of individually earned (IND) and individual plus group earned (GRP) financial incentives against an attention control (AC) among DPP participants. Medicaid beneficiaries with prediabetes (HbA1c 5.7-6.4%; FPG 100-125 mg/dL) or history of gestational diabetes, and a BMI = 25 kg/m<sup>2</sup> (= 23 kg/m<sup>2</sup> for Asians) were enrolled into the DPP (6-15 participants/class) that was delivered by certified DPP coaches. During 16 weekly Core sessions, participants received incentives for weekly attendance and for achieving at least 5%, 7% and 10% weight

loss. A total of \$315 in incentives could be earned by participants in the IND or GRP arms. We analyzed differences in weight loss and attendance across the three study arms using hierarchical models to accommodate randomization at the class level and repeated time measures. There were 93 DPP class cohorts; 849 participants attended at least one session. Mean age and BMI were 48.3 years and 36.5 kg/m<sup>2</sup>; 81% were non-white or Hispanic, and 28% reported English was not their primary language. During the core sessions, attendance declined 38% (IND), 41% (GRP), and 63% (AC),  $p < 0.01$ . Weight declined 2.1% (IND), 2.3% (GRP), 2.3% (AC),  $p = 0.60$ . Participants achieving at least 5% weight loss were: 5.9% (IND), 9.4% (GRP), and 7.1% (AC),  $p = 0.24$ . In this culturally diverse Medicaid population, relative to the attention control, financial incentives increased participation in the DPP but did not increase weight loss during the core sessions. Further research is needed to understand the factors that facilitate or limit healthy behaviors in this population.

**Desai JR, Vazquez-Benitez G, Schroeder EB, Lawrence JM, Waitzfelder BE, Morales LS, Nichols GA, Karter AJ, Steiner JF, Coleman KJ, Newton KM, Pathak RD, Elston Lafata J, Segal JB, O'Connor PJ.** All is not equal...or is it? Targeting uncontrolled cardiovascular risk factors in racial and ethnic populations to prevent major cardiovascular events [abstract]. *Diabetologia*. 2016 Aug;59(Suppl 1):S54. [Presented at the *European Association for the Study of Diabetes (EASD) 52nd Annual Meeting*, Munich, Germany, Sep 2016.]

**BACKGROUND/AIMS:** Despite consistent improvement in cardiovascular (CV) risk factors (RF) over the past decade, uncontrolled yet modifiable CV RFs remain significant contributors to major CVD. This study assessed the contribution of uncontrolled CVRFs to potentially preventable major CVD by race, ethnicity, and gender. **MATERIALS AND METHODS:** Data were from 11 integrated health care systems in the United States for the years 2005-2011. Subjects included 760,971 adults (>20 years) with diabetes enrolled for >6 months during the study period. Poor RF control was classified as LDL-c > 100 mg/dL, HbA1c > 7% (53mmol/mol), BP > 140/90 mmHg, or smoker from electronic health records. Major CV events were from primary hospital discharge diagnoses for myocardial infarction, acute coronary syndrome, stroke, or heart failure. The four major race ethnicity groups were Hispanic and non-Hispanic white, black, and Asian. Aggregate five-year incidence rates and average attributable fractions (AAF) were estimated using multivariable Poisson regression models for race/ethnicity and gender strata. **RESULTS:** At baseline, white, black, Asian, and Hispanic subjects had a mean (SD) age of 61 (13), 57(13), 57(13), and 54(13) years; the percent female was 47.1%, 55.3%, 48.6%, and 49.7%; and a prior history of CVD was 39.3%, 32.4%, 24.2%, and 22.5%, respectively. Mean follow-up was 59 months. HbA1c and LDL-c were uncontrolled in 42-60% of subjects (Table). Five-year major CV event rates per 100 person-years for men and women were 85.8 and 66.6 for whites, 100.9 and 83.9 for blacks, 67.0 and 43.0 for Asians, and 83.0 and 59.3 for Hispanics. The percentages of CV events attributable to inadequate RF control for men and women were 13.3% and 18.0% for whites, 15.4% and 21.3% for blacks, 19.7% and 8.1% for Asians, and 18.3% and 12.7% for Hispanics, respectively. Within gender, AAF were different across race/ethnicity strata ( $p < 0.01$ ). **CONCLUSION:** In this large cohort of adults with diabetes from 11 geographically dispersed U.S health systems, rates of major CV events differed by gender, race, and ethnicity, as expected. Yet, excess major CV events due to suboptimal HbA1c, LDL-c, BP, and smoking levels were substantial within each subgroup. Improved CV risk factor control can prevent future CV events across all demographic groups.

Dobrzynski T, MacNeill LT, Cromer M, Riggs G, Mayne M, **Salzman JG.** Factors associated with appropriate spinal immobilization and long backboard use [abstract]. *Prehosp Emerg Care*. 2016 Jan-Feb;20(1):163-4. [Poster at the *National Association of EMS Physicians (NAEMSP) Scientific Assembly*, San Diego, CA, Jan 2016.]

**BACKGROUND:** The 2013 NAEMSP/ACS Committee on Trauma joint position statement on long backboard and spine immobilization included criteria defining appropriate use of these treatments. This study sought to identify factors associated with the appropriate use of long backboard immobilization following release of these guidelines. **METHODS:** This was a retrospective review of collected data from Fisdap, a database of prospectively reported clinical field experiences for paramedic, AEMT, and EMT students. Inclusion criteria included student consent to research, data validated by preceptor as good data, and patient encounter date of 2013 and 2014. The association of US geographic region where the

encounter occurred (West, North, South, East), student training level (EMT/AMET vs. paramedic), patient race/ethnicity (African-American, Caucasian, Other, Hispanic), patient gender (male vs. female), and patient age ( $\leq 18$ ; 1964;  $\geq 65$ ) with appropriate backboard use was evaluated using logistic regression. Appropriate use was defined according to the 2013 position statement criteria and derived from data elements from Fisdap. RESULTS: A total of 24,020 runs (2013 = 15,417; 2014 = 8,603) met inclusion criteria and were analyzed (Table 1). Overall, 82.4% of patients were appropriately long backboarded, 13.9% had inappropriate placement, and appropriateness could not be determined in 3.7% of patients. Encounter year (2013 = 77.9%; 2014 = 90.3%), geographic location [Midwest (OR = 1.54; 95% CI 1.31.8); South (OR = 1.24; 95% CI 1.101.40); reference = West], and race (African-American; OR = 1.22; 95% CI = 1.101.36; reference = Caucasian) were all significant factors associated with higher levels of appropriate placement. Encounters with an AEMT student (OR = 0.81; 85% CI 0.710.92) and encounters with a patient  $\leq 18$  (OR = 0.74; 95% CI 0.66 0.82) or  $\geq 65$  (OR = 0.75; 95% CI 0.69 0.82) were associated with a lower likelihood of appropriate placement. CONCLUSION: Factors associated with higher likelihood of appropriate long backboard use include patient encounter in 2014, encounters in the Midwest or South, and African- American patient race. Encounters with AEMT students and encounters with patients  $\leq 18$  or  $\geq 65$  were associated with a lower likelihood of appropriate long backboard use.

**Farrar K, Cicolello K, Zwank MD.** Impact of EMR discharge notifications on rates of patient follow-up and treatment of hypertension: a retrospective cohort [abstract]. *Acad Emerg Med.* 2016 May;23(Suppl):S74. [Presented at the *Society of Academic Emergency Medicine (SAEM 2016) Annual Meeting*, New Orleans, LA, May 2016.]

BACKGROUND: The dangers of untreated hypertension (HTN) are well known. Because of this, recognition of abnormal elevated blood pressure (EBP) during ED encounters is very important. We implemented an EMR alert that generates a notification to providers at the time of discharge if a patient's blood pressure has exceeded 140/90 during their visit. The alert also prompts the clinician to provide the patient with a diagnosis of EBP or HTN, a primary care referral, and/or HTN-specific discharge instructions. Objectives: We sought to determine if the alert led to improved patient notification of EBP and, ultimately, to improved primary care referral and follow-up. METHODS: We conducted a retrospective chart review of 1001 charts (501 pre- and 500 post-intervention) at a tertiary care teaching hospital with annual census of 81,000. Data were abstracted from the electronic medical record by two trained researchers. RESULTS: 40 (8.0%) patients in the pre-intervention group and 82 (16.4%) patients in the post-intervention group received either a new HTN diagnosis, a referral to primary care for blood pressure follow up, or discharge instructions regarding HTN ( $p < 0.0001$ ). A greater difference was seen among patients with no history of HTN (4.2% pre- and 18.3% post-intervention;  $p < 0.0001$ ). When limited to patients with at least two EBPs during the ED visit, the difference was more pronounced (7.0% pre- and 27.4% post-intervention;  $p < 0.0001$ ). Following the ED visit, an equal number of pre- and post-intervention patients were seen in follow up within the next 3 months (54% vs 55%). Of those, only 29 patients (5.8%) in the pre-intervention group had a new antihypertensive or changes to their antihypertensive medications versus 54 patients (10.8%) in the post-intervention group ( $p < 0.005$ ). CONCLUSION: After the EMR alert was implemented, a greater proportion of patients received a key intervention (a new HTN diagnosis, a referral to primary care for follow up, or discharge instructions regarding HTN). This was most pronounced in groups with no prior history of HTN and patients with repeated EBPs during their ED visit. This intervention correlated with an increase in the number of patients who had adjustments to their antihypertensive regimens in follow up.

Feldman LE, Pasquinelli M, **Alban J, Dudek AZ**, Winn R, Watson K, Menchaca MG, Koshy M, Kovitz K. Comparison of initial (T0) screens in UI Health's Minority-Based Lung Cancer Screening Program to that of the National Lung Screening Trial (NLST): PS01.11 [abstract]. *J Thorac Oncol.* 2016 Nov;11(11 Suppl):S275-6. [Poster at the *IASLC (International Association for the Study of Lung Cancer) 2016 Chicago Multidisciplinary Symposium in Thoracic Oncology*, Chicago, IL, Sep 2016.]

**Frail CK, Cooper S**, Gallagher T, Sarkis J, Topor L, **Bruzek RJ**. A novel payer-provider collaboration to improve hypertension control in the community pharmacy setting [abstract]. *J Am Pharm Assoc.* 2016 May;56(3):e94-5. [Presented at *APhA2016 (American Pharmacists Association)*, Baltimore, MD, Mar 2016.]

**OBJECTIVE:** The objective of this quality-improvement pilot was to improve hypertension monitoring and management among members of a Midwestern health plan through an innovative community pharmacy partnership supported by a validated and interoperable blood pressure (BP) monitoring technology. **METHODS:** Health plan members with a hypertension diagnosis and attributed to a regional community pharmacy chain based on prescription claims were invited by letter and face-to-face offer from pharmacists to participate in this service. Interested patients enrolled in the program at their participating pharmacy and were assigned a “smart card” for use with an in-pharmacy BP kiosk. Use of the card links patient readings directly with their electronic pharmacy record and with an online patient portal. Patients were encouraged to monitor their BP frequently. Pharmacists intervened with patients and prescribers as necessary to address adherence issues and to adjust therapy to reach BP goals. Before and after BP readings were assessed to determine the effect of patient self-monitoring and pharmacist intervention. **RESULTS:** Fifty-six of 270 eligible patients (20.7%) were enrolled in the program. Of these, 45 (80.3%) monitored their BP multiple times throughout the pilot. Fourteen patients qualified for a pre- and post-assessment as defined as having uncontrolled BP on initial reading and multiple readings throughout the pilot. Of these, patients demonstrated a mean reduction in systolic BP of 11.2 mm Hg and diastolic BP of 8 mm Hg. Nine of 16 eligible pharmacy locations enrolled patients at their sites. Participating pharmacy locations enrolled a median of three patients (range: 1e22). Pharmacists documented tasks completed within consults, including communicating with prescribers, educating on adherence, and recommending therapy adjustment. **CONCLUSIONS:** The pilot demonstrated promising early results in a model that has potential to improve hypertension monitoring and management in a community pharmacy setting. Opportunities to increase patient and pharmacist engagement should be evaluated.

**Frail CK, Pawloski PA, Rossom RC, Thomas AJ, Werner AM, Elliott TE.** Clinical and demographic characteristics of patients receiving opioid therapy during pregnancy [abstract]. *Pharmacotherapy*. 2016 Dec;36(12):e259. [Presented at the ACCP (American College of Clinical Pharmacology) Annual Meeting, Hollywood, FL, Oct 2016.]

**INTRODUCTION:** Opioid use has increased significantly in recent years, including during pregnancy. Evidence suggests as many as one in four women receive opioid therapy to some extent during pregnancy. Concerns have emerged regarding potential increased fetal risks, including central nervous system effects. Research question or hypothesis: The purpose of this work is to describe clinical and demographic characteristics of patients receiving opioid therapy during pregnancy. Study design: Retrospective observational study. **METHODS:** Pregnant members of a Midwestern integrated health care system who delivered a live birth between 2006 and 2014 and had continuous pharmacy benefits beginning three months prior to their estimated pregnancy start through three months after their known delivery date were included. As part of a larger study aimed at understanding opioid prescribing patterns during pregnancy, demographic, clinical, and healthcare utilization variables of interest were identified and described. Opioid use during pregnancy was defined as more than five days in any three-month period, excluding the two-week period following delivery. **RESULTS:** Of 11,565 deliveries during the study period, 862 (7.4%) representing 816 unique patients were associated with opioid use during pregnancy. Fifteen percent of Medicaid beneficiaries received opioids during pregnancy versus 5% of commercially insured patients. Adjusting for Medicaid coverage, patient characteristics associated with an increased likelihood of receiving opioid therapy include: single marital status (OR = 1.19), current smoking status (OR = 2.42), a history of substance abuse (OR = 3.87), and mental health diagnoses (anxiety OR = 2.66, bipolar OR = 2.38, depression OR = 2.42). In addition, the use of non-opioid analgesics and mood-altering agents (e.g., benzodiazepines, antidepressants) were associated with increased opioid use. **CONCLUSIO:** Opioid use was more common among single women who smoke or have a mental health diagnosis or history of substance abuse. Women with these risk factors may benefit most from targeted outreach to decrease opioid use during pregnancy.

**Frail CK, Thomas AJ, Pawloski PA.** Application of statin medication adherence trajectory models in an integrated financing and care delivery system [abstract]. *Pharmacotherapy*. 2016 Dec;36(12):e237. [Presented at the ACCP (American College of Clinical Pharmacology) Annual Meeting, Hollywood, FL, Oct 2016.]

**INTRODUCTION:** Group-based trajectory models have been applied to classify patients based on

medication adherence patterns over time rather than a single summary measure (e.g., proportion of days covered). Previous studies of trajectory group membership used claims data to predict trajectory group inclusion. Research question or hypothesis: The study objective was to classify 12-month statin medication adherence patterns and develop prediction formulas for forecasting individual patients' adherence trajectories using baseline claims and EMR-based clinical data. Study design: Retrospective descriptive analysis. METHODS: Members of a Midwestern health plan who initiated new statin therapy in 2012 were included. Members were partitioned into six group-based trajectory models of utilization using latent class analysis. Logistic regressions were conducted, with membership in each adherence group as the outcome. Demographic, clinical, and health care utilization variables were explored as possible predictors of inclusion into adherence groups. Akaike Information Criterion (AIC) was used to determine the best multivariate predictive model for each group. RESULTS: Six adherence trajectory groups were defined with distinct adherence and persistence patterns over 12 months; including ongoing persistence, early discontinuation, and fluctuation in utilization. The trajectory most easily predicted was discontinuation at approximately two months (C-statistic = 0.74). Predictors for this group included: black or Hispanic race/ethnicity; Charlson score; diagnosis of a chronic lung condition, chronic kidney disease, obesity, or depression; the use of multiple prescribers or multiple pharmacies; and total number of chronic prescription medications. CONCLUSION: Baseline clinical and claims-based characteristics may be used to identify new statin users likely to follow one of six specific adherence trajectories. This information may support early targeted interventions to improve adherence in high-risk groups.

**Gordon BD, Bernard K, Isenberger KM, Zwank MD.** Patterns of use of cervical spine decision rules installed in EHR imaging order [abstract]. *Acad Emerg Med.* 2016 May;23(Suppl):S58. [Presented at the *Society of Academic Emergency Medicine (SAEM 2016) Annual Meeting*, New Orleans, LA, May 2016.]

BACKGROUND: The use of computerized decision support for advanced imaging orders is required in some outpatient settings but not yet in the ED. Validated clinical decision rules are shown to help guide the ordering decision of cervical spine CT imaging. OBJECTIVES: We sought to determine if providers would voluntarily use newly embedded decision rules within a cervical spine CT electronic order more frequently than the standard method of order entry. We also had interest in which rule providers preferred when both were available. METHODS: At three hospitals, the cervical spine CT order was updated in a quality-improvement project to include questions from the Canadian and NEXUS cervical spine decision rules. In each order, providers could answer questions from either rule to satisfy the order indications requirements. They could alternatively use a 'rule not appropriate' option to apply the standard method of documenting imaging indications required by the radiology department. Data were collected from each cervical spine CT order placed by ED attending physicians, residents or physician assistants during the review period. Descriptive statistics determined the proportion of orders in which the ordering provider used a decision support rule or opted out of using the rule. RESULTS: From 9/1/2014 thru 8/31/2015, 2022 orders were placed meeting the inclusion criteria. The ordering provider documented the use of a rule in 1257 (62%) orders. When stratified by provider role, attending physicians chose to use the rule less than half of the time (48%), whereas physician assistants and residents chose to use the rule more frequently (64% and 74%, respectively). When a rule was used, the Canadian rule was used in 638 (51%) orders and the NEXUS rule in 619 (49%) orders. The table details the breakdown of all orders placed by provider role. CONCLUSION: When asked to enter indications for a c-spine CT order, providers opt to use a decision rule more frequently than the standard method of order entry. However, attending physicians used the rule less frequently when compared to physician assistants or residents. Providers who used a decision rule chose the Canadian rule and the NEXUS rule with similar frequency.

Haller IV, Renier CM, Hitz P, Palcher JA, **Elliott TE.** Validation of the automated Diagnosis, Intractability, Risk Efficacy (DIRE) opioid risk assessment tool [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):227. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

BACKGROUND/AIMS: Despite the drastic increases in prescription opioid misuse and abuse, risk assessment for aberrant drug-related behaviors prior to initiating opioid therapy for chronic non-cancer pain management continues to be underutilized in clinical practice. The purpose of the study was to investigate availability of data elements in the electronic health record that could be used to assess risk

for aberrant drug-related behaviors with the automated Diagnosis, Intractability, Risk, Efficacy (DIRE) opioid risk assessment tool. **METHODS:** DIRE is a 7-item tool usually administered by a clinician and used to predict efficacy of analgesia and patient compliance with long-term opioid therapy. Each factor is rated from 1 (least favorable case) to 3 (more favorable case for opioid prescribing). The total score is used for risk stratification, with scores <14 being an unsuitable candidate and scores  $\geq 14$  being a possible candidate for opioid therapy. The validation of the automated process versus clinician administered rating was conducted using kappa analysis and test characteristics (sensitivity, specificity, positive and negative predictive values). **RESULTS:** We developed structured data queries, natural language processing (NLP) algorithms for unstructured data, and data mapping strategies to populate the DIRE for a cohort of chronic non-cancer pain patients who were on long-term opioid therapy and who had a clinician-administered DIRE documented in the electronic health record prior to signing the most recent opioid agreement. We used ICD-9 diagnosis codes and NLP to populate diagnosis and psychological and chemical risk items. Encounter data and NLP were used for the reliability item. Intractability and social support items were populated using NLP only. Information on oral morphine equivalents, length of treatment, changes in pain scores and NLP were used to populate the efficacy item. If no information was found, most items were scored as 3 and efficacy as 2. The results of the NLP versus clinician-administered validation kappa analysis and test characteristics are pending. **CONCLUSION:** Among major barriers to appropriate management of chronic non-cancer pain with opioids are inadequate time and resources available to clinicians at a point of care for risk assessment. Novel approaches, such as NLP, may support clinical decision-making by automating the process of data extraction.

