BLUE LIGHT

EXPOSURE /OVEREXPOSURE OUR EYES AND LIFESTYLE

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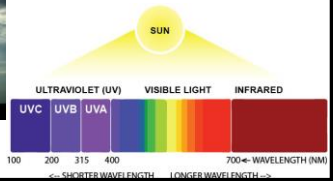
What is this blue light everyone is talking about?

- Light entering the eye is comprised of the visible and non visible

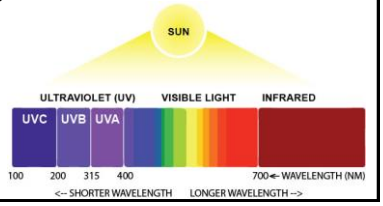


- Visible light is what we are familiar with as the "rainbow"

ROYGBIV =red, orange, Yellow, green, blue, indigo, violet

Visible light isn't the only light that goes into our eyes.

Non-visible light such as UV and Infra red light are also coming from the sun

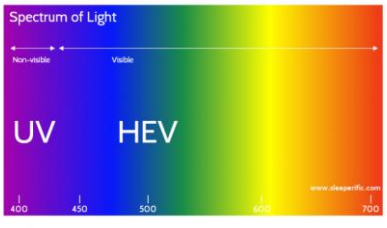


There has been much education about the UV light and how we need to protect ourselves (skin, eyes, etc) from too much exposure.

UV light can cause sunburn – that can become/ cause skin cancer

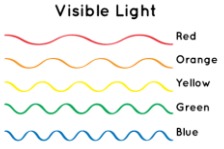
UV light overexposure can cause / advance cataracts

Blue light is the next light on the spectrum and the first light in the visible spectrum



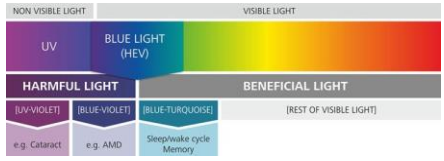
Blue light is the highest energy light on the visible spectrum

Its energy is 390-500nm and it has a short wave length.



Because short-wavelength, high energy blue light scatters more easily than other visible light, it is not as easily focused.

The blue light spectrum can be divided even further and each part of the blue light can affect our eyes/ bodies differently.



The GOOD (?)

The "good" about blue light affects a small population But the general positives are:

*Blue light is included in the basic illumination in the world – visible spectrum and creates all the color we see

*Blue light helps with our Circadian cycles (sleep/wake patterns)

*The blue light in ranges 465-495 help with the function of the pupil

The Good

Blue light has been studied in treatment for mental illness and psychological disorders such as anxiety, dementia, and bulimia.

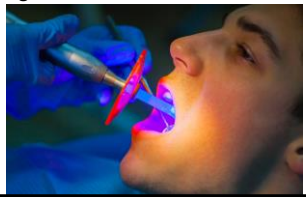
It has been found to show increased activity levels in daytime in these patients.

Also the use of blue light in newborn babies with jaundice to convert bilirubin in these babies.

The Good

Dentistry

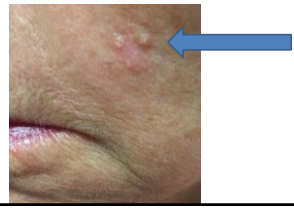
- The blue light we often see our dentists use is called a dental curing light.
- It's used to set fillings and sealants in a matter of seconds.



The Good

Dermatology

photodynamic, or "blue-light," therapy is helping dermatologists ward off skin cancer in patients with actinic keratoses.



WHERE DOES ALL THIS BLUE LIGHT COME FROM?

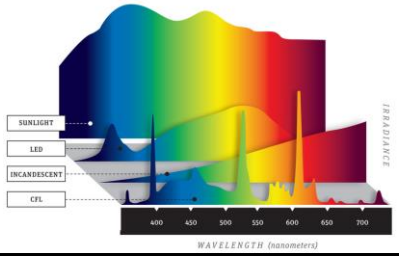
SUNSHINE

25-30% of blue light comes from the sun
And helps make the sky appear blue

INDOOR LIGHT

The change in the past decade from traditional incandescent light bulbs to current more "energy efficient" CFL's and LED bulbs

Incandescent bulbs produced much lower blue light than the new bulbs being used today.



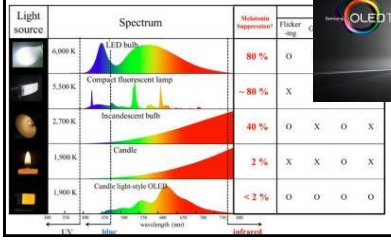
Digital Devices

TV screens – these have increased the amount of blue light being emitted with the increase in technology.

The change to LED screens increased the blue light

NOW- OLED TVs are coming out.