**Hanson LR, Barclay TR, Werner AM, Erickson LO, Crow JM, Borson S, Lakshminarayan K, Rosenbloom MH.** Outcomes from routine cognitive screening in a health care system [abstract]. *Alzheimers Dement.* 2016 Jul;12(7):P756. [Poster at the *Alzheimer's Association International Conference (AAIC) Annual Meeting*, Vancouver, Canada, Jul 2016.]

**BACKGROUND:** Even with routine health care, dementia often goes undiagnosed until the moderate-severe stages. The potential benefits of cognitive screening in the asymptomatic population are unclear. HealthPartners has piloted the use of the Mini-Cog (MC) as a standardized screening tool for cognitive function in patients aged 65 and older. **METHODS:** Patients screened within specialty or primary care clinics were identified. Data from the 18 months prior to screening and the 18 months following screening were collected from the electronic medical record and included the MC score (scored 0-5), demographics, interventions received, and measures of healthcare utilization. Two definitions of screening positive were tested for the MC (score of <3 and <4). Data analysis consisted of Poisson regression and normal mixed effects regression. **RESULTS:** The MC was administered in 1166 patients (average 77 years, 58% female). Rates of patients screening positive for cognitive impairment were 16% and 32% (MC score of <3 and <4, respectively). Following a positive screen, documentation of diagnostic interventions (i.e., imaging, neuropsychology) were generally low (<7%), though significantly higher than after negative screens. In the 18 months following a positive screen, patients were more likely to be diagnosed with dementia or mild cognitive impairment (14% vs. 3%,  $p < 0.001$ ) and to receive a prescription for a dementia medication (12% vs. 2%,  $p < 0.001$ ) compared to patients with a negative screen, regardless of cutoff score used. Patients screening positive had a significantly lower overall incidence rate of office visits (-5%) in the 18 months following screening compared to the prior 18 months, which was more prominently seen in patients screened in primary care (-23%). Incidence of emergency room visits remained the same, and hospitalizations changed significantly but differently by screen site, with significantly lower incidence in primary care screens and higher incidence in specialty care. **CONCLUSIONS:** Screening was associated with increased recognition of previously undetected cognitive impairment and changes in healthcare utilization. Further studies are needed to better understand what work flows may influence clinicians' actions and increase the diagnostic follow-up of a positive screen.

**Hanson LR, Forsberg AC, Erickson LO, Schlichting JT, Hage LM, Barclay TR.** Minnesota Memory Project: Use of the Alberta Smell Test in a longitudinal aging cohort [abstract]. *Alzheimers Dement.* 2016 Jul;12(7):P971. [Poster at the *Alzheimer's Association International Conference (AAIC) Annual Meeting*, Vancouver, Canada, Jul 2016.]

**BACKGROUND:** The Minnesota Memory Project is a longitudinal study investigating cognitive and

lifestyle factors associated with advancing age. Gathering information about memory function and health prior to diagnosis can help identify ways to make earlier diagnoses, identify risk factors of memory loss, and develop programs to help prevent or delay symptoms. Olfactory deficits are an early feature of cognitive impairment and have been linked to disease progression. The Alberta Smell Test (AST) is a fast and cost-effective method of evaluating olfactory function. METHODS: Adults living in the community were recruited for participation in the Minnesota Memory Project. Annual assessments included cognitive screening (Montreal Cognitive Assessment; MoCA), neuropsychological testing, physical measurements, and self-report inventories of health history and lifestyle characteristics. The AST, an optional sub-study, investigates sense of smell by asking participants to identify odors from scented felt-tipped markers. This sensitivity analysis examines the accuracy of the AST in detecting cognitive impairment using MoCA scores. RESULTS: Subjects who completed the AST (N=134) ranged in age from 50–92 (average 70) and were generally female (70.1%), white (98.5%), and without a diagnosis of memory loss (97.8%). The average MoCA score was 26.7 (SD 2.3) and the average AST total score was 8.6 (SD 4.2). Using a cutoff of 25 to indicate potential cognitive impairment, 31 of the subjects had low MoCA scores (23.1%). Total AST score (out of 20 trials) and minimum unirhinal score (out of 10 trials) were significantly worse in the low MoCA group. This group also tended to be older (mean 75.4) and have fewer females (55.8%). Both AST scores significantly predicted the MoCA group, accounting for 8-10% of the variance in MoCA group status. ROC curve results demonstrated that the AST minimum unirhinal score may be a slightly better predictor of MoCA group than AST total score (AUC=0.646 and 0.668, respectively). CONCLUSIONS: Results suggest that the AST is a potential screening tool for cognitive impairment. The Minnesota Memory Project will continue to collect longitudinal data on participants in an increased capacity for testing this association.

Heller SK, Cannon CP, Howitt H, Khunti K, **Bergenstal RM**, White WB, EXAMINE Investigators. Alogliptin in triple therapy with metformin and sulfonylureas provides significant reductions in HbA1c and is well tolerated: an analysis from the EXAMINE Trial [abstract]. *Diabetes*. 2016 Jun;65(Suppl 1):A301. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

Patients with type 2 diabetes (T2D) often require multiple therapies to achieve glycemic control. There has been no study evaluating alogliptin (ALO) when added to metformin (MET) and a sulfonylurea (SU). We performed a post hoc analysis of the EXAMINE trial to evaluate the anti-hyperglycemic efficacy and safety of the addition of ALO to T2D patients on existing MET and SU in this study. A substantial population in EXAMINE entered on dual therapy with MET and SU (N=1,398; ALO=693, placebo (PBO) =705) and were followed for up to 40 months (median 18 months). Investigators were allowed to change therapies according to local standard of care, including the existing dose of MET and SU. The type/dose of MET and of SU were neither standardized nor controlled. In this subgroup, 550 ALO and 505 PBO patients persisted to study end without addition of other anti-hyperglycemic therapy. For all patients on MET+SU at baseline characteristics were similar for ALO and PBO groups (mean HbA1c, 8.14%). Changes from baseline for HbA1c observed in these subgroup analyses were as follows: (1) all patients randomized on baseline MET+SU: -0.38% ALO vs. +0.14% PBO, LS mean difference for change from baseline of HbA1c at last visit -0.52% (p<0.001); (2) patients persisting on MET+SU without addition of other glycemic therapies: -0.43% ALO vs. +0.15%, LS mean difference -0.56% (p<0.001), and for the overall EXAMINE study population (-0.33% ALO vs. 0.03% PBO, LS mean difference -0.36% p < 0.001). The ALO and PBO groups did not differ in the percentage of patients with  $\geq 1$  adverse event (AE) (75.2% ALO and 79.6% PBO) or serious AEs (28.3% ALO and 32.1% PBO). There was no significant difference in the incidence of any report of hypoglycemia (8.8% ALO and 6.7% PBO, p=0.161) or serious hypoglycemia (1.30% ALO and 0.43% PBO, p=0.088). These data demonstrate that triple therapy with MET, SU and ALO in this double blind trial was effective and well tolerated.

**House CM, Moriarity KA, Nelson WB.** The incidence and doppler echocardiographic characteristics of normally functioning mitral prostheses with mean gradient  $\geq 10$  mm Hg [abstract]. *J Am Soc Echocardiogr*. 2016 Jun;29(6):B50. [Presented at the *American Society of Echocardiography (ASE) 27th Annual Scientific Sessions*, Seattle, WA, Jun 2016.]

INTRODUCTION: A prosthetic mitral valve mean gradient  $\geq 10$  mm Hg is considered abnormal. While these prostheses are often dysfunctional secondary to obstruction or insufficiency, occasionally they are

found to be functioning normally on further imaging. METHODS: 41 consecutive patients with a prosthetic mitral valve and mean gradient  $\geq 10$  mm Hg were identified between December 2009 and August 2015. Patients without subsequent transesophageal echocardiography, fluoroscopy, surgical procedure or transthoracic echocardiography confirming normal prosthesis function or dysfunction were excluded. The remaining cohort of 30 patients were then classified as obstruction, insufficiency, or normal; high gradient. A comparison group of 25 patients with a mean transprosthetic gradient  $\leq 5$  mm Hg (low-gradient group) was also identified. Statistical comparisons were performed. RESULTS: Of the 30 patients, 7 (23%) had obstruction, 8 (27%) had significant valvular or perivalvular insufficiency, and 15 (50%) were deemed normal high gradient. Patients with obstruction had a significantly higher mean gradient compared to the insufficiency or normal high-gradient groups ( $p$ -value = 0.001). Net atrioventricular compliance (Cn) was reduced ( $\leq 4$  ml/mm Hg) in all three groups, with a mean gradient  $\geq 10$  mm Hg compared to the low-gradient group (obstruction =  $2.2 \pm 0.6$  ml/mm Hg; insufficiency =  $1.3 \pm 0.3$  ml/mm Hg; normal high gradient =  $2.4 \pm 1.1$  ml/mm Hg; low-gradient group =  $5.2 \pm 2.3$  ml/mm Hg). All patients with obstruction had a pressure half-time (PHT) value  $\geq 130$  msec, while no other patient had a PHT  $\geq 130$  msec. Effective orifice area index (EOAi) differed significantly among the three groups, with a mean gradient  $\geq 10$  mm Hg ( $p$ -value  $\leq 0.0001$ ), with the normal high-gradient group having the largest EOAi values; their EOAi values were still quite small, though (EOAi =  $0.8 \pm 0.2$ ). Receiver operator characteristic curves found that EOAi, EOA, and VTI Ratio distinguished normal from abnormal prosthesis function in patients with mean gradients  $\geq 10$  mm Hg (area under curve = 0.92, 0.86, and 0.82, respectively). Cardiac index was significantly higher for the normal high gradient group ( $3.5 \pm 0.9$  L/min/m<sup>2</sup>) compared with all other groups ( $p = 0.001$ ). CONCLUSION: These data suggest that at least a third of all individuals with a mean transprosthetic mitral gradient  $\geq 10$  mm Hg will have a normally functioning prosthesis. These patients will likely have a small EOAi and reduced Cn, along with a relatively increased cardiac index. Echo variables are useful to distinguish those with a normal mitral prosthesis despite a mean gradient  $\geq 10$  mm Hg.

Kene M, Carpenter D, Vinson DR, Ballard D, Rauchwerger AS, **Kharbanda EO**, Kharbanda AB. Pediatric appendicitis: trends in emergency department imaging and outcomes in the community setting, 2010-2015 [abstract]. *Ann Emerg Med.* 2016 Oct;68(4 Suppl):S82-3. [Presented at the *American College of Emergency Physicians (ACEP) Research Forum*, Las Vegas, NV, Oct 2016.]

OBJECTIVE: Imaging studies in emergency department (ED) evaluation of pediatric appendicitis are obtained not only for diagnosis but to identify perforation and avoid negative appendectomy (NA). While imaging rates increased over the last decade in adults and children, perforation rates decreased only among adults. We sought to describe trends in imaging and to identify predictors of NA and perforation in pediatric ED patients with acute appendicitis. METHODS: This retrospective cohort study included ED patients aged 2-17 years who underwent non-incidental appendectomy in a 21-hospital health care system from 2010-2015. Patients with appendicitis, appendectomy, NA and perforation were identified using ICD-9 codes. We evaluated patient characteristics associated with imaging (ultrasound [US] or CT) for patients with a single study. Demographics, laboratory data and facility level variables were included. Proportions were compared using the chi-squared test, continuous values with the Wilcoxon-Mann-Whitney nonparametric test. To identify predictors of NA and perforation, we performed a bivariate analysis of patient characteristics, then constructed three age-stratified multivariable models (age 2-5 years, 6-10 years, and 11-17 years) for each outcome. RESULTS: Overall, 4320 patients met inclusion criteria. The proportion without imaging decreased from 29% in 2010 to 6% in 2015 and with multiple studies (CT and US) increased from 8% to 24%. The proportion with CT decreased from 47% to 30% and US increased from 16% to 40%. Increased CT utilization was associated with ED arrival between 12 a.m.-8 a.m., body weight  $>90$ th percentile, older age and higher white blood cell (WBC) count, while US was associated with clinic visit  $>72$  hours before the ED visit and shorter ED length of stay (LOS), see Table. Facility capacity for pediatric surgery was not associated with imaging choice. The NA rate ranged from 4.5% to 7.8%, while the perforation rate ranged from 16%-18% over the study period. Race did not alter the odds of perforation or NA. In the three multivariable regression models, NA odds decreased for WBC count  $>10,000$ , referent WBC count 10,000 (2-5 years adjusted odds ratio [AOR] 0.2, 95% CI 0.1-0.6; 6-10 years AOR 0.4, 95% CI 0.2-0.9; and 11-17 years AOR 0.3, 95% CI 0.2-0.5), while odds of perforation increased for WBC count  $>10,000$  only in 6-10 years (AOR 1.9, 95% CI 1.0-3.4) and 11-17 years (AOR 4.2, 95% CI 2.5-7.2). CONCLUSION: Fewer pediatric patients underwent appendectomy without imaging, but NA and perforation rates did not change over the study period. In a community ED setting, age,

weight, and ED arrival time were predictive of CT utilization for diagnosing appendicitis, although US was associated with shorter LOS. Elevated WBC count increased the odds of perforation among older children and decreased the odds of NA among all age groups. Race did not alter the odds of perforation, unlike other studies, perhaps due to differences in access, as all patients in our cohort were part of the health care system. Our results support the use of WBC count as a candidate predictor for outcomes in appendicitis, adding to its current use in appendicitis risk scores.

Kollitz KM, Tomhave W, **Van Heest AE**, Moran SL. A direct measure of thumb use in children after index pollicization for radial longitudinal deficiency [abstract]. *J Hand Surg.* 2016 Sep;41(9 Suppl):S33. [Presented at the *American Society for Surgery of the Hand (ASSH) 71st Annual Meeting*, Austin, TX, Oct 2016.]

**HYPOTHESIS:** The assumption that good performance on dexterity and strength measures is correlated with use of the new thumb after index pollicization for congenital thumb hypoplasia has not previously been tested. The Thumb Grasp and Pinch assessment (T-GAP) is a new measure of thumb use that classifies grasp patterns used by children after index pollicization in age-appropriate activities of daily living. We hypothesize that thumb use and hand dexterity/strength are related but not equivalent; therefore, we hypothesize low to moderate correlation between T-GAP scores and standard dexterity and strength outcome measures. **METHODS:** Prospectively collected data from children with congenital thumb hypoplasia treated with index pollicization were reviewed. Standard outcomes measures included strength, range of motion, the Box and Blocks test (BBT), the Nine Hole Peg test (9HP), and the Functional Dexterity Test (FDT). Patients also completed the T-GAP consisting of 9 age-appropriate tasks designed to elicit specific hand and thumb use patterns. Grasp and pinch style were scored as follows: Palmar grasp without thumb (1 point); scissors between two most ulnar digits (2 points); scissors between radial digits (no thumb; 3 points); palmar grasp with thumb (4 points); key pinch (5 points); tip pinch (6 points); thumb to index and long (7 points). Scores for each task were summed to produce a final T-GAP score. Spearman correlation coefficients were calculated to describe the relationship between T-GAP scores and standard outcomes measures. **RESULTS:** Twenty-two patients were included in the study. T-GAP score was significantly correlated with scores on the BBT ( $R = 0.59$ ), NHPT ( $R = 0.66$ ), and FDT ( $R = 0.70$ ) ( $P < 0.02$  for all, Table 1). T-GAP score was also significantly correlated with tripod pinch, key pinch and grip strength ( $R = 0.75, 0.51, \text{ and } 0.55$  respectively) and with opposition and grasp span ( $R = 0.59 \text{ and } 0.70$ ) ( $P < 0.05$  for all, Table 2). **CONCLUSIONS:** The T-GAP effectively measures the complex active use of the pollicized digit during activities that require a variety of grasp and pinch styles. T-GAP score was correlated with strength, range of motion, and all 3 dexterity measures (BBT, 9HP, FDT). These correlations provide evidence for concurrent validity and construct validity of the T-GAP. Intermediate correlations imply that the T-GAP and standard dexterity tests measure related but distinct aspects of dexterity. The varied grasp and pinch styles employed by children with congenital thumb hypoplasia are not entirely captured by standard dexterity outcome measures, which are based on speed and allow any pinch pattern to be used, including those without use of the thumb.

Kugler KC, Downs DS, **Sherwood NE**, Spring B. Optimization of behavioral interventions: three real-world applications [abstract]. *Ann Behav Med.* 2016 Mar;50(Suppl 1):S162. [Presented at the *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions: Behavioral Medicine at a Crossroads: 21st Century Challenges and Solutions*, Washington DC, Apr 2016.]

Recently, there is an emerging new approach, inspired by engineering principles, to the development of multicomponent behavioral interventions. This approach requires interventions to first be optimized to meet a specific criterion (e.g., only include active components, implement for less than some specified amount of money, select the best set of tailoring variables for an adaptive intervention) before they are evaluated. The talks in this symposium showcase three different applications to optimization of behavioral interventions and discuss the lessons learned to date. The first talk details the study design and initial results from the optimization of a multicomponent intervention to identify a cost-effective weight loss intervention. This talk highlights the flexibility of a factorial design for optimization. The second talk provides the rationale for using a sequential multiple assignment randomized trial, or SMART, to optimize an adaptive intervention for weight loss management. This study seeks to identify the best time to intervene with non-responders and the relative efficacy of two treatments to address self-regulation

challenges. The third talk describes the application of control engineering principles to optimize an intensive adaptive intervention to efficiently manage gestational weight gain. This study demonstrates how dynamical systems modeling of weight gain related to energy intake, physical activity, and planned/self-regulatory behaviors can be used to adapt intervention dosages to pregnant women. As a whole, this symposium will demonstrate how this emerging approach is currently being used in real-world settings to optimize behavioral interventions. These studies were funded by three different institutes, suggesting increased interest in optimizing behavioral interventions across different public health outcomes. The discussant, who has extensive expertise in behavioral interventions, will provide insight from NIH about the funding climate for using this emerging approach.

**LaFleur NA, Barringer KW, Isenberger KM, Salzman JG.** Do emergency department blood cultures influence antibiotic therapy in patients diagnosed with sepsis [abstract]? *Acad Emerg Med.* 2016 May;23(Suppl):S110. [Presented at the *Society of Academic Emergency Medicine (SAEM 2016) Annual Meeting*, New Orleans, LA, May 2016.]

**BACKGROUND:** Obtaining blood cultures prior to antibiotic administration in emergency department (ED) patients admitted with a diagnosis of sepsis has been considered standard of care and a cornerstone of the Surviving Sepsis guidelines. Several studies in other disease states, most notably pneumonia, have questioned the utility of this practice. **OBJECTIVES:** The objective of this study is to determine the impact and clinical relevance of routine blood cultures obtained in the ED for patients with the diagnosis of sepsis, severe sepsis, or septic shock. **METHODS:** We performed a retrospective analysis of consecutive adult patients (age 18 and older) diagnosed and treated for sepsis in an urban, academic ED between 09/2014 - 02/2015. Inclusion criteria were admission through the ED and clinical diagnosis of sepsis with routine blood cultures obtained prior to initiation of antibiotics. Blood cultures were classified as positive, negative, or contaminant. Additionally, a physician reviewed individual charts for antimicrobial sensitivities, inpatient documentation, and timing of antibiotic therapy changes in correlation with true positive blood culture results. **RESULTS:** There were 194 patients admitted through the ED with blood cultures obtained and meeting the above criteria. Of these, 45 of 194 patients (23.2%) had evidence of positive blood cultures, with 30 of the 45 positive blood cultures (15.4%) resulting in true bacteremia. Blood culture results altered antibiotic therapy in 15 patients (7.7%). Diagnoses included indwelling lines or hardware (5), pneumonia (4), complicated UTI (4), and 2 patients with possible endocarditis. For the other 15 patients with bacteremia whose therapy was not altered, cultures from other sources were positive during admission (urine, vaginal cultures, surgical cultures, etc). **CONCLUSION:** Blood cultures obtained in patients admitted with the diagnosis of sepsis from the ED altered antibiotic therapy in 7.7% of patients. Bacteremia secondary to indwelling catheters/devices and pneumonia patients on ICU status resulted in 60% of these cases. Additional studies are needed to further delineate which ED patients admitted with the diagnosis of sepsis would benefit from blood cultures.

**Lerner RE, Shapiro AC, Richter SA, Craft CE, Menge MR, Zylla DM, Fewer LJ, Ehresman M, Barnett AM, Holasek L.** Medical scribes in a community oncology clinic [abstract]. *J Clin Oncol.* 2016;34(Suppl):Abstract 6585. [Poster at the *American Society of Clinical Oncology (ACSO) 2016 Annual Meeting*, Chicago, IL, Jun 2016.]

**BACKGROUND:** Recent reports have suggested that scribes may improve clinician satisfaction, productivity, and clinic-related efficiencies while maintaining patient satisfaction; however, there is limited data on the use of scribes in the oncology setting. **METHODS:** This quality-improvement project assessed the practical and financial feasibility of using medical scribes in a community cancer center. Three oncologists utilized scribes for a six-month period. Physician productivity, timeliness and quality of physician electronic health-record (EHR) documentation, patient and physician satisfaction, and overall costs were measured and compared to the same time period for the previous year. Data were extracted and summarized from the EHR data warehouse. Patient and provider satisfaction were surveyed by questionnaire; quality of clinical documentation was evaluated by independent blinded reviewers for best practices. **RESULTS:** Physician average work RVU's per clinic day did not change, but average number of new patient visits/day/physician increased by 29% (from 1.4 to 1.8). After scribe implementation, nearly all encounters were closed within 30 days of the visit (83% pre to 99.8% post). Participating oncologists showed marked improvements in satisfaction with the amount of time spent with patients, ability to

complete documentation, and in their work-life balance compared to non-participating colleagues. Patient satisfaction was high at scribe implementation and remained so through the study period. For patients who had a scribe, 90% were comfortable having a scribe present. Based on scored elements from institutional note optimization guidelines, EHR note quality improved from 76% to 98%. **CONCLUSIONS:** The use of medical scribes in a cancer clinic was well accepted by patients and physicians. Physicians maintained productivity, increased access and improved their workplace quality of life. Timeliness and quality of documentation improved. These outcomes can provide financial and patient safety benefits for the broader health care organization. However, the use of scribes might be more costly than dictation or voice recognition software, and models for cost sharing should be explored.

**LeRoy JM, Boley SP, Engebretsen KM, Mackenzie RB, Stellpflug SJ.** EMF development of a porcine model of amlodipine toxicity [abstract]. *Ann Emerg Med.* 2016 Oct;68(4 Suppl):S128-9. [Presented at the *American College of Emergency Physicians (ACEP) Research Forum*, Las Vegas, NV, Oct 2016.]

**OBJECTIVES:** Despite aggressive interventions such as vasopressors and high-dose insulin, many patients with amlodipine toxicity succumb to refractory shock. Amlodipine-induced shock is unique in that its mechanism of action is theorized to occur not only through L-type calcium channel blockade but also via release of nitric oxide (NO) in the peripheral vasculature. Methylene blue, a NO scavenger, has been used clinically in amlodipine-induced refractory shock with its efficacy studied in only a single rat model. We designed a randomized, two-armed porcine study comparing methylene blue to norepinephrine therapy in amlodipine toxicity. Here, we describe the preparation of the study drug and a three-pig pilot study to define a toxic dose of amlodipine. **Methods:** Amlodipine preparation: 250 commercially obtained 10 mg amlodipine tablets were ground and mixed with 300 mL of dimethylsulfoxide (DMSO). This mixture was sonicated for 15 minutes, with the resulting product separated using vacuum filtration. This solution was then centrifuged and the supernatant collected. This was then diluted and placed in an ultraviolet-visible (UV/vis) spectrophotometer. The concentration was measured by determining absorption at 360 nm and then compared to a previously derived absorption versus concentration plot. **PILOT STUDY:** Three pigs were sedated, instrumented, and monitored according to an established porcine model that has been used for similar studies at our institution. Based on experience with porcine models of poison-induced shock, we administered a 2 mg/kg bolus of amlodipine followed by an infusion of 0.3 mg/kg/hr. The dose was adjusted in the subsequent pigs if a predefined point of toxicity was reached too quickly or not at all during the five-hour study period. Throughout the study period, hemodynamic and laboratory parameters were monitored. **RESULTS:** Amlodipine preparation: From a total of 2500 mg of amlodipine tablets, our procedure produced 300 mL of amlodipine dissolved in DMSO with a concentration confirmed by UV/vis spectroscopy of 6.9 mg/mL, an 83% yield. Pilot study: The first pig developed hypotension and death within fifteen minutes of the bolus infusion. We thus eliminated the bolus and initiated a more conservative drug infusion rate of 0.25 mg/kg/hour, increasing the infusion every 20 minutes up to 1 mg/kg/hour. This pig lived until the end of the five-hour protocol but only displayed mild evidence of amlodipine toxicity. The DMSO solvent was found to depolymerize the polyethylene and polyvinylchloride intravenous tubing, and much of the drug leaked. For the third pig, the drug was infused through a more durable polytetrafluoroethylene line. The same initial infusion rate was used, increasing the dose until desired effect. This animal had hemodynamic patterns consistent with our expectation of amlodipine toxicity using infusion rates of 2 to 5.5 mg/kg/hour. **CONCLUSION:** We piloted a porcine model of amlodipine toxicity for the purpose of studying a novel antidote. Amlodipine can be reliably extracted from tablets in a DMSO solution using a vacuum filtration procedure, and concentrations can be confirmed using UV/vis spectroscopy. IV line and catheter material must be considered when using DMSO as a solvent, as many plastics are not compatible with DMSO infusion. An infusion rate of 2 to 5.5 mg/kg/hour in a porcine model, without an initial bolus, will likely produce expected amlodipine toxicity.

Lighthart M, **Pawloski PA, Rehrauer DJ, Frail CK.** Retrospective analysis of a multidisciplinary antihypertensive protocol [abstract]. *J Manag Care Pharm.* 2016 Apr;22(4 Suppl):S5. [Poster at the *AMCP (Academy of Managed Care Pharmacy) Managed Care & Specialty Pharmacy Annual Meeting*, San Francisco, CA, Apr 2016.]

MacNeill LT, Dobrzynski T, Cromer M, Riggs G, Mayne M, **Salzman JG.** Impact of the NAEMSP guidelines for spinal immobilization and long backboard application on usage rates between 2010 and

2014 [abstract]. *Prehosp Emerg Care*. 2016 Jan-Feb;20(1):164. [Poster at the *National Association of EMS Physicians (NAEMSP) Scientific Assembly*, San Diego, CA, Jan 2016.]

**BACKGROUND:** Previous research has demonstrated that use of the long backboard for spinal immobilization in trauma patients may cause more harm than good, prompting the release of the 2013 NAEMSP/ACS Committee on Trauma joint position statement on long backboard and cspine immobilization usage. This study evaluated whether the release of this position statement impacted the rates of long backboard and ccollar usage. **METHODS:** This study was a retrospective review of prospectively collected data from paramedic, AEMT, and EMT students entering data into Fisdap, a database of prospectively reported clinical field experiences. Inclusion criteria included student consent to research, data validated by preceptor as good data, and patient encounter dates between 2010 and 2014. Change in the rate of long backboard and ccollar use per year was analyzed using logistic regression. **RESULTS:** A total of 1,105, 818 runs (2010 = 202, 858, 2011 = 216,980, 2012 = 265,403, 2013 = 253,718, 2014 = 166,859) met inclusion criteria. Rate of long backboard use decreased from 7.90% in 2010 to 1.73% in 2014, resulting in a 30% decrease in long backboard use year over year (OR = 0.70, 95% CI = 0.690.70). Rate of ccollar use decreased from 8.25% in 2010 to 3.95% in 2014, which was an 18% year-over-year decrease. When the years were grouped into pre (2010-2012) and post (2013-2014) position statement time periods, there was a much faster year-over-year reduction in usage rates for long backboards (OR = 0.5899; 95% CI: 0.56480.6161) and ccollar spinal immobilization (OR: 0.7871; 95% CI: 0.76350.8114) in the post position statement time period. **CONCLUSION:** The rate of long backboard and ccollar spinal immobilization has been declining since 2010, which included time prior to the release of the 2013 position statement paper. Release of the position statement appears to have accelerated the decrease in rates of long backboard and ccollar immobilization compared to the preposition paper period.

Manasse S, Forman EM, **Sherwood NE**, Mama SK, Magidson J. Uncle Sam wants you to get an NIH training grant: Everything you need to know about applying for pre-doctoral grant funding [abstract]. *Ann Behav Med*. 2016 Mar;50(Suppl 1):S56. [Presented at the *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions: Behavioral Medicine at a Crossroads: 21st Century Challenges and Solutions*, Washington DC, Apr 2016.]

Pre-doctoral grant funding from the National Institutes of Health (e.g., Ruth L. Kirschstein National Research Service Award; F31s) can set the stage for a productive research career by providing rich training experiences, giving the recipient the independence necessary to conduct high-impact research, and demonstrating the recipient's potential to obtain future NIH funding. However, such funding is difficult to secure, and in-depth guidance for students and mentors in the application process is limited and vague. This panel will focus on topics of interest for those who may be interested in applying for or serving as a mentor on applications for pre-doctoral NIH funding. Session panelists include those who have successfully attained NIH pre-doctoral funding (including F31s and dissertation awards across NIMH, NIDA, and NINR), served as mentors for NIH pre-doctoral training fellowships, and reviewed NIH training fellowship applications. Panel members will take questions from the audience throughout the presentation and for the last 10 minutes. Topics include:

- 1) Considerations regarding the decision to apply for pre-doctoral funding (e.g., timing, pros and cons, enhancing competitiveness)
- 2) The grant writing process (e.g., integrating research and training plans, putting together a mentorship team, discussion of examples of funded proposals)
- 3) The review process (e.g., scoring criteria, characteristics of good applications from a reviewer perspective)
- 4) Successful mentorship of training fellowship applications (e.g., how to be an effective mentor during the process)

**Mullen DM, Bergenstal RM.** Novel pattern identification through standardized data display using the ambulatory glucose profile (AGP) report [abstract]. *Diabetes Technol Ther*. 2016 Feb;18(Suppl 1):A94-5. [E-poster at the *Advanced Technologies & Treatments for Diabetes (ATTD 2016) International Scientific Meeting*, Milan, Italy, Feb 2016.]

**BACKGROUND/AIMS:** Lack of a common glucose report, streamlined data acquisition, and aggregated reports across devices lead to difficulty fully using the data available and frustration among clinicians and patients. The IDC developed an endorsed standardized report that can be used across all glucose devices called the Ambulatory Glucose Profile (CapturAGP).

**AIMS:**

- 1) Evaluate streamlined, standardized cloud-based glucose reporting using CapturAGP™ software and report
- 2) Assess patient and clinician preferences regarding the AGP report, including presentation of glucose data, standardized terminology and utility in diabetes management

**METHOD:** Seven diverse clinical sites were recruited representing different practice styles from across the United States, all with large Type 1 DM populations (n = 140 patients and 17 clinicians). The study included EMR integration, time in motion, workflow mapping and surveys of all patients/families and clinicians. **RESULTS:** Patients reported better understanding of glucose patterns by using the AGP (CGM users 70%; SMBG users 64%). Patients also reported that with the AGP they saw new trends and patterns (SMBG 90%; CGM 92%). Clinicians reported that the AGP report, when compared to other data sources, was best at helping educate patients about glucose patterns (89%) and for helping the clinicians see patterns (84%). **CONCLUSION:** A standardized glucose report that aggregates results from multiple devices streamlines clinical processes. Patients/families, and clinicians reported that they could clearly see glucose patterns using the AGP. Expedient glucose pattern recognition allows valuable clinical visit time to be spent in shared decision-making conversations rather than in data collection/interpretation.

**Nelson JG, Simon HM, Schnitker CK, Wewerka SS, Mischel-Abramowski E.** Cost-effectiveness of faculty physician incentives for resident feedback [abstract]. *Ann Emerg Med.* 2016 Oct;68(4 Suppl):S39-40. [Poster at the *American College of Emergency Physicians (ACEP) Research Forum Educational Program*, Las Vegas, NV, Oct 2016.]

**BACKGROUND/AIMS:** EM residents in the United States must attain pre-determined educational milestones set forth by the ACGME for graduation. Faculty-generated feedback has been shown to improve residents' progression toward these ends. Unfortunately, feedback quality has often been lacking in residency education. Our EM residency introduced cards completed by faculty at end of shift to highlight and hopefully improve direct feedback given to residents, but initial use by faculty was inconsistent. In response to resident-perceived deficiencies in end-of-shift feedback, small annual financial incentives were offered for improved percentage of end-of-shift cards completed (as a proxy for feedback quantity) as well as resident-rated quality of each faculty physician's end-of-shift feedback. The aim of this study was to determine if faculty-directed financial incentives improved shift card completion percentage and resident-perceived quality of faculty-to-resident feedback. **METHODS:** In this IRB-approved retrospective observational study, feedback was compared pre- and post-implementation of a financial bonus policy. Eligible faculty were employed throughout a one-year time period before and after implementation of the incentive (n=24). Quantity of feedback was calculated as the number of cards completed per shift worked with at least one resident. Quality of feedback was determined from annual surveys asking residents to rate the quality of feedback received from each faculty member over the previous year on a scale from 1-9. The average faculty score before and after incentive implementation was determined and compared. **RESULTS:** Mean percentage of shift cards completed was significantly higher postincentive (M = 129.51%, SD = 42.82) compared to pre-incentive (M = 26.54%, SD = 41.69), p < .01. Mean resident-perceived feedback quality scores were similar preincentive (M = 7.52, SD = 0.63) and post-incentive (M = 7.71, SD 0.57), p = 0.66. **CONCLUSION:** This financial incentive is associated with significantly increased quantity of end-of-shift card completion but no difference in resident-perceived quality of end-of-shift feedback.

**Ness WL, Holland MA, Johnston D, Giordana MD, Kroon SK, Hurley RW.** From novice to expert: simulation-based learning raises confidence and competency levels of oncology nurses in chemotherapy-biotherapy administration [abstract]. *Oncol Nurs Forum.* 2016 Mar;43(2):25. [Presented at the *Oncology Nursing Society (ONS) 41st Annual Congress*, San Antonio, TX, May 2016.]

With recent advancements in the use of technology, simulation training provides a safe environment to enhance skills. Chemotherapy administration is considered high-risk; therefore, simulation-based

education and competency may provide value in ensuring that the oncology nurse is extensively trained on the safe administration of chemotherapy. We piloted a feasibility study using simulation-based learning to improve nurses' confidence, knowledge, and skills in 4 core areas, including chemotherapy/biotherapy administration, management of chemotherapy/biotherapy hypersensitivity reactions, management of chemotherapy extravasations, and management of chemotherapy spills. The secondary objective was to measure the impact of simulation training and competency on chemotherapy near misses and errors one year pre and post implementation. A baseline survey and online education were required. The nurses then received live education in the four core areas over three hours utilizing interactive simulation mannequins. Simulation-based competencies were conducted within two months of training and nurses were required to complete the competency within 90 minutes in three core areas (excluding spills). We measured self-rated confidence in the four core areas at baseline, three months, and nine months using a five-point continuous scale from extremely NOT confident to extremely confident. A total of 40 oncology nurses completed the interactive simulation-based competency. At baseline, 57.6% rated themselves as confident or extremely confident in the four core areas versus 97.06% at 3 months. In regards to chemotherapy extravasations, 26.19% rated themselves as confident or extremely confident at baseline vs 94.12% at the 3 months post survey. Furthermore, self-reported confidence in skills as an oncology nurse improved from baseline with 65.12% reporting confident or extremely confident in skills vs 95.83% at 8 months. Interactive skill-based education utilizing a simulation mannequin improved the confidence, knowledge, and skills of the oncology nurses. Secondary endpoints on the impact of enhanced training and competencies on chemotherapy errors and near misses will be evaluated at 1 year pre and post implementation. There is limited information in the literature with oncology-based simulation competencies; our data demonstrates the utility of the program in improving oncology nursing confidence and skills.

**O'Connor PJ, Parker ED, Sinaiko AR, Kharbanda EO, Margolis KL, Daley MF, Trower NK, Sherwood NE, Greenspan LC, Lo JC, Magid DJ.** Relation of change in weight status to the development of hypertension in children and adolescents [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):181. Project: A08-087 Pediatric Hypertension. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** This study examined the association of body mass index (BMI) percentile and change in BMI percentile to change in blood pressure (BP) percentile and development of hypertension in children and adolescents. **METHODS:** This retrospective cohort included 101,725 subjects aged 3.17 years from three health systems across the United States. Height, weight, age, sex and BP measures were extracted from electronic health records, and then age/ sex/height-adjusted BP percentiles and BMI percentiles were computed. Mixed linear regression estimated change in systolic BP percentile, and proportional hazards regression was used to estimate risk of incident hypertension associated with BMI percentile and change in BMI percentile. **RESULTS:** The largest increases in BP percentile were observed among children and adolescents who became obese or maintained obesity. Over a median 3.1-year follow-up, 0.4% of subjects developed hypertension. Obese children aged 3.11 had 3.5-fold increased risk of developing hypertension compared with children of normal weight. Obese adolescents aged 12-17 had a 3.2-fold increased risk of developing hypertension compared with children of normal weight. Children and adolescents who stayed obese had a 5.4- and 4.8-fold increased risk of developing hypertension, respectively, compared with those who maintained a normal weight. Children who became obese and adolescents who became overweight had a 2.6- and 2.3-fold increased risk of developing hypertension, respectively. **CONCLUSION:** We observed a strong, statistically significant association between increasing BMI percentile and increases in BP percentile, with risk of incident hypertension primarily associated with obesity. The adverse impact of weight gain and obesity in this young cohort over a short period of time underscores the need for effective strategies for prevention of overweight and obesity in youth to slow progression toward diabetes and cardiovascular disease later in life.

**O'Connor PJ, Sperl-Hillen JM, Asche SE, Crain AL, Ekstrom HL, Margolis KL.** Design features of successful outpatient chronic disease care clinical decision support systems [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):190. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** To identify key design features of point-of-care diabetes clinical decision support (CDS) that have high use rates and high provider satisfaction rates and that have improved control of major cardiovascular risk factors. **METHODS:** Based on a series of National Institutes of Health-funded projects to develop point-of-care electronic health record-linked, web-based CDS systems, we have identified design features that contribute to observed high use rates (60.80%) at targeted visits, high primary care provider satisfaction rates (94.95%) and positive effects on glucose and blood pressure control in adults with diabetes. **RESULTS:** The ideal outpatient chronic disease care CDS system would include the following features: a) co-designed by primary care physicians (PCPs) and researchers; b) supported by clinic and medical group leaders; c) designed to improve publicly reported quality measures; d) introspective identification of targeted encounters; e) total target encounters limited to about 20% of all adult visits; f) rooming nurse launches CDS early in encounter workflow; g) PCP sees CDS early in workflow and uses for visit planning; h) patient reviews CDS before PCP enters room; i) simple visual display of potential benefits for patients; j) prioritization of treatment options based on potential benefit to patient; k) automated feedback to PCP and clinics on CDS use rates at targeted encounters; l) compensation to clinics to cover training costs; m) location of algorithms in web service to facilitate updates and scalability; and n) built-in SmartSet to facilitate clinical actions. **CONCLUSION:** These design features may inform future iterations of chronic disease CDS systems.

**O'Connor PJ, Sperl-Hillen JM, Crain AL, Ekstrom HL, Margolis KL.** Eliciting patient treatment preferences using a clinical decision support system [abstract 1252-P]. *Diabetes*. 2016 Jun;65(Suppl 1):A328. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

CV Wizard is a web-based EHR-integrated point-of-care clinical decision support (CDS) system that presents personalized cardiovascular (CV) risk information to primary care providers (PCP) and patients in both a low numeracy and high numeracy format. Here we report PCP perspectives on how this CDS system affected shared decision making and patient-centered care. Twenty clinics were randomized to either usual care (UC) or use of the CDS system with diabetes or high reversible cardiovascular risk adults. The CDS system targeted 20% of office visits, and was used at 70-80% of targeted visits over a 2-year period. Consented providers (n=102) were surveyed at baseline and 18 months after implementation. Corrected survey response rates were 90% at baseline and 82% at follow-up.