Little if any blue light



Digital Devices

Cell Phones, Tablets,

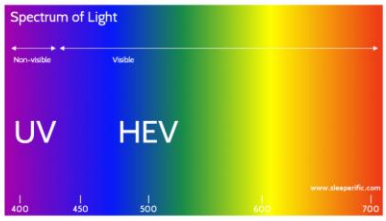
Laptops and computer monitors.

All emit significant levels of blue light

90% of Americans use digital devices for 2 or more hours a day

60% use digital devices for 5 or more hours a day

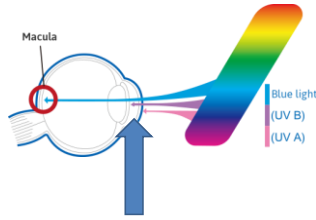
DOES IT REALLY AFFECT OUR EYES?



WE know and it has been proven that UV light exposure over time causes or expedites cataract development

UV LIGHT

This is because the lens of eye absorbs UV light



The cornea also absorbs some of the UV light

Eye Conditions

Anterior Segment/ Cornea conditions related to exposure to the sunlight

Pterygium- abnormal growth on the bulbar conjunctiva

Pinguecula- subconj. Bump comprised of degenerated tissue

Eye Conditions

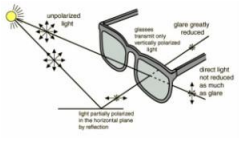
Photokeratitis

Especially "snow blindness" – a painful, temporary loss of vision due to overexposure to the sun's UB rays = sunburned cornea/conj.

Sunglasses

Most offer UVA/UVB coverage for outside to help minimize this exposure

polarized glasses help decrease glare



BLUE LIGHT

We are being bombarded with much more blue light in our average day than before.

Blue light reaches the retina:

Causes:

Glare
Eye Fatigue
Eye Strain

AMD

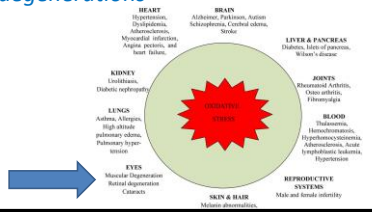
Risks of blue light causing AMD?????

NO current studies have shown that digital screens cause increased incidence of AMD

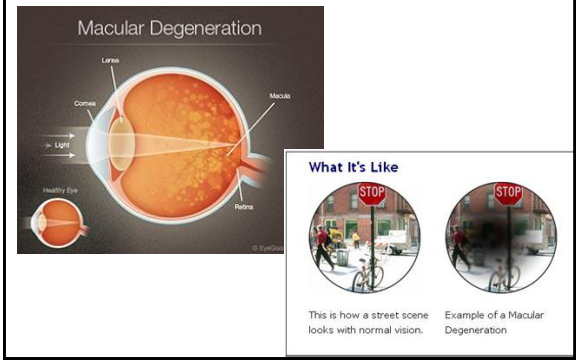
HOWEVER…….

AMD

Studies have shown that high constant levels of blue light can cause photo-oxidative buildup and damage in the retina that can contribute to age changes and degenerations



AMD



EYE STRAIN

Symptoms

Neck and shoulder pain
Eye strain
Headaches
Blurred vision
Dry eyes

Eye Strain

Sitting at workstations for computer screens to be 20-40 inches or arms length from our eyes is optimal.

Health/ Strain

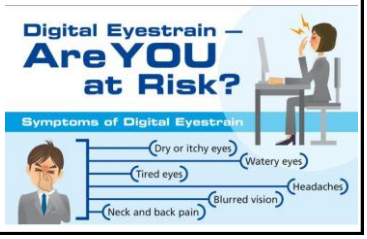
The angle at which devices are held contribute to neck and shoulder pain

Eye Strain

The decreased blinking rate while looking at devices lead to the dry eye and blurred vision complaints.

EyeStrain

Adults under 30 experience the highest rate of digital eyestrain = 73%

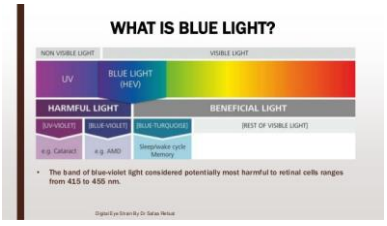


- **90%** of patients do not discuss digital device useage at the time of their eye exam.

It is becoming something that needs to be included in the conversation with the patients, especially those who complain of the most common eye strain symptoms.

SLEEP DISRUPTION AND HEALTH

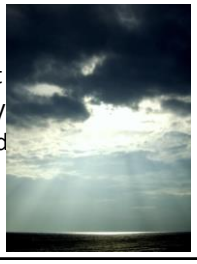
Probably the biggest connection of blue light and health problems is how it affects sleep



SLEEP

Short wavelengths = blue light

Has been associated with alertness and wakefulness.