Generalized linear mixed models were used to compare UC and CDS responses to common questions at baseline and follow-up, and CDS users were queried on their perceptions of the CDS system at follow-up only. Compared to UC, PCPs in the CDS group reported increased follow-up rates of CV risk calculations while seeing patients (73% vs. 28%, p=.006), being better prepared to discuss CV risk reduction priorities with patients (98% vs. 78%, p=.03), providing accurate advice on aspirin for primary prevention (75% vs. 48%, p=.02), and more often discussing CV risk reduction (60% vs. 30%, p=.06). PCP users reported that the CDS system improved CV risk factor control (98%), saved time talking to patients about CV risk reduction (93%), efficiently elicited patient treatment preferences (90%), was useful for shared decision making (95%), influenced treatment recommendations (89%), and helped initiate CV risk discussions (94%); 85% of PCPs reported that their patients liked CV Wizard. The CV Wizard CDS system was successfully integrated into the workflow of primary care visits with high sustained use rates, high PCP satisfaction, high patient satisfaction, and positive impacts on shared decision making and patient-centered care.

**O'Connor PJ, Sperl-Hillen JM, Crain AL, Ekstrom HL, Margolis KL.** Randomized trial of a diabetes clinical decision support system: use rates, provider satisfaction, and impact on clinical outcomes [abstract]. *Diabetologia*. 2016 Aug;59(Suppl 1):S424. [Presented at the *European Association for the Study of Diabetes (EASD) 52nd Annual Meeting*, Munich, Germany, Sep 2016.]

**BACKGROUND/AIMS:** CV Wizard is a web-based electronic health record (EHR)-integrated point-of-care clinical decision support (CDS) system that presents personalized cardiovascular (CV) risk information to primary care providers (PCPs) and patients in both a low numeracy and high numeracy format. Here, we report use rates, PCP satisfaction, and impact of the CDS system on clinical outcomes of eligible diabetes patients. **MATERIALS AND METHODS:** Nineteen primary care clinics with 7035 eligible diabetes patients with high CV risk were randomly assigned to either usual care (UC) or use of the CDS

system. This CDS system identifies target high-risk patients and provides prioritized and personalized EHR-linked, web-based CDS for management of glucose, BP, lipids, tobacco, weight, and aspirin to both the PCP and the patient at the point of care. Consented providers (n=102) were surveyed at baseline and 18 months after implementation, with survey response rates of 92% at baseline and 80% at follow-up. EHR data and multilevel regression models were tested for differential trends in CV risk among patients at UC and CDS clinics. RESULTS: The CDS system was used at 70-80% of targeted visits made by diabetes patients. Compared to UC, PCPs in the CDS group reported increased use of CV risk calculation while seeing patients (73% vs. 28%, p=.006), being more prepared to discuss CV risk reduction priorities with patients (98% vs. 78%, p=.03), being more able to provide accurate advice on aspirin use for primary prevention (75% vs. 48%, p=.02), and more frequent discussion of CV risk reduction with patients (60% vs. 30%, p=.06). PCPs at CDS clinics reported that the CDS system improved CV risk factor control (98%), saved time talking to patients about CV risk reduction (93%), efficiently elicited patient treatment preferences (90%), was useful for shared decision making (95%), influenced treatment recommendations (89%), and helped initiate CV risk discussions (94%); 85% of PCPs reported that their patients liked CV Wizard. During the 14-month period when the final CDS intervention was in place, CV risk declined 0.2% per visit for diabetes patients at UC clinics and 0.6% per visit for diabetes patients at CDS intervention clinics. CONCLUSION: In a randomized trial, the CV Wizard CDS system was successfully integrated into the workflow of primary care visits, with sustained use rates of 70-80% at targeted clinic visits, high PCP satisfaction, perceived positive impact on shared decision making and patient-centered care, and a favorable effect on CV risk factor control.

**O'Connor PJ, Sperl-Hillen JM, Crain AL, Margolis KL, Rush WA, Desai JR, Ekstrom HL.**

Comparative effectiveness of two diabetes clinical decision support systems on cardiometabolic outcomes and CV risk: randomized trial [abstract 2304-PUB]. *Diabetes*. 2016 Jun;65(Suppl 1):A581. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

CMS and others are encouraging medical groups to reduce CV risk in diabetes patients and other high risk adults. Electronic health record (EHR)-linked point of care Clinical Decision Support systems (CDS) can support this effort, and basic EHR-linked CDS that provides patient-specific treatment recommendations has previously been shown to significantly improve glucose and some aspects of BP control in diabetes patients. To compare the performance of this basic CDS versus an enhanced CDS system (with prioritized CDS to both patient and provider), we group randomized 6561 adults with diabetes to receive basic versus enhanced CDS. Over a median of 14 months of follow-up, Framingham 10-year absolute risk of fatal or nonfatal heart attack or stroke declined from 27.8% to 24.8%, and Framingham reversible CV risk (net of age and sex) declined from 12.6% to 9.6%. The proportion of subjects achieving goals increased for BP (40.7% to 78.3%), LDL (55.8% to 71.1%), and A1c (68.4% to 72.4%), and smoking declined from 29.4% to 23.4%. We conclude that enhanced CDS was not superior to basic CDS, but that both CDS systems were associated with sustained clinically and statistically ( $p < .05$ ) significant reduction in CV risk in diabetes patients.

**O'Connor PJ, Sperl-Hillen JM, Desai JR, Margolis KL.** Designing outpatient diabetes care clinical decision support systems for high use rates [abstract 2309-PUB]. *Diabetes*. 2016 Jun;65(Suppl 1):A582. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

To identify key design features of point-of-care diabetes clinical decision support (CDS) that have high use rates, high provider satisfaction rates, and have improved control of major CV risk factors. Based on a series of NIH-funded projects to develop point-of-care Electronic Health Record (EHR)-linked Web based clinical decision support systems, we have identified design features that contribute to observed high use rates (60-80%) at targeted visits, and high primary care provider (PCP) satisfaction rates (94-95%), and positive effects on glucose and blood pressure control in adults with diabetes. Key features of successful outpatient chronic disease care clinical decision support system include the following: (a) co-designed by PCPs and researchers, (b) supported by clinic and medical group leaders, (c) designed to improve publicly-reported quality measures, (d) introspective identification of targeted encounters, (e) target patients with potential for substantive clinical benefit, (f) have rooming nurse launch CDS early in

encounter workflow, (g) have PCP see CDS early in workflow for visit planning, (h) have patient review CDS before PCP enters room, (i) simple visual display of potential benefits for patients, (j) prioritization of treatment options based on potential benefit to patient, (k) ongoing feedback of CDS use rates to PCP and clinics, (l) compensate clinics to cover training costs, (m) locate algorithms in Web service to facilitate updates and scalability, (n) build in EHR order sets to facilitate clinical actions. These CDS design and implementation features are generally associated with high use rates, high PCP satisfaction rates, and clinical improvement. However, tailoring the features to particular practice settings is necessary.

**O'Connor PJ**, Wolfson J, Vock DM, Bandyopadhyay S, **Vazquez-Benitez G**, Johnson PE, Adomavicius G. Use and customization of risk scores for predicting cardiovascular events using electronic health record data [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):203. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** The Framingham Risk Score (FRS) and the ACC/AHA Pooled Cohort Score (PCS) are widely used in clinical practice to guide individual patient care decisions. However, these risk scores have been estimated and validated mostly using data from longitudinal cohort studies; their performance when applied to patient data extracted from electronic health records is less well established. **METHODS:** Risk factor data were obtained from the electronic medical record and insurance claims of 84,116 adults receiving care at a large health care delivery and insurance organization from 2001 to 2011. We assessed calibration and discrimination for four risk scores: the published versions FRS and PCS and versions obtained by refitting the FRS and PCS using Cox regression models. Population subgroups in which the various models gave highly divergent risk predictions were identified using recursive partitioning techniques. **RESULTS:** The original FRS was well-calibrated (calibration statistic  $K=7.4$ ), but the original PCS was not ( $K=39$ ). Discrimination was similar in both models (C-index  $C=0.740$  vs.  $C=0.747$  for original FRS and PCS). The refitted FRS ( $K=4.6$ ,  $C=0.754$ ) yielded better calibration and discrimination than the original FRS; the refitted PCS ( $K=15.1$ ,  $C=0.746$ ) was better calibrated than the original PCS. Individual risk predictions differed between original and refitted models for some subgroups but were similar when comparing refitted models. **CONCLUSION:** Both the FRS and PCS are appropriate for use in clinical decision support systems that rely on electronic health data, though it may be advisable to refit the models they are based on using available data from the target population to optimize performance.

Pardee RE, Bachman DJ, Hornbrook MC, Cleveland CR, Mathur P, Ng D, **Aumer SM**, Harding WH, Jordan C, Meier J, Wong CC, Hoch BA. The Learning Healthcare (Data) System: Virtual Data Warehouse data capture revisited [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):226-7. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** At the 2014 HCSRN annual meeting, Bachman and colleagues presented an excellent investigation into rates of encounters and drug fills at Virtual Data Warehouse (VDW) sites in order to evaluate (among other things) the VDW enrollment file's "OUTSIDE\_UTILIZATION" field, which purported to flag periods during which complete data capture of either pharmacy or encounter data was suspect. That investigation revealed serious problems with the flag, calling its usefulness into question. Taking this to heart, the VDW enrollment workgroup proposed removing this field and adding a suite of six new flags intended to express confidence in the capture of pharmacy, laboratory, outpatient encounter, inpatient encounter, tumor and electronic medical record data individually. These flags are assigned by local VDW analysts on the basis of their knowledge of data capture limitations at their respective sites for identifiable subgroups of patients. VDW programs were written and tested for creating these new data incompleteness variables. All HCSRN sites were invited to run these programs and share their results. **METHODS:** Modeled after Bachman et al's work, we calculated rates of pharmacy fills, lab results, encounters, tumor records and vital signs by the appropriate new flag. We then plotted these rates over time to see whether in fact the people/periods flagged as having suspect data capture did in fact have lower rates compared to those who/that were not. **RESULTS:** At the sites that implemented the flags, data capture rates generally varied in line with expectations--suspected incomplete groups had markedly lower rates. Of the six flags, "incomplete\_Rx" saw the best implementations, with all seven implementation sites showing clear distinctions between people whose data capture was suspect and those for whom it was not "Incomplete\_tumor" had the most variable implementations, with clear

distinctions at some sites but not others. **CONCLUSION:** On balance, the new flags stand to improve the quality of data-based research in the HCSRN. Projects needing to define populations at risk of exposure to particular pharmacy fills, tumors or lab result values, for example, would do well to use the new flags to screen out people for whom exposure risk may not be completely captured.

Pestka DL, **Sorge L**, **Frail CK**, Funk KA, Roth MT, Hadsall R, Sorensen TD. Assessing the state of comprehensive medication management practice within primary care clinics [abstract]. *Pharmacotherapy*. 2016 Dec;36(12):Abstract #355. [Presented at the *ACCP (American College of Clinical Pharmacology) Annual Meeting*, Hollywood, FL, Oct 2016.]

**Rossom RC**, Shortreed SM, Coleman KJ, Beck AL, Waitzfelder BE, Stewart C, Ahmedani BK, Zeber JE, Simon GE. Antidepressant adherence across diverse populations and health care settings [abstract]. *J Patient Cent Res Rev*. 2016 Summer;3(3 Suppl):213-4. Project: A10-003 MHRN Infrastructure. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** Much of the work in antidepressant adherence relies on self-report and small sample sizes with limited racial/ethnic representation. Our study aimed to determine factors associated with poor early adherence to antidepressants in a large, diverse sample of patients using pharmacy refill data. **METHODS:** Electronic medical record data for patients 18 and older with depression who filled a new outpatient antidepressant prescription between Jan. 1, 2010 and Dec. 31, 2012 in one of six Mental Health Research Network health care systems were obtained. Self-reported race/ethnicity and pharmacy fill data were obtained from electronic medical records. Patients were considered to have early adherence if they had a second antidepressant fill within 180 days of the first. **RESULTS:** 177,469 adult patients had 184,967 new episodes of depression associated with a filled antidepressant prescription. Patients refilled their antidepressants within 180 days of the first dispensing in 71% of treatment episodes. Race/ethnicity was a strong predictor of early adherence, with patients who self-identified as Asian, non-Hispanic black, Hispanic or Native Hawaiian/Pacific Islander significantly less likely to refill their antidepressant prescriptions than were non-Hispanic whites or Native Americans/Alaskan Natives. Other apparent predictors of early adherence, including neighborhood income and education, gender and prior mental health hospitalizations, were no longer significant after adjusting for race/ethnicity. **CONCLUSION:** Race/ethnicity was a robust predictor of antidepressant adherence, with racial/ethnic minority groups other than Native Americans/Alaskan Natives less likely to be adherent. Patients from these racial and ethnic minority groups may have the greatest potential benefit from targeted interventions to improve early antidepressant adherence.

Russell-Jones D, Bode BW, De Block C, Franek E, Heller SR, Mathieu C, Philis-Tsimikas A, Rose L, Woo VC, Osterskov AB, Graungaard T, **Bergental RM**. Double-blind mealtime faster-acting insulin aspart vs. insulin aspart in basal-bolus improves glycemic control in T1D: the Onset 1 Trial [abstract #293-OR]. *Diabetes*. 2016 Jun;65(Suppl 1):A77. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

Limiting excursions of postprandial glucose (PPG) is desirable in people with diabetes. This multicenter, treat-to-target, phase 3 trial evaluated the efficacy of faster-acting insulin aspart (faster aspart) in T1D. Primary endpoint was change from baseline in HbA1c after 26 weeks treatment. Post run-in, adult subjects were randomized to double-blind mealtime faster aspart (n=381), or insulin aspart (IAsp; n=380), or open-label postmeal faster aspart (n=382); each with insulin detemir. HbA1c was reduced for faster aspart and IAsp (Figure), confirming non-inferiority to IAsp for both mealtime and postmeal dosing (est. treatment diff. [ETD], % [95% CI]: mealtime, -0.15 [-0.23; -0.07]); postmeal, 0.04 [-0.04; 0.12]); HbA1c reduction was significantly greater for mealtime faster aspart vs. IAsp. Superiority to IAsp for 2 h PPG increment during a standardized meal test was confirmed for faster aspart (ETD: -0.67 [-1.29; -0.04] mmol/L; -12.01 [-23.33; -0.70] mg/dL). 1 h PPG increment was also reduced (ETD: -1.18 [-1.65; -0.71] mmol/L; -21.21 [-29.65; -12.77] mg/dL). No significant differences in overall rate of severe or confirmed hypoglycemic episodes (plasma glucose <3.1 mmol/L [56 mg/dL]). In summary, faster aspart effectively improved glycemic control with superior PPG control for mealtime faster aspart vs. IAsp, representing a clinical advance in treating T1D.

**Salzman JG, Frascone RJ, Zagar AE, Loken NM, Burnett AM, Peterson BK, Griffith KR, Ward CM, Wewerka SS.** Intraosseous pressure monitoring in healthy volunteers [abstract]. *Prehosp Emerg Care.* 2016 Jan-Feb;20(1):170-1. [Poster at the *National Association of EMS Physicians (NAEMSP) Scientific Assembly*, San Diego, CA, Jan 2016.]

**BACKGROUND:** Intraosseous (IO) pressure monitoring has not been explored as a potential invasive monitoring option for critically ill and injured patients. **OBJECTIVES:** The objective of this study was to describe IO pressure measurements in normal healthy volunteers. **METHODS:** This is a prospective, proof of concept, pilot study of healthy volunteers approved by our local institutional review board. Inclusion criteria included age 18–70 year old, BMI 19–40, ability to provide informed consent, and no active treatment for any disease. Participants consented to have two IOs placed per device manufacturer recommendations (tibial and humeral). External cuff pressure readings were recorded every 5 minutes, and IO pressure measurements were recorded continuously for up to 60 min. A safety review committee reviewed data after the 10th and 15 participants were enrolled. Mean IO pressure readings and systolic/diastolic cuff pressure measures were summarized and are reported descriptively. The slopes of mean IO pressure readings from the start to the end of the monitoring session are also described. **RESULTS:** Fifteen patients were enrolled between April and July 2015. Average patient age was 33 years (range = 22–50), and 40% were female. The IO waveform morphology was arterial, including a distinct dichrotic notch. Respiratory variability within the waveform tracing was also observed in all subjects. Results from the humeral placements were inconsistent and are not presented. The median of the mean tibial IO pressure across the study sample was 60 mm Hg (IQR = 30.5–83.5 mm Hg). In most participants, the mean tibial IO pressure was below the systolic and diastolic cuff readings. We observed a decrease in IO pressure from the initial placement until the final reading, with an approximate 1% decrease in pressure per minute. **CONCLUSION:** This is the first study in healthy volunteers establishing the presence of an intraosseous waveform, which was observed to be arterial in nature. The mean tibial IO pressure was consistently obtained but had a wide variation in absolute values. IO pressure decreased approximately 1% per minute during the testing period.

**Schousboe JT, Beran MS.** Abdominal aortic calcification on lateral spine bone density test images: potential role in cardiovascular disease risk screening [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):183. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** Abdominal aortic calcification (AAC) is associated with incident clinical cardiovascular disease independent of other clinical risk factors. The aorta lies immediately anterior to the lumbar spine, and AAC can be accurately scored on bone density lateral spine images. Our objective was to estimate the proportion of individuals 65.80 years old undergoing bone densitometry who are not known a priori to be at high risk for cardiovascular disease (based on prior diagnoses and Framingham hard coronary heart disease [CHD] 10-year risk score) but who have a high level of AAC (AAC-24 Framingham score >5). **METHODS:** AAC was scored on lateral spine bone density images for 1,499 randomly selected patients aged 65.80 at a large urban community health care delivery organization, blinded to patient characteristics. Established diagnoses of cardiovascular disease or diabetes mellitus were determined by identification of appropriate ICD-9 diagnosis codes at provider visits. Framingham 10-year hard CHD risk scores were calculated from clinical data (systolic blood pressure, total and high-density-lipoprotein cholesterol, smoking status, use of antihypertensive medication) extracted from the electronic health record. **RESULTS:** Mean age of the study cohort was 71 years; 92.9% were female, 94.1% were Caucasian, 14.0% had preexisting cardiovascular disease, 10.7% had preexisting diabetes mellitus, and 24.7% had a Framingham hard CHD risk score >7.5%. A total of 490 patients (32.7%) had no AAC, 603 (40.2%) had mild to moderate AAC (AAC-24 score of 1 to 4), and 406 (27.1%) had a high level of AAC; 184 patients (12.3%) had both a high level of AAC and were not previously known to be at high risk based on preexisting clinical cardiovascular disease, diabetes mellitus or a Framingham hard CHD risk score >7.5%. **CONCLUSION:** The proportion of those aged 65 to 80 undergoing bone densitometry who are not known to be at high risk for incident cardiovascular disease but who have high AAC is sufficient that densitometric lateral spine imaging at the time of bone densitometry may have a role in cardiovascular disease risk screening, considering bone densitometry is recommended at least

once for all women >65 years old and men >70 years.

**Schuld JC, Volker ML, Anderson SA, Zwank MD.** Post-splinting x-rays of non-displaced hand, wrist, ankle, and foot fractures are unnecessary [abstract]. *Acad Emerg Med.* 2016 May;23(Suppl):S148. [Presented at the *Society of Academic Emergency Medicine (SAEM 2016) Annual Meeting*, New Orleans, LA, May 2016.]

**BACKGROUND:** Acute non-displaced fractures (NDFs) are very common in the emergency department (ED), and some physicians advocate for obtaining postsplinting x-rays to identify potential displacement that can occur during the splinting process. Obtaining these x-rays requires extra time, cost, and radiation exposure to patients. **Objectives:** Our objectives are (1) to determine how often x-rays are obtained after splinting of NDFs of the hand, wrist, ankle, or foot; (2) to identify if post-splinting x-rays changes treatment management in the ED; and (3) to identify medical complications at follow-up in patients who do not receive post-splinting x-rays. **METHODS:** This is a retrospective chart review study of a cohort of ED patients who were discharged with hand, wrist, ankle, or foot fractures. Electronic medical records were reviewed to identify patients with NDFs (as read by the reading radiologist) and underwent splinting with or without post-splinting x-rays. Postsplinting x-ray reports were evaluated to determine whether displacement had occurred during the splinting procedure. For the group that did not undergo post-splint x-rays in the ED, follow-up medical records within two months of the initial ED visit (in-network only) were reviewed to assess for follow-up x-rays and management decisions. **RESULTS:** 265 patients met the study criteria and were included (138 males; age range 1-94; average 37.2). 27 patients (10.2%) had postsplinting x-rays performed in the ED. None of these patients had interval fracture change or management change (i.e., resplinting). Two-hundred four patients followed up within our health system. One-hundred seventy-nine patients underwent x-rays at the clinic follow-up visit. Fourteen of these patients had interval displacement of the fracture, and one had surgical fixation (bimalleolar ankle fracture). **CONCLUSION:** Of the 206 patients who had post-splinting x-rays obtained in the ED or follow-up clinic, 1 (.005%) had a change in management based on the interval fracture change from pre-splinting x-rays. Post-splinting x-rays of NDFs do not change ED management of patients and rarely change patient follow-up management.

**Sherwood NE, Butryn ML, Forman EM, Almirall D, Seburg EM, Crain AL, Hayes MG, Levy RL.** The BestFIT Weight Loss Trial: smart study design and early implementation lessons learned [abstract]. *Ann Behav Med.* 2016 Mar;50(Suppl 1):S162. Project: A13-012 BestFIT. [Presented at the *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions: Behavioral Medicine at a Crossroads: 21st Century Challenges and Solutions*, Washington DC, Apr 2016.]

Behavioral weight loss programs help people achieve clinically meaningful weight losses (8-10% of starting body weight). Despite data showing that only half of participants achieve this goal, a “one size fits all” approach is normative. This weight loss intervention science gap calls for adaptive interventions that provide the “right treatment at the right time for the right person.” Sequential Multiple Assignment Randomized Trials (SMART) use experimental design principles to answer questions for building adaptive interventions, including whether, how, or when to alter treatment intensity, type, or delivery. The BestFIT study is a SMART designed to evaluate the optimal timing for intervening with weight loss treatment non-responders and the relative efficacy of two treatments that address self-regulation challenges that impede weight loss: 1) augmenting treatment with portion-controlled meals (PCM) that decrease the need for self-regulation; and 2) switching to acceptance-based behavior treatment (ABT), which boosts capacity for self-regulation. The primary aim is to evaluate the benefit of changing treatment with PCM versus ABT. The secondary aim is to evaluate the best time to intervene with nonresponders. The symposium goals are to: 1) describe the BestFIT SMART study design and the development of the decision rules for study implementation, including re-randomization of study participants to the second-stage treatments (PCM versus ABT); 2) describe the operationalization of study decision rules, recruitment methods, and early study implementation based on the first 100 study participants; and 3) discuss lessons learned and recommendations for designing SMARTs, including strategies for optimizing implementation.

**Sperl-Hillen JM, Crain AL, Ekstrom HL, Margolis KL, O'Connor PJ.** A clinical decision support system

promotes shared decision-making and cardiovascular risk factor management [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):218. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** Cardiovascular (CV) Wizard is a web-based electronic health record-integrated point-of-care clinical decision support (CDS) system that presents personalized CV risk information to providers and patients in both a low-numeracy visual format and a high-numeracy quantitative format. We report primary care provider perspectives on how this CDS system affected shared decision-making and CV risk factor management. **METHODS:** Twenty clinics were randomized to either usual care or use of the CDS system with diabetes, heart disease or high-reversible CV risk adults. The CDS system targeted 20% of office visits and was used at 70.80% of targeted visits over a 2-year period. Consented providers (N=102) were surveyed at baseline and 18 months after implementation. Corrected survey response rates were 90% at baseline and 82% at follow-up. Generalized linear mixed models were used to compare usual care and CDS responses to common questions at baseline and follow-up, and CDS users were queried on their perceptions of the CDS system at follow-up only. **RESULTS:** Compared to usual care providers, those in the CDS group reported increased follow-up rates of CV risk calculations while seeing patients (73% vs. 28%, P=0.006), being better prepared to discuss CV risk reduction priorities with patients (98% vs. 78%, P=0.03), providing accurate advice on aspirin for primary prevention (75% vs. 48%, P=0.02) and more often discussing CV risk reduction (60% vs. 30%, P=0.06). CDS users reported that the CDS system improved CV risk factor control (98%), saved time when talking to patients about CV risk reduction (93%), efficiently elicited patient treatment preferences (90%), was useful for shared decision-making (95%), influenced treatment recommendations (89%) and helped initiate CV risk discussions (94%); 85% of providers reported that their patients liked CV Wizard. **CONCLUSION:** The CV Wizard CDS system was successfully integrated into the workflow of primary care visits with high sustained use rates, high primary care provider satisfaction, high patient satisfaction and positive impacts on provider-reported clinical processes related to CV risk factor management.

**Sperl-Hillen JM, O'Connor PJ, Margolis KL, Crain AL, Ekstrom HL.** Overuse and underuse of aspirin for primary prevention [abstract 1225-P]. *Diabetes.* 2016 Jun;65(Suppl 1):A321. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

The US Preventive Services Task Force (USPSTF) recommends aspirin for primary prevention of atherosclerotic vascular disease (ASCVD) when the ASCVD benefit outweighs the risk of gastrointestinal hemorrhage. The complexity and time required to assess aspirin risks and benefits can result in overuse and underuse of aspirin. As part of an NIH-funded study to lower ASCVD risk, we implemented electronic clinical decision support (CDS) algorithms to guide aspirin use based on USPSTF criteria and major bleeding risks. Baseline data was collected for whether aspirin was algorithmically recommended for all patients at their first eligible primary care encounter in 20 clinics over 2012-2014. The analysis excluded patients with CHD and included 6651 adults with diabetes (mean age 55.6, mean 10-year ASCVD risk 27.8%) and 11,682 adults meeting pre-specified criteria for high ASCVD risk without diabetes (mean age 58.4, mean 10-year ASCVD risk 24.7%). Overuse and underuse was determined by comparing concordance with (a) aspirin recommendations and (b) documented aspirin use. The CDS recommended aspirin for 4,139 (63.1%) patients with diabetes and 8,722 (74.7%) without diabetes. Among patients with aspirin recommended, aspirin was not used in 829/4139 (20%) with diabetes and 6493/8722 (74.4%) without diabetes (underuse). Among patients for whom the CDS did not recommend aspirin, aspirin was used in 1448/2969 (59.8%) with diabetes and 1021/2960 (34.4%) without diabetes (overuse). Those with diabetes who were likely to benefit from aspirin use had higher aspirin use rates (less underuse) than similar high CV risk patients without diabetes. However, those with diabetes who were unlikely to benefit from aspirin based on USPSTF criteria and bleeding risks also had higher aspirin use rates (more overuse) than patients without diabetes. Strategies to ensure greater evidence-based use of aspirin, such as providing electronic clinical decision support, may help providers more accurately assess individualized risks and benefits of aspirin.

**Sperl-Hillen JM, O'Connor PJ, Margolis KL, Crain AL, Ekstrom HL.** Overuse and underuse of aspirin for primary prevention of cardiovascular events in primary care [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):184. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd*

Annual Conference, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** The U.S. Preventive Services Task Force (USPSTF) currently recommends aspirin for primary prevention of coronary heart disease in men 45.79 years old and strokes in women 55.79 years old when the potential cardiovascular disease benefit outweighs the potential harm of gastrointestinal hemorrhage. The complexity and time required to assess risks and benefits for primary prevention can be a barrier for providers to giving patients USPSTF-consistent recommendations, resulting in potential overuse and underuse. **METHODS:** As part of a National Institutes of Health-funded randomized trial to lower cardiovascular risk, we developed a sophisticated web-based electronic health record (EHR)-integrated tool to guide aspirin recommendations as determined by algorithms assessing USPSTF criteria and major bleeding risks. Baseline data was collected for whether aspirin was algorithmically indicated (or not) for all patients at their first eligible primary care encounter in 20 clinics over 18 months. The analysis included patients aged 18.75 (mean 58.4) with elevated cardiovascular disease risk (mean 10-year ASCVD risk 24.7%) and excluded patients with congenital heart defects or diabetes. Aspirin overuse and underuse was determined by comparing concordance with: a) the algorithm's aspirin recommendation, and b) EHR-medication documentation of aspirin. **RESULTS:** Of the 11,682 patients meeting eligibility criteria at baseline, aspirin was indicated in 8,722 (74.7%) and not indicated in 2,960 (25.3%). Among patients with an aspirin indication, 6,493/8,722 (74.4%) did not have aspirin documented (underuse). Among patients without an aspirin indication, 1,021/2,960 (34.4%) had aspirin documented (overuse). **CONCLUSION:** Overall, 7,514/11,682 (64.3%) of patients who met study inclusion criteria for age and cardiovascular risk exhibited either potential overuse or underuse of aspirin for primary cardiovascular disease prevention. Despite expected missing documentation of aspirin due to its over-the-counter availability, which would result in measures of greater underuse and lower overuse than actuality, it is clear that patient aspirin use is very commonly inconsistent with USPSTF guidelines. The recommendation to consider colorectal benefits in the latest USPSTF draft could make decisions about aspirin appropriateness even more complex. EHR-based tools to help providers assess individualized risks and benefits of aspirin could greatly improve the quality of aspirin recommendations and potentially reduce costly cardiovascular disease events while simultaneously reducing rates of aspirin-related hazards.

Tabano H, Gill T, Anzuoni K, Allore H, Gruber-Baldini A, Dublin S, **Elliott TE**, Ganz D, Tai-Seale M, Gurwitz J, Bayliss E. Patient-reported outcomes collected as part of the Medicare annual wellness visit in the Health Care Systems Research Network [abstract]. *J Patient Cent Res Rev.* 2016 Summer;3(3 Suppl):168. [Presented at the *Health Care Systems Research Network (HCSRN) 22nd Annual Conference*, Atlanta, GA, Apr 2016.]

**BACKGROUND/AIMS:** For seniors with multiple chronic conditions, patient-reported outcomes (PROs) can provide meaningful information on patients' health, well-being and effects of treatment that transcend specific conditions. Effective use of PROs for clinical care and research requires an understanding of their availability and accessibility. **METHODS:** The data and measures workgroup of the HCSRN-OAIC Advancing Geriatric Infrastructure and Network Growth (AGING) Initiative conducted an electronic survey to inventory PROs available at each HCSRN site and to understand their storage and accessibility. PRO domains inventoried included self-rated health, functional status, mood, pain, cognition, fall risk and advance directives. For each domain, sites were asked to list specific measures used and to describe PRO data collection, storage and extraction. The inventory was distributed through the HCSRN governing board to representatives at each site. **RESULTS:** To date, 15 of 19 HCSRN sites have fully or partially completed the inventory. Four were unable to participate due to lack of PRO data or resources. Most sites rely on a combination of systematic outreach and patient initiation to complete the annual wellness visit (AWV) questionnaire, with the most complete data coming from the past 5 years. The percentage of Medicare patients completing an AWV questionnaire varies among sites, ranging from 5% to 43%. The most common method of storage is via "Smart Text" within text fields of the electronic health record. For the AWV, most sites address three or more of the PRO domains included in the inventory, and many address additional domains as part of the AWV, such as oral health, diet, exercise, incontinence, substance use and social needs. **CONCLUSION:** Although there is some overlap, the method of collection, storage and availability of PROs gathered as part of the Medicare AWV vary widely across HCSRN sites. While there has been an improvement in the availability of this information in recent years,

most sites' AWW questionnaire coverage remains low. The final inventory results will inform data infrastructure development and data collection processes across the HCSRN and will facilitate engagement in multisite aging research related to multiple chronic conditions.

White WB, **Bergenstal RM**, Cannon CP, Kupfer S, Wilson C, Heller SK. Hypoglycemia is associated with increased risk of cardiovascular events: results from the EXAMINE Trial [abstract 1091-P]. *Diabetes*. 2016 Jun;65(Suppl 1):A284-5. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

Hypoglycemia is a known complication of some antidiabetic drugs (although not incretin-based therapies). The cardiovascular (CV) outcomes of patients experiencing hypoglycemia have not been well studied. We evaluated the consequence of reported hypoglycemia on the risk for subsequent major adverse CV events (MACE; CV death, nonfatal myocardial infarction or nonfatal stroke). Patients in the EXAMINE trial (N=5380) were at elevated risk for MACE due to baseline type 2 diabetes and acute coronary syndrome within the 15-90 days prior to study entry. EXAMINE patients were randomized to double-blind alogliptin or placebo in addition to standard antidiabetic treatment (adjusted throughout the trial). Most patients were men (68%), white or Asian (73%, 20% respectively) and the mean (SD) age was 61 (9.9) years. Metformin, sulfonylureas and insulin were commonly used at baseline (66%, 47% and 30% of patients, respectively). During the trial, 354 (6.6%) patients were reported to have hypoglycemia (6.7% with alogliptin and 6.5% with placebo); rates of serious hypoglycemia were low (0.7% with alogliptin and 0.6% with placebo). Using a Cox proportional hazards model adjusted for baseline covariates (age, sex, HbA1c, antidiabetic treatment) and study treatment, we found a significant increase in MACE among patients who developed serious hypoglycemia (12/34 [35.3%]) vs. those who did not (609/5346 [11.4%]) (adj. HR: 2.42, 95% CI: 1.27-4.60; p=0.007). An increase in MACE was also found for patients with any hypoglycemia (64/354 [18.1%]) vs. those without (557/5026 [11.1%]) (adj. HR: 1.38, 95% CI: 1.05-1.80; p=0.019). Hypoglycemia, in addition to being an adverse event for patients, may have negative CV prognostic implications. Further research on the impact of treatment induced hypoglycemia on CV events is warranted.

White WW, Kupfer S, Cannon CP, Mehta CR, Heller SR, Wilson C, Bakris GL, Cushman WC, Nissen SE, **Bergenstal RM**, Fleck P, Zannad F. Mortality findings from the EXAMINE Trial [abstract 1090-P]. *Diabetes*. 2016 Jun;65(Suppl 1):A284. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

The EXAMINE trial patients had elevated cardiovascular (CV) risk due to type 2 diabetes and a recent (15-90 days) acute coronary syndrome (ACS). We evaluated the risk of CV death in patients randomized to treatment with alogliptin or placebo and following major non-fatal CV events that occurred during the trial. In 5380 patients, overall rates of CV death were 4.1% for alogliptin and 4.9% for placebo (HR = 0.85, 95% CI, 0.66-1.10). Patients were followed until the first post-randomized non-fatal CV event of myocardial infarction (MI), stroke, hospitalized heart failure (HHF), and hospitalization for unstable angina (UA) and then to death or censoring. Time-updated multivariable Cox models were used to estimate the risk of death following each event. There were a total of 736 patients (13.7%) who experienced at least one first non-fatal CV event (5.9% MI, 1.1% stroke, 3.0% HHF, and 3.8% UA). CV death occurred subsequently in 8.2% of those experiencing an MI event, 20.1% of those experiencing a HHF event, 8.8% of those experiencing a stroke, and 3.4% of those experiencing UA, versus 3.7% (n = 172) of the 4644 patients without a non-fatal CV event. Compared with patients who did not experience a non-fatal event, the adjusted hazard ratio for death was 1.83 (95% CI, 1.29-2.59, p = 0.006) after MI, 3.91 (95% CI, 2.77-5.51, p < 0.0001) after HHF, 1.74 (95% CI, 0.77-3.94, p = 0.186) after stroke, and 0.81 (95% CI, 0.41-1.58, p = 0.527) after admission for UA. Mortality rates following a non-fatal event were comparable on alogliptin and placebo. In EXAMINE, the majority of deaths occurred in patients who did not experience a non-fatal CV event, although the risk of death was markedly higher following a non-fatal event, particularly HHF. These findings illustrate ongoing opportunities to reduce mortality in patients with type 2 diabetes and CV diseases.

Wysham C, Bonadonna RC, Aroda V, Domingo MP, Kapitza C, Stager W, Yu C, Niemoeller E, Souhami E, **Bergenstal RM**, LixiLan-L Trial Investigators. Efficacy and safety of LixiLan vs. insulin glargine

according to baseline characteristics in patients with type 2 diabetes from the LixiLan-L Trial [abstract 1018-P]. *Diabetes*. 2016 Jun;65(Suppl 1):A265. [Poster at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

The LixiLan-L open-label trial compared the efficacy and safety of LixiLan, a novel fixed-ratio combination of insulin glargine (Gla-100) and lixisenatide, with Gla-100 over 30 weeks in patients with type 2 diabetes (T2D) inadequately controlled on basal insulin ( $\pm$  2 oral antidiabetic drugs). In this analysis, safety and efficacy outcomes were assessed within subgroups according to baseline characteristics ([BC]; glycated hemoglobin [HbA1c] <8, =8%; body mass index <30, =30 kg/m<sup>2</sup>; duration of T2D <10, =10 years). Reduction in HbA1c, proportion of responders achieving HbA1c <7%, and incidence of hypoglycemia (=70 mg/dL) for the BC subgroups are shown (Table). There were no major changes in parameters across subgroups and efficacy was maintained in patients with high HbA1c. The LixiLan treatment group showed consistently greater glycemic control and more responders compared with the Gla-100 group in all of the subpopulations tested. Hypoglycemia varied slightly for subgroups (Table), without marked differences observed. In conclusion, LixiLan consistently improved glycemic control compared with Gla-100 in all subgroups of BC, including the most challenging groups of patients with long duration of diabetes, obesity, and high HbA1c.

Zhang P, Lovato J, O'Connor PJ, Sullivan M, Accordian Study Group. Long-term impact of intensive glucose, blood pressure, or lipid control on health utility: ACCORDION Study [abstract 352-OR]. *Diabetes*. 2016 Jun;65(Suppl 1):A92. [Presented at the *American Diabetes Association (ADA) 76th Scientific Sessions*, New Orleans, LA, Jun 2016.]

ACCORDION is a prospective, observational follow-up study of more than 8000 participants who were treated and followed in the Action to Control Cardiovascular Risk in Diabetes (ACCORD) Trial, over 10000 participants. The study was to further elucidate and clarify the long-term effects of intensive control of hyperglycemia, dyslipidemia, high blood pressure as implemented in the ACCORD trial. Here we reported the long-term effect of the three intervention strategies on health related quality of life (HRQOL). Data used to derive three HRQOL measurements (utility index mark 2 (HUI-2), utility index mark 3 (HUI-3) and feeling thermometer (FT) were collected at baseline, 12 months, 36 months, 48 months, and end of the original ACCORD study and at 27 and 57 months in the follow-up study. Linear mixed effects models, controlling for stratification factors and baseline utility score were used to assess the effect of intervention assignment on mean HUI-2, HUI-3 and FT scores. Intensive therapy for glycemia, blood pressure, or lipids had no observed adverse or beneficial effect on HRQOL measures during both trial and follow-up periods (Table, available in the journal *Diabetes*). These results should be considered in the context of the clinical results of the ACCORD/ACCORDIAN studies, when considering the advantages and limitations of diabetes care strategies.

## Posters and Presentations

**Alpern ML, Anugwom CM, Regan JT, Skarda PK.** Improvement in outpatient asthma control with registered nurse phone visits [presentation]. *Twin Cities Quality Forum*. Minneapolis, MN. 2016 May.

**Ankel FK.** Program director bootcamp [presentation]. *International Conference on Residency Education (ICRE)*. Niagara Falls, Ontario, Canada. 2016 Oct.

**Ankel FK.** ICE Summit 2016, Co-chair. *International Clinician Educators (ICE) Summit*. Niagara Falls, Ontario, Canada. 2016 Oct.

**Ankel FK, Bourne C.** Junior career development: mentoring - why it matters and how to do it well [presentation]. *Council of Emergency Medicine Residency Directors (CORD) Academic Assembly*. Nashville, TN. 2016 Mar.

**Ankel FK, Swaminathan A, Calderone Haas M.** Tips to create your personal learning network [presentation]. *Council of Emergency Medicine Residency Directors (CORD) Academic Assembly*.

Nashville, TN. 2016 Mar.

**Barringer KW, Nelson JG.** Educational research, you may already be doing it [panel]. *SAEM (Society of Academic Emergency Medicine) Annual Meeting*. New Orleans, LA. 2016 May.