So having exposure to blue light

To wake up and through the day

Helps boost attention and mood

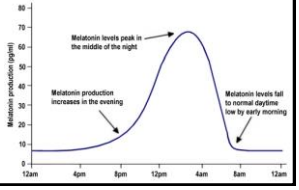
BUT……..

SLEEP

Blue light suppresses the melatonin in our brain

Melatonin is the sleep hormone- that helps us regulate our circadian rhythms

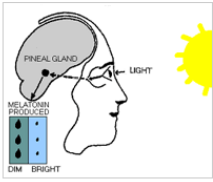
(our body's normal wake/sleep cycle)

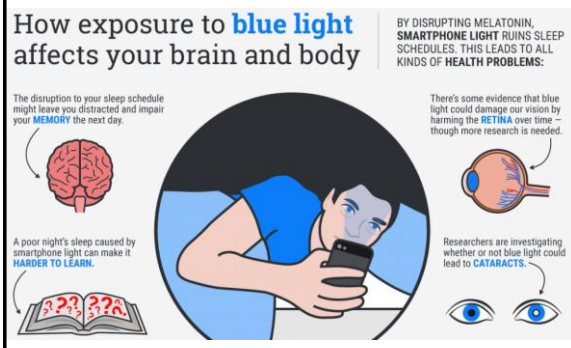


SLEEP

Exposure to blue light when we are getting ready for sleep is counteractive.

By continually exposing our eyes to the blue light it is decreasing Our melatonin and limiting our sleep readiness





SLEEP

It HAS been clinically proven that exposure to blue light disrupts sleep!!

Yet- More than 75% of Americans look at digital devices in the hour before gong to bed.

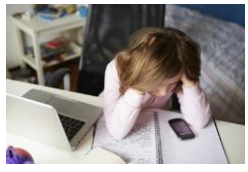
SLEEP DEPRIVATION

The decrease in sleep that occurs due to the change in our rhythms can affect additional things in our health.

Sleep Deprivation =

- ⬆ Risk of Diabetes
- ⬆ Risk of Heart Disease
- ⬆ Obesity
- ⬆ Risk of Cancer

SLEEP DEPRIVATION



WHAT CAN BE DONE?

Wearing lenses:

For daily work with devices =“computer eyewear”

Anti reflective coating = reduces reflections

Amber/ Yellow filters

Pro: filters out blue and violet ligh

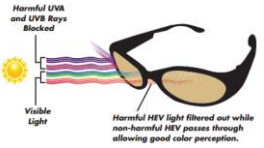
Con: lenses usually have yellow tint

What to do

HEV filter lenses / coatings:

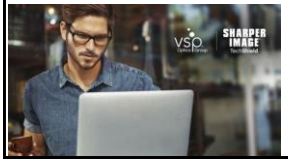
PRO: designed to block out High Energy blue light

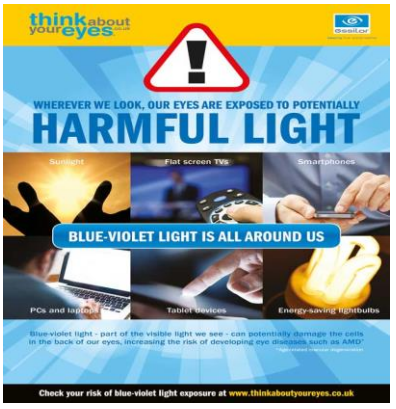
Con: may have light yellow tint or bluish tint



What to do - lenses

HEV Filters Available





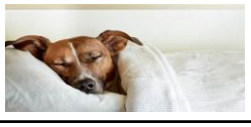
Best Behaviors

Turn brightness down on devices or use display altering software on them.

Turn the brightness down on devices

OR

Just begin to limit your device time at least an hour before bedtime.



Best Behaviors

Help protect your vision:

Minimize blue light exposure

- f.lux (for iphones/Ipads)

- **Use Night Shift on your iPhone, iPad, and iPod touch**

  Night Shift automatically adjusts the colors of your display to the warmer end of the spectrum—making the display easier on your eyes.

Best Behaviors

Eat Healthy

Lutein and Zeaxanthin have been found to absorb excess light energy to prevent damage to plants from too much light exposure.

It is has been demonstrated that these carotenoids can also filter high energy blue light from reaching the underlying structures of the retina reducing the rick of damage.

Foods to eat that contain Lutein and Zeaxanthin:

Kale, spinach, mustard greens, turnip greens, collards, green peas, brussel sprouts, sweet corn, broccoli and eggs.

Get enough Vitamin –A

Eat your sweet potatoes, carrots and leafy greens

Best Behaviors

- Make your workspace eye friendly
  - Have computers at eye height and less than 30" away from your face
- Get scheduled for your annual eye exam