**Benjamin DE, Hernandez BS.** Innovative non-clinical emergency medicine curriculum for medical students [poster]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**Bennett JL, Goertz MK, Bourdon RT.** Incidental pulmonary nodules in the emergency department: a potential opportunity to improve patient safety [poster]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**Bennett JL, Goertz MK, Gordon BD, Bourdon RT.** Incidental pulmonary nodules in the emergency department: a potential opportunity to improve patient safety [poster]. *Metro Minnesota Council on Graduate Medical Education (MMCGME) 2016 Quality Forum*. Minneapolis, MN. 2016 May.

**Bergenstal RM.** Is there a racial difference in the mean CGM glucose in relation to the A1C [presentation]? *American Diabetes Association (ADA) 76th Scientific Sessions*. New Orleans, LA. 2016 Jun.

**Bergenstal RM.** Hybrid closed loop pivotal trial in type 1 diabetes [presentation]. *European Association for the Study of Diabetes (EASD)*. Munich, Germany. 2016 Sep.

**Bergenstal RM, Buckingham B, Garg S, Weinzimer S, Brazg R, Ilany J, Bode B, Bailey T, Anderson SM, Slover R, Shin J, Lee S, Kaufman FR.** Pivotal trial of a hybrid closed-loop system in type 1 diabetes (T1D) [poster]. *American Diabetes Association (ADA) 76th Scientific Sessions*. New Orleans, LA. 2016 Jun.

A hybrid closed-loop (HCL) insulin delivery system was evaluated to establish its safety for unsupervised use in patients = 14 years. The system included the Medtronic MiniMed 670G pump, fourth-generation sensors, and a control algorithm. Patients calibrated the sensor periodically and gave mealtime and correction boluses as needed. A 2-week run-in (baseline) phase was followed by a 3-month study phase of HCL at home and supervised hotel settings for 5 nights followed by an optional continued-access program. Data were available from 124 patients with T1D (55 male) with mean ( $\pm$ SD) age,  $37.8\pm 16.46$  years (30 age = 21) and duration of diabetes  $21.7\pm 13.65$  years. Sensor glucose (SG) and A1c values from baseline and study phases were compared. HCL mode was used for a median 87.2% (IQR, 75.0% to 91.7%) of the time after first start. There were higher percentages of SG 71-180 mg/dL, lower percentages of SG =70 mg/dL, and lower percentages of SG =50 mg/dL during 24 hours and at night ( $p<.001$  for each) in the study phase compared to baseline (Table). Mean A1c decreased from  $7.4\pm 0.9\%$  to  $6.9\pm 0.6\%$  ( $p<.001$ ). SG variability measured by coefficient of variation decreased from 0.38 to 0.35 ( $p<.001$ ). There was no diabetic ketoacidosis, severe hypoglycemia, or serious device-related adverse event during 12,389 patient-days. At study's end, 99 patients entered the continued-access program. The HCL system was safe, acceptable, and associated with improved glucose control during extended at-home use.

**Bisson J, Bloom C, Reynolds AL.** An organizational case study for aligning efforts: clinical quality, maintenance of certification Part IV and CME [presentation]. *Alliance for Continuing Education in the Health Professions 41st Annual Conference*. National Harbor, MD. 2016 Jan.

Brady SS, **Erickson LO**, Wolfson JA, Kjolhaug J, Wilkerson JM, Jones-Webb R, Toomey TL. Direct and stress-moderating effects of coping on binge drinking and alcohol-related protective behaviors among college students [presentation]. *Society for Prevention Research*. Washington DC. 2016 May.

**Brechtken J.** Two devices you never want to use in the same procedure: Lucas and Edwards valve [presentation]. *Transcatheter Valve Therapies (TVT 2016)--Challenging Cases: TAVR Complications*. Chicago, IL. 2016 Jun.

**Brust A, Mauren G, Mercer A.** Universal EPDS screening and outcomes in a large multispecialty clinic [poster]. *Postpartum Support International 29th Annual Conference*. San Diego, CA. 2016 Jun.

The Edinburgh Postnatal Depression Scale (EPDS) is an instrument designed to screen new mothers for postpartum depression. It has better reliability and validity than other self-report forms such as the PHQ-9 or the Beck Depression Scale. The EPDS has been translated into 23 languages, although not all translations have been validated. Park Nicollet has translations available in Spanish, Vietnamese, Somali, and Hmong.

**Burnett AM, Peterson BK.** Development and implementation of a pre-hospital stroke code system [presentation]. *Minnesota Department of Health--Minnesota Stroke Conference*. Minneapolis, MN. 2016 Jun.

Chan TM, **Ankel FK**, Cooney R. Innovative professional development [presentation]. *Council of Emergency Medicine Residency Directors (CORD) Academic Assembly*. Nashville, TN. 2016 Mar.

Cheung C, Wyman J, Bronas U, **McCarthy TC, Switzer JA**, Mathiason M. Is yoga better than aerobic/strengthening exercises for managing knee osteoarthritis in older adults [poster]? *Osteoarthritis World Congress*. Amsterdam, Netherlands. 2016 Mar.

**Chu MM, Zhu DW, Lavell KA, House CM.** Management of functional Sprint Fidelis implantable cardioverter-defibrillator leads at cardiac resynchronization therapy-defibrillator generator replacement: An alternative approach for prevention of inappropriate shocks caused by lead failure [presentation]. *Robert Hebbel Seventeenth Annual Research Day, University of Minnesota*. Minneapolis, MN. 2016 Mar.

**Cortes-Puentes GA, Moulki N, Lin LQ, Medina AM, Skarda PK.** Improving advance directive documentation in the outpatient setting [presentation]. *Twin Cities Quality Forum*. Minneapolis, MN. 2016 May.

**Cunningham BP**, Ali A, Zaman S, Montalvo R, Reahl B, Rotuno G, Kark J, Bender M, Miller B, Basmajian H, McLemore R, Shearer D, O'Toole RV, Obremsky WT, Sagi HC. Immediate weight bearing as tolerated has improved outcomes without an increased risk of reoperation after intramedullary fixation for subtrochanteric fractures compared to modified weight bearing [presentation]. *Orthopaedic Trauma Association Annual Meeting*. National Harbor, MD. 2016 Oct.

**Dean KR, Easterday CA, Ziegenfuss JY.** The use of REDCap in a small, non-academic survey research center [presentation]. *International Field Directors & Technologies 2016 Conference*. Austin, TX. 2016 May.

**Doggett S, Pasquarella JR, Evenson J, Wewerka SS.** Protecting your head when you sled. Do helmets really matter [poster]? *Pediatric Trauma Society 4th Annual Meeting*. Nashville, TN. 2016 Nov.

Head injuries account for approximately one third of all sledding-related ED visits, and the head and neck together represent the region of the body most frequently injured in sledding accidents. It is estimated that 53% of all related head injuries could be addressed by helmet use. While helmet use during downhill skiing and snowboarding has increased over the past decade, little attention has been paid to helmet use among recreational sledders. A retrospective chart review was conducted with 147 patients ages 5-19 (mean age 13.2 years, 66% male) treated in the ED for injuries sustained while skiing, snowboarding or sledding. Preliminary analysis revealed that overall, patients who were not wearing a helmet during their activity had significantly more head injuries compared to those wearing a helmet ( $p < .003$ ). Analyses of the data for head injury by helmet use, controlling for activity, showed a significant overall increase in head injury for snowboarders not wearing a helmet compared to skiers or sledders ( $p < 0.0005$ ).

Interestingly, only one sledding patient in the sample wore a helmet. However, among sledders, 52.27% suffered a head injury while not wearing a helmet, while the single patient who wore a helmet (2.27%) did not suffer a head injury. When comparing this to the percentage of snowboarders (18.2%) and skiers

(24.4%) who did not suffer a head injury while wearing a helmet, the need for helmets during sledding becomes obvious.

**Dries DJ.** Primary fascial closure after damage control laparotomy: factors affecting outcome [presentation]. *Academic Surgical 11th Annual Congress*. Jacksonville, FL. 2016 Feb.

**Dries DJ.** Acute respiratory failure and mechanical ventilation; Sedation, analgesia, and neuromuscular blockade; Postoperative management; Ventilation (Skill Station) [presentation]. *Society of Critical Care Medicine (SCCM) Pediatric Fundamental Critical Care Support (PFCCS) Course*. Saint Paul, MN. 2016 Mar.

**Dries DJ.** Team approach to fistula care [presentation]. *Bariatric Education Days: Evolving Treatment Across Health Systems Conference*. Minneapolis, MN. 2016 May.

**Dries DJ.** Enteric fistula: principles of management [presentation]. *North Central Region Fall Conference WOCN*. Bloomington, MN. 2016 Oct.

**Dries DJ, Salzman JG, Burnett AM, Frascone RJ, Loken NM, Wewerka SS, Zagar AE, Dries DJ.** Intraosseous pressure monitoring in critically ill and injured patient [presentation]. *Society of Critical Care Medicine (SCCM's) 45th Critical Care Congress*. Orlando, FL. 2016 Feb.

Learning Objectives: Intraosseous (IO) pressure monitoring has not been explored as a potential invasive monitoring option. The objective of this study was to describe IO pressure measurements and their relationship to blood pressure obtained via external blood pressure cuff in ICU patients. Methods: This is a prospective, convenience sample, proof of concept pilot study conducted in the medical and surgical ICUs at an urban, Level I trauma center. Patients were identified in the emergency department and enrolled under a waiver of informed consent. Inclusion criteria included: age  $\geq$  18 years, presence of an IO placed by emergency medical services or in the emergency department, and planned admission to the Medical or Surgical Intensive Care Unit. External cuff pressure readings were recorded every 15 minutes, and IO pressure data obtained via pressure transducer was recorded continuously for up to 12 hours. IO systolic, diastolic, and mean pressure (IO SBP, IO DBP, IO Mean) readings were summarized for the minute before and minute following an external cuff pressure reading. The ratios of IO pressures to external cuff pressures (IO Systolic Blood Pressure / Cuff SBP; IO DBP / Cuff DBP; IO Mean / Cuff Mean) were calculated. Results: Twenty patients were enrolled between January 2014 and May 2015. Average patient age was 60 (range = 45–81), and 80% were male. Primary diagnoses were mostly medical in nature. The average IO SBP, IO DBP, and IO mean were  $35.41 \pm 14.10$  mm Hg,  $30.51 \pm 8.99$  mm Hg, and  $34.26 \pm 9.98$  mm Hg, respectively. The ratio of IO SBP to cuff SBP, IO DBP to cuff DBP, and IO mean to cuff mean are  $28.4 \pm 11.7\%$ ,  $31.9 \pm 23.5\%$ , and  $32.3 \pm 20.7\%$ , respectively. The correlation of determination ( $R^2$ ) for IO SBP to cuff SBP was higher than the relationship between diastolic and mean IOP to cuff pressure (range 0.05 – 0.66). There were no adverse events reported during the monitoring period. Conclusions: IO pressure was reliably obtained at roughly 30% of external blood pressure cuff readings. This method of pressure monitoring may be an alternative to invasive central monitoring in the future.

**Droegemuller CJ, Kipper KI.** Simulation stroke bootcamp [presentation]. *AHA (American Heart Association) 2016 MN Stroke Bootcamp*. Minneapolis, MN. 2016 Apr.

Dusek JA, Chang BH, Dusek KC, **Erickson LO**, Rivard RL. Relaxation response versus health education for systolic hypertension: a randomized controlled trial [presentation]. *Integrative Health Research Conference*. Las Vegas, NV. 2016 May.

**Easterday CA, Dean KR, Ziegenfuss JY.** From basic science to business intelligence: how survey paradata can inform strategy and operations [presentation]. *International Field Directors and Technologies Conference (IFD&TC)*. Austin, TX. 2016 May.

**Frey WH, 2nd.** Beyond the basics of Alzheimer's; new treatments, approaches and research: intranasal

insulin, drugs and adult stem cells bypass the blood-brain barrier to treat Alzheimer's, Parkinson's and other brain disorders [presentation]. *Keystone Senior Living; Lighthouse of Columbia Heights*. Columbia Heights, MN 2016 Feb.

**Frey WH, 2nd.** Beyond the basics of Alzheimer's; new treatments, approaches and research: intranasal insulin, drugs and adult stem cells bypass the blood-brain barrier to treat Alzheimer's, Parkinson's and other brain disorders [presentation]. *Lyngblomsten*. Saint Paul, MN. 2016 Mar.

**Frey WH, 2nd.** Beyond the basics of Alzheimer's; new treatments, approaches and research: intranasal insulin, drugs and adult stem cells bypass the blood-brain barrier to treat Alzheimer's, Parkinson's and other brain disorders [presentation]. *Augustana Care Facility*. Minneapolis, MN. 2016 May.

**Frey WH, 2nd.** Diet is not just about calories: Let's think differently about diet, the brain and memory loss [presentation]. *Keystone Senior Living of Highland Park*. Saint Paul, MN. 2016 Oct.

**Gilbertson JA, Cole PA.** Reconstruction of complex acromion fractures and nonunions with a locking mesh plate [e-poster]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

**Gilbertson JA, Tatro JM, Schroder LK, Cole PA.** Midterm outcomes of operatively treated scapula fractures [presentation]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

**Gilbertson JA, Tatro JM, Schroder LK, Cole PA.** 5-10 year outcomes of operatively treated scapula fractures [presentation]. *Orthopaedic Trauma Association Annual Meeting National Harbor*, MD. 2016 Oct.

**Godfrey GE, Billstein LE, Terwilliger AJ.** MIAHTAPS—A violence risk assessment successfully utilized to reduce assaults to health care workers [presentation]. *International Conference on Forensic Nursing Science and Practice*. Denver, CO. 2016 Oct.

Want to reduce assaults—and nursing staff fear—when caring for patients with a risk of violence? Master this assessment tool.

**Grall KJ, Barrett LJ, Koonce AE, Hegarty CB.** Is virtual grand rounds a good option for resident conferences [poster]? *CORD (Council of Emergency Medicine Residency Directors) Academic Assembly*. Nashville, TN. 2016 Mar.

**Grall KJ, Paddock MT, Hegarty CB, Hahn BA, Bogan MT, Wong M, Walter JW.** RegionsRAP: implementation of a novel journal club format incorporating instructional technology [poster]. *CORD (Council of Emergency Medicine Residency Directors) Academic Assembly*. Nashville, TN. 2016 Mar.

Haddix A, **Maciosek MV, Isham GJ,** Sanchez EJ, Teutsch SM, Woolf SH, Jones WA, **LaFrance AB.** Priorities for America's health: saving lives by closing gaps in key preventive services [presentation]. *American Public Health Association Annual Meeting & Expo*. Denver, CO. 2016 Nov.

**Hegarty CB, Barringer KW, Nelson JG,** Wong M, **Binstadt ES.** ABCs of team leadership: using shift card data to guide future education [poster]. *CORD (Council of Emergency Medicine Residency Directors) Academic Assembly*. Nashville, TN. 2016 Mar.

Hendriksen SM, **Westgard BC, Walter JW,** Masters TC, Logue CJ. Case series of patients with central retinal artery obstruction with the diagnosis confirmed with bedside ultrasound [poster]. *Undersea and Hyperbaric Medicine Society Annual Scientific Meeting*. Las Vegas, NV. 2016 Jun.

INTRODUCTION/BACKGROUND: Central retinal artery obstruction (CRAO) is a rare diagnosis but often results in sudden severe permanent vision loss. It is one of the newest indications for hyperbaric oxygen therapy, but time to treatment may be important, with current recommendations stating that patients should be treated within 24 hours. The purpose of this study was to confirm that bedside ultrasound may

play a role in the diagnosis of CRAO. MATERIALS/METHODS: A retrospective chart review was conducted to include all CRAO cases from January 2016 to March 2016 that were evaluated for CRAO with a bedside ultrasound. The diagnosis of CRAO was confirmed by Ophthalmology. Bedside ultrasound was conducted on the patient's eyes bilaterally. RESULTS: Four cases of CRAO were documented, three of which were later treated with hyperbaric oxygen because they were within the 24-hour treatment window. All patients had objective findings of decreased blood flow or possible emboli within the central retinal artery that was detectable by ultrasound. SUMMARY/CONCLUSIONS: Bedside ultrasound may be an important tool to hasten the diagnosis of central retinal artery occlusion to decrease the time to hyperbaric oxygen treatment.

**Hernandez BS.** Are top EM applicants declining to interview earlier in 2015: a review of declined invitations from 2013-2015 [poster]. *CORD (Council of Emergency Medicine Residency Directors) Academic Assembly.* Nashville, TN. 2016 Mar.

**Honstad AA, Pena FA, Lafferty PM.** Functional and radiographic outcomes for surgical reduction and internal fixation of posterior malleolus fractures [poster]. *Minnesota Orthopaedic Society Annual Meeting.* Minneapolis, MN. 2016 May.

**Horrigan PB, Olson JT, Lafferty PM.** Sagittal alignment measurements in operatively treated distal femur fractures [Poster #P483]. *American Academy of Orthopaedic Surgeons (AAOS) 2016 Annual Meeting.* Orlando, FL. 2016 Mar.

INTRODUCTION: Open reduction and internal fixation (ORIF) is presently the treatment of choice for distal femur fractures. However, with the increasing popularity of less invasive stabilization methods, there is an increasing need for reliable radiographic methods for assessing adequate reduction, particularly in the sagittal plane. Methods: This is a retrospective study of 67 adult patients without prior knee arthroplasty and with distal femur fractures treated with internal fixation. Research staff attempted each of seven previously validated measurements utilizing radiographic landmarks. Measurements were attempted on the most adequate postoperative lateral image of the distal femur. Measurement comprised the angle subtended by the anterior femoral cortical line and a line between two of six different radiographic landmarks. The Blumensaat Line-Shaft Angle (BLSA) was also recorded. The average measurement for each available data point was recorded in degrees, as was the success of obtaining each measurement point. Demographic data were also collected. Intra-observer reliability was calculated. Results: In only seven of 67 patients (10.4%) were all seven measurements obtainable. The average number of obtainable data points (out of seven) was 4.59. Two landmarks (AD and BD) were measurable in 95.5% and 92.5% of patients, respectively. Both measurements involved the proximal rim of the femoral condylar articular surface. Intraobserver reliability was calculated for these two variables, both of which were statistically significant and moderate to strong in correlation, respectively: AD:  $R = 0.53254$  ( $P = 0.01891$ ); BD:  $R = 0.73039$  ( $P = 0.00087$ ) Discussion and Conclusion: Historically, reliable imaging of distal femur fractures to determine proper reduction has been difficult to obtain. One recent study has attempted to describe intraoperative landmarks for assessing sagittal plane alignment of distal femur fractures. However, to our knowledge, no attempt at reproducible measurement of sagittal plane distal femoral anatomy after operative fixation has been performed. Despite the possibility of distal femoral implants obscuring radiographic measurements of sagittal plane alignment, two angular measurements were obtainable in over 90% of included patients. This data suggests that the proximal rim of the femoral condylar articular surface is the most easily identifiable of five different radiographic landmarks in patients treated with distal femoral internal fixation. These two most reliable measurements may be used to guide intraoperative decision making with the use of standard image intensification.

**House CM, Moriarity KA, Nelson WB.** The incidence and Doppler echocardiographic characteristics of normally functioning mitral prostheses with mean gradient  $\geq 10$  mm Hg [presentation]. *Robert Hebbel Seventeenth Annual Research Day, University of Minnesota.* Minneapolis, MN. 2016 Mar.

**Isham GJ, Sanchez EJ, Teutsch SM, Maciosek MV, Woolf SH, Haddix A, Jones WA, LaFrance AB, Nelson AF.** Priorities for America's health: identifying highest-impact, highest-value services outside of primary care [presentation]. *American Public Health Association Annual Meeting & Expo.* Denver, CO.

2016 Nov.

Lack of understanding what health-related services or policies provide the greatest health benefits for the most cost-effectiveness is a widespread problem. We propose that a solution developed in the realm of clinical preventive services merits application beyond primary care. The 2016 ranking of clinical preventive services builds on a robust, peer-reviewed approach to understanding and comparing the relative health and cost impact of disparate clinical services. To develop these priorities, we modeled the potential impact of 27 recommended, evidence-based clinical preventive services for cost-effectiveness and clinically preventable burden across a cohort of the U.S. population. We used a variety of models, including microsimulation models, in support of this approach, which allows accurate comparison of the health benefit and cost-effectiveness across vastly different preventive services. We then ranked the services with a separate measure for each category, drawing on methods developed for previously published rankings in 2001 and 2006. This presentation will focus on the relevance of these rankings outside of a primary care clinic. We will review the concept behind making evidence-based comparisons across treatments; highlight the benefits of quantifying the differences in value among disease management services, new drugs and medical devices; and discuss applications well beyond the walls of primary care.

**Johnson JD, Rozumalski A, Thomas AJ, Schroder LK, Switzer JA.** Three-dimensional gait analysis in a healthy geriatric cohort [e-poster]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

**Johnson JD, Rozumalski A, Thomas AJ, Schroder LK, Switzer JA.** Three-dimensional gait analysis in a healthy geriatric cohort [presentation]. *International Geriatric Fracture Society Annual Meeting*. Washington DC. 2016 Oct.

**Kelly JT, Bourdon RT, Stanfield SC, Burnett AM, Marsh CA, Droegemuller CJ.** Decreasing time from patient arrival via emergency medical services to CT imaging and TPA administration for suspected acute ischemic stroke patients [poster]. *ACMQ (American College of Medical Quality) Annual Meeting*. Washington DC. 2016 Apr.

**Kelly JT, Bourdon RT, Stanfield SC, Burnett AM, Marsh CA, Droegemuller CJ.** Decreasing time from patient arrival via emergency medical services to CT imaging and TPA administration for suspected acute ischemic stroke patients [poster]. *IHI (Institute for Healthcare Improvement) Quality Forum*. Orlando, FL. 2016 Dec.

**Kelly JT, Bourdon RT, Stanfield SC, Burnett AM, Marsh CA, Droegemuller CJ.** Decreasing time from patient arrival via emergency medical services to CT imaging and TPA administration for suspected acute ischemic stroke patients [poster]. *Metro Minnesota Council on Graduate Medical Education (MMCGME) 2016 Quality Forum*. Minneapolis, MN. 2016 May.

**Kelly JT, Stellpflug SJ, Isenberger KM, Zwank MD.** Patient satisfaction surveys: rising importance, limited reliability [presentation]. *AAEM (American Academy of Emergency Medicine) Scientific Assembly*. Las Vegas, NV. 2016 Feb.

**Kharbanda EO, Ekstrom HL, O'Connor PJ, Sinaiko AR, Asche SE, Dehmer SP, Fontaine PL, Sherwood NE, Stultz JM.** Use of electronic clinical decision support to improve clinical recognition of incident elevated blood pressure and return for repeat measurement [presentation]. *Pediatric Academic Societies Annual Meeting*. Baltimore, MD. 2016 May.

**Kipper KI.** Assessments for orientation and performance improvement [presentation]. *Simulation 2016 Conference, HealthPartners Clinical Simulation*. Saint Paul, MN. 2016 Oct.

**Kipper KI, Anderson HA.** Simulation 101 [presentation]. *Association for Nursing Professional Development (ANPD) Conference*. Pittsburgh, PA. 2016 Jul.

**Kipper KI, Anderson HA.** Maximizing simulation: inquiring minds want to know [presentation]. *Association for Nursing Professional Development (ANPD) Conference*. Pittsburgh, PA. 2016 Jul.

**Kipper KI, Anderson HA, Parker H, Griffin C.** Using simulation to determine readiness for independent practice [presentation]. *International Meeting for Simulation in Healthcare (IMSH 2016)*. San Diego, CA. 2016 Jan.

**Kipper KI, Anderson HA, Reid CA.** Best practices in simulation [presentation]. *Healthcare Educator Conference*. Bloomington, MN. 2016 Apr.

**Kipper KI, Mandy MR.** High-stakes summative assessment to determine nursing competency [presentation]. *International Meeting for Simulation in Healthcare (IMSH 2016)*. San Diego, CA. 2016 Jan.

**Larsen TA, Hernandez BS, Roeber EJ, Dries DJ, Willett SJ.** Eliminating the preventable occurrence of right mainstem intubation in the pediatric trauma patient [poster]. *Pediatric Trauma Society 4th Annual Meeting*. Nashville, TN. 2016 Nov.

**BACKGROUND:** Right mainstem intubation is a preventable occurrence that can be associated with airway injury and barotrauma. A quality PI initiative was undertaken to eliminate the preventable occurrence of right mainstem intubation in pediatric trauma patients. Overall, the objective of this performance measure is to achieve 0% right mainstem intubation. **METHODS:** In a Level I adult and pediatric trauma center, the Pediatric Major Trauma Resuscitation Policy was modified to improve documentation of pediatric airway management. Color-coded reference cards were attached to endotracheal tubes for pediatric trauma patients indicating the correct depth according to the Broselow resuscitation tape. Ongoing education was provided to emergency medicine staff, which performed intubation, to utilize available tools providing consistent and appropriate endotracheal tube depth. After intubation, a chest x-ray was immediately obtained to determine tube insertion depth. **RESULTS:** A before-after review was conducted to evaluate the impact of protocol modification for pediatric intubation between January 2009 and December 2015. During this time, 1,948 pediatric trauma patients were admitted. During this 7-year period, only 94 pediatric trauma patients were intubated. Prior to implementation of the PI initiative for pediatric intubation in October 2014, right mainstem intubation occurred in six of 68 (8.8%) of intubated pediatric trauma patients. After implementation of the PI initiative, right mainstem intubation occurred in 1 of 26 (3.8%) of intubated pediatric trauma patients. **CONCLUSIONS:** In a Level I adult and pediatric trauma center, intubation is infrequent among children. Right mainstem intubation can be reduced among pediatric trauma patients with a focused PI program, ongoing education and prompt availability of intubation guides.

Larson S, **Greene SM, Nelson AF.** Understanding the unique and generalizable partnerships created by the HCSRN to produce and use knowledge. The HCSRN: A national resource and partner for improving public health [lecture]. *American Public Health Association (APHA) Learning Institute*. Denver, CO. 2016 Oct.

The Health Care Systems Research Network was established in 1992 by the leadership of four research groups embedded in large integrated delivery systems that provide both health care and insurance coverage. Stemming from committed leadership, investigator goodwill, and trusting relationships, the HCSRN has grown to 20 organizations that provide health care and financing to more than 32 million people. Participating members share a common purpose: to improve the health of their populations by producing and using knowledge in the public domain and generating collaborative partnerships locally and nationally. Through evolving rules of engagement and a healthy culture of collaboration, the HCSRN is a desired partner for addressing the issues important to our communities. Local and national health policy and funding organizations include HCSRN in planning and prioritizing research needs as well as health care improvement initiatives. HCSRN investigators assemble "special interest groups," which function as incubators for new project ideas and may focus on specific health issues (obesity, cancer) and/or designated populations (child and adolescent health, older adults). Interest groups function both proactively, generating new investigator-initiated projects, and reactively, in that they are well-positioned to respond to relevant funding opportunities that arise. To support efficient multisite projects, research

administrators and IRB professionals also convene standing work groups under the auspices of the HCSRN. In these work groups, common templates, tools, and resources are developed to assist protection of research participants and ease the administrative burdens associated with grant development and contracting. Such supportive structures help ensure a rapid and predictable experience by researchers, collaborators, and funders. More than a dozen federally funded networks within the HCSRN continue to produce an ever-expanding portfolio and platform for increasingly complex research. The portfolio includes multisite condition-specific networks studying mental health, cancer, addiction, and diabetes, as well as population-focused networks studying aging. In each case, these multisite networks generate dozens of sub-projects, publications, and policy-relevant findings, examples of which will be discussed in this session. Local and national elements of the HCSRN architecture and infrastructure are openly shared to enrich the public commons. Examples include the Virtual Data Warehouse, data query capabilities, streamlined IRB review mechanisms, and governance. The HCSRN's principles and processes have also been applied by members to create local and regional partnerships such as the Midwest Research Network and have helped shape collaboration between health systems and their local public health agencies. Collectively, the HCSRN is producing learning communities to improve population health and well-being on a national scale.

**LeFevere RC.** The disaster: life-threatening on-ice emergencies [presentation]. *TRIA Orthopedics 19th Annual Orthopaedics and Sports Medicine Conference*. Bloomington, MN. 2016 Feb.

**Leniek KL.** OSHA respirator medical evaluation: questionnaire review and office visits [presentation]. *Greater Lakes Area Safety & Health Monthly Meeting*. Alexandria, MN. 2016 Dec.

**Leniek KL.** Role of physician and employer in early and safe return to work [presentation]. *Central Minnesota Human Resource Administrators Cooperative Monthly Meeting*. Monticello, MN. 2016 Dec.

**Leniek KL.** Injured worker case study: treatment of work-related back injuries [presentation]. *HealthPartners Central Minnesota Clinic & NovaCare Back Injuries in the Workplace Seminar*. Sartell, MN. 2016 Feb.

**Leniek KL.** Prevention of back injuries through pre-employment physical exams [presentation]. *HealthPartners Central Minnesota Clinic & NovaCare Back Injuries in the Workplace Seminar*. Sartell, MN. 2016 Feb.

**Leniek KL.** Promoting healthier lifestyles among truck drivers [presentation]. *Women in Trucking Event*. Eagan, MN. 2016 Jan.

**Leniek KL.** Occupational blood borne pathogen exposures [presentation]. *HealthPartners Occupational Medicine Residency Program*. Saint Paul, MN. 2016 Nov.

**Leniek KL.** Minnesota statute workers' compensation treatment parameters [presentation]. *HealthPartners Occupational Medicine Residency Program Lecture Series*. Saint Paul, MN. 2016 Nov.

**Marigi EK, Money J, Gao R, Abdulai A, Marsical J, Bernstein D, Cole PA.** Students training orthopaedic patients to stop smoking [poster]. *University of Minnesota Medical School Essentials of Clinical Medicine Service Learning*. Minneapolis, MN. 2016 Mar.

**Marston SB, Horazdovsky RD, Shin JS.** Efficacy of intrawound vancomycin powder to reduce infections after total joint arthroplasty [presentation]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

Masters TC, Hendrickson SM, **Westgard BC, Walter JW**, Logue CJ. Fluorescence microangiography to guide management of non-healing wounds [poster]. *Undersea and Hyperbaric Medicine Society Annual Scientific Meeting*. Las Vegas, NV. 2016 Jun.

INTRODUCTION/BACKGROUND: Treatment of non-healing wounds is often complicated by poor

perfusion. Tissues need a constant supply of blood and oxygen to ensure adequate wound healing. Currently, the most reliable method for assessing these wounds is clinical gestalt. TCPO<sub>2</sub> is often used to measure tissue perfusion, though this modality has multiple drawbacks. Fluorescence microangiography is increasingly being recognized as a useful tool by providing real-time visual and quantitative assessments of perfusion to guide treatment decisions in patients with complicated wounds. We discuss two patients whose management changed based on the results of their microangiography studies. MATERIALS/METHODS: Two patients with non-healing wounds underwent evaluation with the LUNA fluorescence microangiography device. After consent and time out, a peripheral IV was started on the patient for the injection of 2.5 mL indocyanine green (ICG) dye. A still photo of the target was taken for future reference. We then injected the ICG dye followed by a saline flush. Images were obtained at 7.5 frames per second and captured the ingress and egress of ICG dye to the target area. RESULTS: The first patient was an 87-year-old woman with ischemic changes to the fourth and fifth digits of her right foot. The initial plan was to perform a transmetatarsal amputation. After evaluation with fluorescence microangiography, she underwent a fourth- and fifth-digit amputation and went on to heal without complication. The second patient was a 63-year-old man with a history of PAD and a non-healing post-surgical wound from a great toe amputation. Based on his fluorescence microangiography evaluation, his initial hyperbaric course of 20 treatments was extended to 30 treatments, and he ended up healing well. SUMMARY/CONCLUSIONS: Fluorescence microangiography is a promising tool in the evaluation of complex wounds.

**Mathews BK.** Coaching – building relationships, improving performance [presentation]. *University of Minnesota Internal Medicine Residency Program Clinical Competency Committee*. Minneapolis, MN. 2016 Dec.

**Mathews BK.** Demystifying milestones [presentation]. *University of Minnesota Internal Medicine Residency Program Clinical Competency Committee*. Minneapolis, MN. 2016 Jul.

**Mathews BK.** Improving diagnosis in hospital medicine via point-of-care ultrasound [presentation]. *Annual Hospital Medicine Update: Full Systems Review*. Minneapolis, MN. 2016 May.

**Mathews BK.** HOCUS-POCUS Hospitalist-Oriented Compression Ultrasonography [presentation]. *Annual Hospital Medicine Update: A Full Systems Review*. Minneapolis, MN. 2016 May.

**Mathews BK.** Clinical competency committee – development of the resident assessment and coaching process [presentation]. *University of Minnesota Medical School*. Minneapolis, MN. 2016 May.

**Mathews BK.** Point-of-care ultrasound and patients' understanding of the diagnostic process [presentation]. *Diagnostic Error in Medicine International Conference*. Hollywood, CA. 2016 Nov.

**Mathews BK.** Medical bias in internal medicine [presentation]. *Minnesota-ACP Internal Medicine Meeting*. Minneapolis, MN. 2016 Oct.

**Mathews BK.** Diagnostic error in medical education [panelist]. *Society of Academic Emergency Medicine*. Iowa City, IA. 2016 Sep.

**Mathews BK.** Diagnostic error in medicine – point-of-care ultrasound in the diagnostic process [webinar]. *Society to Improve Diagnosis in Medicine (SIDM)*. 2016 Sep.

**Mathews BK.** Abdominal ultrasonography – case-based image interpretation [presentation]. *Essentials in Critical Care National Program, American College of Chest Physicians (CHEST)*. Chicago, Illinois. 2016 Sep.

**Mathews BK.** Five signature findings of lung ultrasonography [presentation]. *University of Minnesota Internal Medicine Residency Program. Educational Conference and Workshop*. Saint Paul, MN. 2016 Sep.

**Mathews BK**, Olson APJ. A new era in diagnosis: tools to understand and mitigate diagnostic error after the IOM report [presentation]. *Society of Hospital Medicine (SHM) Annual Meeting*. San Diego, CA. 2016 Mar.

Miller RG, Perras CA, **Frail CK**, Snyder ME. Perceived roles of community pharmacists and technicians in referrals to health resources [presentation]. *American Society of Health-System Pharmacists (ASHP) 2016 Midyear Clinical Meeting (MCM) & Exhibition*. Las Vegas, NV. 2016 Dec.

**Miotke SA, Null E, Wewerka SS, Mohr WJ**. Boomtown: oil industry burn patient demographics, treatment characteristics, and outcomes [presentation]. *Minnesota Surgical Society*. Minneapolis, MN. 2016 Oct.

**Mohr WJ, Null E, Morris AR, Moseley MB, Wewerka SS, Salzman JG**. Oil industry burn patient demographics, treatment characteristics, and outcomes [poster]. *Global Health Conference Midwest (GHCM 2016)*. Omaha, NE. 2016 Feb.

**Moser-Bleil BK, Skarda PK**. Post-intervention assessment of hepatitis C birth cohort screening [presentation]. *Twin Cities Quality Forum*. Minneapolis, MN. 2016 May.

**Mullen DM**. AGP: increasing accessibility, integrating data and advancing usability. *American Diabetes Association (ADA) 76th Scientific Sessions*. New Orleans, LA. 2016 Jun.

**Mullen DM, Carlson AL, Conry J, Criego A, Davidson JL, Johnson M, Olson B, Sperl-Hillen JM**. Standardized report for pattern recognition: role of the Ambulatory Glucose Profile (AGP) in closed loop therapy [presentation]. *National Institutes of Health Fourth Artificial Pancreas Workshop: Testing and Adoption of Current and Emerging Technologies*. Bethesda, MD. 2016 Jul.

**Mullen DM**, Johnson TJ, Walker DM, Ford EW, Huerta TR. SC13 changes in e-cigarette awareness and perceived harmfulness and their relationship to smoking cessation [presentation]. *North American Primary Care Research Group (NAPCRG) Annual Conference*. Colorado Springs, CO. 2016 Nov.

Electronic cigarettes are gaining in popularity as an alternative to regular cigarettes and for potential in aiding cessation efforts among smokers. Objective: This study seeks to extend previous research and examine longitudinal trends in e-cigarette awareness and perceived harmfulness in association with intention to quit. Design: Data from three administrations of the Health Information National Trends Survey (HINTS 4 Cycles 2-4) were combined into a single dataset for multi-year analysis spanning 2012-2014. Results: Overall awareness of e-cigarettes increased from 77.1% in 2012 to 85.4% in 2013 and 94.3% in 2014. Perception of e-cigarette harmfulness declined slightly from 50.7% in 2012 to 47.6% in 2014. Older respondents were increasingly less likely to be aware of e-cigarettes than those in the referent group of 18- to 34-year-olds. Racial minorities had lower odds of being aware of e-cigarettes than whites. Females and minority races were less likely to believe that e-cigarettes were less harmful than regular cigarettes compared to males and whites, respectively. E-cigarette awareness and perceived harm were not found to be associated with intention to quit smoking. CONCLUSION: The two additional survey years since the original study have shown a continued increase in overall public awareness of e-cigarettes. Still, no relationships between awareness and intention to quit or perceived harm and intention to quit were found in the extended analysis.

**Nelson AF**. Different institutional budget models [roundtable discussion]. *University of Minnesota Division of Epidemiology and Community Health*. Minneapolis, MN. 2016 Dec.

**Nelson AF**. Confluence of cultures in time of transition: Research and care delivery [presentation]. *Kaiser Permanente Southern California*. Los Angeles, CA. 2016 Jul.

**Nelson AF, Larson S, Greene SM**. Priorities for America's health: identifying highest-impact, highest-value services outside of primary care [presentation]. *American Public Health Association (APHA) 2016*

*Annual Meeting & Expo*. Denver, CO. 2016 Oct.

This interactive short course describes how to partner with the Health Care Systems Research Network (HCSRN). Our researchers use electronic health records, healthcare claims, and other administrative databases from across our participating health systems to study and improve population health. You will hear an overview of the network and its data resources, learn about questions that can be answered with these data, and discover collaboration opportunities.

**Nelson JG**. Preliminary impact of a novel team-based competition on faculty attendance to weekly residency didactics [poster]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**Nelson JG, Simon HM, Schnitker CK, Wewerka SS, Mischel-Abramowski E**. Cost-effectiveness of faculty physician incentives for resident feedback [poster]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**O'Connor PJ**. The future of quality measurement -- metrics that matter [presentation]. *American Diabetes Association (ADA) 76th Scientific Sessions*. New Orleans, LA. 2016 Jun.

**O'Connor PJ, Sperl-Hillen JM, Crain AL, Margolis KL, Desai JR**. Recent trends in CV risk factor control and CV risk in adults with diabetes [presentation]. *European Diabetes Epidemiology Group 2016 Annual Meeting*. Kildare, Ireland. 2016 Apr.

**O'Connor PJ, Sperl-Hillen JM, Desai JR**. Using CV wizard to reduce CV risk in adults [presentation]. *Geek Talk, Center for Medicaid and Medicare Innovation*. Baltimore MD. 2016 Mar.

**O'Connor PJ**. Patient-centered care — is there too much of a good thing [presentation]? *American Diabetes Association (ADA) 76th Scientific Sessions*. New Orleans, LA. 2016 Jun.

**O'Halloran KP**. Tibial shaft fracture nonunion six-week predictive model [presentation]. *Minnesota Orthopaedic Society Annual Meeting*. Orlando, FL. 2016 Mar.

**O'Halloran KP, Coale M, Costales T, Zerhusen TJ, Nascone JW, O'Toole RV, Castillo RC**. A predictive model of tibial shaft fracture nonunion at the time of definitive fixation [presentation]. *American Academy of Orthopaedic Surgeons (AAOS) 2016 Annual Meeting*. Orlando, FL. 2016 Mar.

**Parker DL**. A public health perspective on child labor [presentation]. *EPICOH (Epidemiology in Occupational Health) 25th Conference*. Barcelona, Spain. 2016 Sep.

**Parker DL, Yamin SC**. Characteristics of safety in a national sample of small businesses [presentation]. *EPICOH (Epidemiology in Occupational Health) 25th Conference*. Barcelona, Spain. 2016 Sep.

**Parker DL, Yamin SC**. A national small-business intervention: lockout and tagout [presentation]. *EPICOH (Epidemiology in Occupational Health) 25th Conference*. Barcelona, Spain. 2016 Sep.

**Pawloski PA**. Collaborating with the CRN: an overview and examples of adherence research [presentation]. *NIH Adherence Network CRN Working Group Meeting*. Bethesda, MD. 2016 Aug.

**Powers MA, Melancon T**. Diabetes educators and care coordinators create a new paradigm for primary care [presentation]. *American Association of Diabetes Educators Annual Conference: AADE16*. San Diego, CA. 2016 Aug.

An aging population with more chronic disease is overtaxing the nation's primary care physicians, who need support from certified diabetes educators, social workers, dietitians, and other health team members.

**Rasimas JJ.** Antagonizing the errors of history: bedside experience with Flumazenil [presentation]. *European Association of Poisons Centers and Clinical Toxicologists (EAPCCT) 36th International Congress.* Madrid, Spain. 2016 May.

**Rasimas JJ, Held JT, Holt R, Narang PD.** One institutional policy for treating depression with ketamine and a proposal for clinical consortium [poster]. *College of Psychiatric and Neurologic Pharmacists (CPNP) Annual Meeting.* Colorado Springs, CO. 2016 Apr.

**Ridley TJ, Freking WG, Ward CM.** Infection rates of buried vs. exposed Kirschner wires in phalangeal, metacarpal, and distal radius fractures [poster]. *Minnesota Orthopaedic Society Annual Meeting.* Minneapolis, MN. 2016 May.

**Ridley TJ, Freking WG, Ward CM.** Infection rates of buried vs. exposed Kirschner wires in phalangeal, metacarpal, and distal radius fractures [poster]. *American Society for Surgery of the Hand Annual Meeting.* Austin, TX. 2016 Sep.

**Rossom RC.** Geriatric psychiatry [presentation]. *Park Nicollet's Update in Psychiatry Conference.* Saint Louis Park, MN. Mar 2016.

Samikoglu A, **Rasimas JJ.** Story hour: learning and teaching the psychodynamics of crisis consultation [presentation]. *American Academy of Psychoanalysis and Dynamic Psychiatry Annual Meeting: Let's Play! The Role of Play in Treatment Across the Lifespan.* Atlanta, GA. 2016.

Sanchez EJ, **Isham GJ,** Haddix A, Jones WA, Teutsch SM, Woolf SH, **Maciosek MV, LaFrance AB.** Priorities for America's health: capitalizing on life-saving, cost-effective preventive services [presentation]. *American Public Health Association Annual Meeting & Expo.* Denver, CO. 2016 Nov.

**Sandberg BF, Bohm KC, Switzer JA, Hill BW, Olson JT, Lafferty PM.** Immediate sarmiento bracing for the treatment of humeral shaft fractures [presentation]. *American Academy of Orthopaedic Surgeons (AAOS) 2016 Annual Meeting.* Orlando, FL. 2016 Mar.

**INTRODUCTION:** Coaptation splints require skillful application, are difficult to maintain, and are prone to skin complications. Our study evaluates if immediate application of a sarmiento fracture brace produces equivalent radiographic alignment compared with coaptation splinting. **METHODS:** Using a retrospective cohort design, 51 patients were identified via CPT code and review of radiographs between January 2008 and March 2015. Demographic data; patient factors, including BMI; and associated nerve palsies were recorded. Orthogonal radiographs at the time of injury, post-reduction, and where available, at union were measured for sagittal and coronal plane angulation. Initial immobilization was selected by staff preference, and 20 patients were placed in fracture braces and 31 in coaptation splints. Acceptable alignment was considered to be <30 degrees of varus angulation, <20 of sagittal plane angulation, and <2 cm shortening. **RESULTS:** Of the 20 patients with immediate sarmiento bracing, the average varus alignment after brace application was 13.5 vs. 11.4 degrees for those with immediate coaptation splinting. The percentage of patients with acceptable alignment after reduction was 84% in both groups. Of patients with complete radiographs at union, all in the sarmiento group healed in acceptable alignment, compared to 92% in the coaptation group. Five patients in the coaptation group required repeat reductions, compared to one in the sarmiento group. All five nonunions were in the coaptation splinting group. Patients in both groups were similar with regards to initial injury displacement and radial nerve palsy. In the sarmiento group, similar proportions of patients were lost to follow up or converted to operative fixation. **DISCUSSION/CONCLUSION:** The initial management of humeral shaft fractures is only superficially discussed in the current literature and, to our knowledge, this is the first report to compare the immediate and final radiographic outcomes of patients initially treated with either a sarmiento brace or coaptation splint. Our data show that post-reduction alignment was similar between patients, and equal proportions of patients had acceptable post-reduction alignment. However, patients immediately placed into a sarmiento brace required fewer repeated reduction attempts. Given the difficult nature of coaptation splinting, these findings support the role of immediate sarmiento bracing for the initial management of humeral shaft fractures.

**Schirmers JD, Gilbertson JA, Schroder LK, Cole PA.** Extra-articular malunions and nonunions of the scapula: a comparison of functional outcome before and after reconstruction [e-poster]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

**Schnaus MJ, Huepfel WM, Onizuka T, Skarda PK.** Post-intervention assessment of routine HIV screening [presentation]. *Twin Cities Quality Forum*. Minneapolis, MN. 2016 May.

**Seburg EM, JaKa MM, Kunin-Batson AS,** Langer SL, Levy RL, **Sherwood NE.** Does parental concern about child weight predict change in child BMI percentile among children in an obesity prevention intervention [poster]? *Society of Behavioral Medicine 37th Annual Meeting & Scientific Sessions*. Washington DC. 2016 Apr. Project: A08-132 Healthy Homes/Kids 5-9.

**Stellpflug SJ.** The serum osm: understand it and order it less [invited presentation]. *American Academy of Emergency Medicine (AAEM) Congress*. Las Vegas, NV. 2016 Feb.

**Stellpflug SJ.** Urine drug screen: classically ordered and useless as ever [invited presentation]. *American Academy of Emergency Medicine (AAEM) Congress*. Las Vegas, NV. 2016 Feb.

**Switzer JA.** Controversies in geriatric care in orthopaedics [instructional course lecture] *American Academy of Orthopaedic Surgeons (AAOS) 2016 Annual Meeting*. Orlando, FL. 2016 Mar.

**Tatro JM, Gilbertson JA, Schroder LK, Cole PA.** Patient perception of cosmesis in operatively indicated scapula fractures [e-poster]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

**Tatro JM, Schroder LK, Molitor BA, D. PE, Cole PA.** 10-year retrospective review of scapula fractures--a National Trauma Data Bank study [e-poster]. *Minnesota Orthopaedic Society Annual Meeting*. Minneapolis, MN. 2016 May.

Thoma B, Chan TM, Joshi N, **Ankel FK,** Trueger S. iMedEd quality appraisal: how to guide for learners, teachers, and producers [presentation]. *Council of Emergency Medicine Residency Directors (CORD) Academic Assembly*. Nashville, TN. 2016 Mar.

**Walker PF.** Global health threats [presentation]. *GHIT Conference 2016*. Global Health Institute Thailand, Chiang Mai University. 2016 Feb.

**Walker PF.** Ethical conundrums in refugee health [presentation]. *North American Refugee Health Conference*. Niagara Falls, NY. 2016 Jun.

**Walker PF.** Displaced persons and the diseases they follow [presentation]. *IDWeek 2016*. New Orleans, LA. 2016 Oct.

**Walter JW.** So you wanna be a 21st century learner [presentation]? *Minnesota ACEP (American College of Emergency Physicians) Chapter Emergency Medicine Leadership Summit*. Bloomington, MN. 2016 Nov.

**Walter JW.** Emergent HBO: where's your enthusiasm [presentation]? *HealthPartners Emergency Medicine & Trauma Update*. Bloomington, MN. 2016 Oct.

**Walter JW,** Minnihan RE, **Westgard BC,** Hendriksen SM, Masters TC, Logue CJ. Prospective study of mucosal atomizer device use on myringotomy patency [poster]. *Undersea and Hyperbaric Medicine Society Annual Scientific Meeting*. Las Vegas, NV. 2016 Jun.

INTRODUCTION/BACKGROUND: Otic barotrauma from Eustachian tube dysfunction is the most common complication related to hyperbaric treatments. Tympanostomy tubes have long been placed in

patients who are unable to equalize the middle ear while undergoing hyperbaric treatments. This requires evaluation by an otolaryngologist, which can delay hyperbaric treatments. Myringotomies performed by the HBO2 provider are an alternative option. A concern with this procedure is premature myringotomy site closure requiring repeat myringotomies or tympanostomy tube placement resulting in further patient discomfort and possible complications. A possible solution is to use a mucosal atomizer device to gently infuse the myringotomy site with air to maintain patency, which has become the standard of care at Hennepin County Medical Center. However, the effectiveness of this method to maintain myringotomy patency has not previously been studied. MATERIALS/METHODS: Patients who are undergoing bilateral myringotomies will be randomly assigned to use a mucosal atomizer device in a randomly assigned ear. This will allow a self-control scenario with the contralateral ear acting as the control. Randomization will occur using a random number generator with continuous enrollment. Patients will use a mucosal atomizer device prior to each hyperbaric oxygen treatment. Patients will be evaluated routinely for myringotomy patency with planned examination 15, 30, 45, 60 and 90 days after the myringotomies are performed to evaluate patency. RESULTS: Study parameters to be measured:

- Primary outcome: myringotomy patency
- Need to repeat myringotomy
- The number of hyperbaric treatments in which the patient has ear pain or requires any stops during compression.
- Any demonstrable otic barotrauma on exam (with TEED score).

Walz E, **Alpern JD**, Travis DA, **Stauffer WM**. Engaging the community expert: bushmeat consumption in a US metropolitan area [presentation]. *Society's Grand Challenges through Community Engaged Research Meeting, Teaching and Learning Conference*. Minneapolis, MN. 2016 Mar.

Walz E, Wilson D, Stauffer J, Travis DA, **Stauffer WM**, **Alpern JD**. Knowledge, attitudes, practices, and economics of West African bushmeat imported into Minnesota [poster]. *Mayo Clinic Infectious Disease Fellows 13th Annual Forum*. Rochester, MN. 2016 Apr.

Walz E, Wilson D, Stauffer J, Travis DA, **Stauffer WM**, **Alpern JD**. Economics, knowledge, attitudes and use of West African bushmeat in Minnesota: an interdisciplinary approach to health [poster]. *Interprofessional Poster Showcase, Academic Health Center 1 Health Event*. Minneapolis, MN. 2016 Apr.

**Williams B**, **Collier RC**, **Boffelli TJ**, **Anderson SA**. Vitamin D levels in patients with metatarsal fractures [poster]. *American Orthopaedic Foot & Ankle Society*. Toronto, Canada. 2016 Jul.

Williams B, Terwilliger A, Robertson B, Gurliacci R, Miller CS, **Haley KB**. Impact of learning environment on paramedic student critical thinking [poster]. *NAEMSE (National Association of EMS Educators) Prehospital Care Research Forum*. Fort Worth, TX. 2016 Aug.

Wolfson JA, **Erickson LO**. Characterizing causal treatment effect heterogeneity with conditional inference trees [presentation]. *Joint Statistical Meetings*. Chicago, IL. 2016 Jul.

**Woster CM**, **Motalib S**, **Pasquarella JR**, **Wewerka SS**, **Zwank MD**. Placement of a cervical collar increases the optic nerve sheath diameter in healthy adults [presentation]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

Wu H, **Cunningham BP**, Liu M, Patel K, Caldwell A, Shearer D, Morshed S, Miclau T, Institute for Global Orthopaedics and Traumatology U. Orthopaedic trauma in the developing world: where are the gaps in research, and what can be done [presentation]? *Orthopaedic Trauma Association Annual Meeting*. National Harbor, MD. 2016 Oct.

**Ziegenfuss JY**. Seasonal variation and nonresponse bias in a population survey of health and well-being [presentation]. *American Association for Public Opinion Research*. Austin, TX. 2016 May.

**Ziegenfuss JY**. Iterative design and embedding research into operational survey of health and well-being

[presentation]. *International Field Directors & Technology Conference (IFD&TC)*. Austin, TX. 2016 May.

**Zwank MD**. Variability in quantity and quality of point-of-care ultrasounds performed by core faculty at a teaching hospital [presentation]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**Zwank MD, Hahn BA**. Provider compliance with the steps of a checklist during central venous catheter insertion is highly variable [poster]. *SAEM (Society of Academic Emergency Medicine) Great Plains Regional Meeting*. Iowa City, IA. 2016 Sep.

**Zylla DM**. Establishing personal pain goals in oncology patients to improve patient care and decrease costs. *ACCC (Association of Community Cancer Centers) 33rd National Oncology Conference: The "How-To" Conference for the Cancer Care Team*. Saint Louis, MO. 2016 Oct.

Opioids remain a mainstay for oncology pain management, but long-term use poses numerous challenges. Fraunshuh Cancer Center led an 18-month initiative to improve patient understanding of opioid use, educate clinicians on opioid costs and comparative effectiveness, and implement a nursing protocol to document personal pain goals (PPG). Learn how this pain intervention improved rates of PPG documentation, streamlined work processes, decreased out-of-pocket costs, and enhanced both patient and provider experience.

## Books and Book Chapters

**Boley SP, Stellpflug SJ, Sherman SC, Cico SJ, Nordquist E, Ross C, Wang E**. Patellar tendon rupture. In: Sherman SC, Cico SJ, Nordquist E, Ross C, Wang E, eds. *Atlas of clinical emergency medicine*. 1st ed. Philadelphia, PA: Wolters Kluwer; 2016:279+.

Bryant RA, **Nix DP**. *Acute and chronic wounds: current management concepts*. 5th ed. Saint Louis, MO: Mosby; 2016.

**Cole PA, Horadovsky RD**. Shoulder girdle injuries. In: Robinson JD, ed. *Orthopaedic trauma in the austere environment: a practical guide to humanitarian care*. Switzerland: Springer; 2016:431-52.

**Cunningham BP, Bolley B, Robinson JD**. Telemedicine and smartphones: is there a role for technology in the austere environment? In: Robinson JD, ed. *Orthopaedic trauma in the austere environment: a practical guide to humanitarian care*. Switzerland: Springer; 2016:677-684.

**Kottke TE, Gallagher JM, Rauri S, Tillema JO, Pronk NP, Knudson SM**. *New summary measures of population health and well-being for implementation by health plans and accountable care organizations*. Washington DC: National Academy of Medicine; 2016 Jul.

Health plans and accountable care organizations measure many indicators of patient health, with standard metrics that track factors such as patient experience and cost. They lack, however, a summary measure of the third leg of the Triple Aim, population health. In response, HealthPartners has developed summary measures that align with the recommendations of the For the Public's Health series of reports from the Institute of Medicine. The summary measures comprise three components: current health, sustainability of health, and well-being. The measure of current health is disability-adjusted life years (DALYs) calculated from health care claims and death records. The sustainability of health measure comprises member reporting of six behaviors associated with health plus a clinical preventive services index that indicates adherence to evidence-based preventive care guidelines. Life satisfaction represents the summary measure of subjective well-being. HealthPartners will use the summary measures to identify and address conditions and factors that have the greatest impact on the health and well-being of its patients, members, and community. The method could easily be implemented by other institutions and organizations in the United States, helping address a persistent need in population health measurement for improvement.

**Kottke TE**, Stiefel M, **Pronk NP**. *Well-being in all policies: promoting cross-sectoral collaboration to improve people's lives [discussion paper]*. Washington DC: National Academy of Medicine; 2016 Apr.

**Lafferty PM**. Extracapsular proximal femur fractures. In: Court-Brown C, McQueen M, Swiontkowski MF, Ring D, Friedman SM, Duckworth AD, eds. *Musculoskeletal trauma in the elderly*. Boca Raton, FL: CRC Press/Taylor & Francis; 2016.

Li L, Hua W, Yan L, Axtman S, Feibelmann S, Kawai A, **Vazquez-Benitez G**, Xu S, Mini-Sentinel Workgroup. *Two-dimensional scan statistics for assessing vaccine safety in pregnancy (PRISM)*: Mini-Sentinel Coordinating Center; 2016 Apr.

Malan D, Radjy S, **Pronk NP**, Yach D. *Reporting on health: a roadmap for investors, companies and reporting platforms*. New York, NY: The Vitality Institute; 2016 Jan.

**Moscetti CW**, **Hawes JK**, Malm CB, **Pronk NP**. *familyPower: a referral-based pediatric obesity treatment program that connects clinic to family: discussion paper*. Washington DC: National Academy of Medicine; 2016 May.

National Academies of Sciences, Engineering, and Medicine, Dietz WH, **Pronk NP**, Shern L. *The role of business in multisector obesity solutions: working together for positive change: workshop in brief*. Washington DC: The National Academies Press; 2016.

O'Connor E, **Rossom RC**, Henninger M, Groom HC, Burda BU. *Screening for depression in adults: an updated systematic evidence review for the US Preventive Services Task Force: Evidence Synthesis No. 128*. Rockville, MD: Agency for Healthcare Research and Quality (AHRQ), AHRQ Publication No. 14-05208-EF-1; 2016 Jan.

**Pronk NP**, **Hermann D**, **Gallagher JM**, **Egan KT**, **Allen CU**, **Remark MM**. Be well at Regions Hospital in Saint Paul, Minnesota, USA. *Health: our business (volume 2): case studies from the corporate world, putting health and wellbeing into action*. London, England: Global CMO Network/Bupa; 2016:66-73.

Regions Hospital, one of the largest HealthPartners business units with its team of 5,100 dedicated professionals, is a Level one trauma center with one of the Twin Cities' busiest emergency departments. The stressors related to hospital care are ever-present, and the jobs are physically, emotionally, and mentally challenging. In order to deliver great care, service, and experience for patients and families, the Regions leadership team knew they had to make the health and wellbeing of employees as much a priority as the care provided to patients – because “you cannot give to others what you do not have yourself.” The Regions health and wellbeing journey started in earnest when leadership used data to identify relationships between healthcare costs and gaps in employee health. This commentary presents the Regions experience between 2009 and 2016 and highlights the key drivers and the population health impact over that period.

**Pronk NP**, chair of the Business Industry Sector of the National Physical Activity Plan Alliance. *National Physical Activity Plan (NPAP)*. Columbia, SC: National Physical Activity Plan (NPAP) Alliance; 2016.

**Pronk NP**, member of the Roundtable on Obesity Solutions, National Academies of Sciences, Engineering, and Medicine. *Obesity in the early childhood years: state of the science and implementation of promising solutions: workshop summary*. Washington DC: National Academies Press; 2016 Jun.

**Switzer JA**, **Schroder LK**, Court-Brown C, McQueen M, Swiontkowski MF, Ring D, Friedman SM, Duckworth AD. Polytrauma in the elderly. In: Court-Brown C, McQueen M, Swiontkowski MF, Ring D, Friedman SM, Duckworth AD, eds. *Musculoskeletal trauma in the elderly*. Boca Raton, FL: CRC Press/Taylor & Francis; 2016.

**Zwank MD**, Sherman SC, Cico SJ, Nordquist E, Ross C, Wang E. *Atlas of clinical emergency medicine*. Philadelphia, PA: Wolters Kluwer; 2016

## Web Pages

Fisher RG, Nixon LJ, Duran AM, Rothenberger M, **Skarda PK**, Duffy B, Olson APJ, Danieli R, Wetherbee E, **Lorence EK**, Rank K, Voight J, Palmer A, Ercan-Fang N. *An interactive approach to milestone assessments across settings*. 2016 Mar. <http://www.im.org/p/cm/ld/fid=1392>. AAIM (Alliance for Academic Internal Medicine) Curated Milestone Evaluation Exhibit.

**Mathews BK**. *Feedback could help doctors improve diagnosis*. 2016 Mar. <http://www.medscape.com/viewarticle/860216>. Medscape.