# Effects of Screen Time on Health

Children's developing brains, eyes, and bodies are especially vulnerable to the negative health effects of excessive screen time. These effects include: **diminished cognitive abilities**, **eye health concerns** (such as myopia, digital eye strain, and potential retinal damage), **sleep deprivation**, attention issues, **musculoskeletal complaints**, and obesity. Furthermore, the overuse of digital devices contributes to an increased chance of psychological and behavioral issues.

Of greatest concern are the preliminary findings by the National Institute of Health showing that kids with lots of screen time showed a premature thinning of the cortex. This outermost layer of the brain processes different types of information from the senses.

Screen time activist Cindy Eckard, the driving force behind Maryland's classroom screen safety legislation (the first in the nation), focused much of her persuasive effort on the **duty of care** parents and teachers have toward children. As such, she focused on the well-documented eye risks and musculoskeletal problems associated with excessive screen time. As Eckard has pointed out, OSHA has been protecting office workers from the dangers posed by digital devices since the 1990s. How is it possible that our children – the most vulnerable population – have been working on these same devices without any attention to health and safety guidelines?

Because so much classwork is done on a computer in many school districts, most after-school homework and studying also requires a computer. In addition to making it difficult for parents to help children manage their screen time, this is especially problematic for our kids because the blue light from the digital devices – in addition to potentially causing serious eye ailments – suppresses a hormone called melatonin, which is necessary for sleep. Resulting sleep deprivation brings a host of additional serious health risks to our children. Similarly, school-related screen time contributes to a lack of outdoor activity, which in turn can result in obesity and heart problems.

Health and wellbeing are basic building blocks of development and are essential to meaningful learning. Proper sleep, clear cognition, the ability to focus, and general health all contribute to a child's success in school and in life. If we erode this basic foundation for success, we also erode a child's ability to learn. The introduction of iPads, laptops, tablets, smartboards, and smartphones into schools drastically increases the amount of screen time children have in a day – and therefore increases the likelihood of adverse effects their health. Given the seriousness of these concerns – coupled with a lack of evidence showing improved learning using digital devices – parents might reasonably expect their schools to practice the Hippocratic Oath to "do no harm" to our students.

## Countering the Counter-arguments:

**They say**: Screens may be causing damage, but most of this damage is done by home and recreational use. Schools can't be expected to sacrifice the benefits of computers because some parents can't control their children's home use.

**In fact:** Schools, which have a duty of care toward our children and are legally obligated to look out for their safety, can't go on assigning classwork and homework on screens, pretending that students aren't already spending dangerous amounts of time on screens at home. Homework and textbook assignments on screens make it especially difficult for parents to monitor and guide their children's screen time.

**They say:** Schools can provide kids with blue light filtering glasses to eliminate the blue light effects. Schools can teach kids proper ergonomic positions in which to safely use devices to eliminate neck pain and eyestrain.

**In fact:** They could, but there will be the inevitable lost and broken glasses, and the inevitable children who don't use the device in a proper ergonomic way. It would amount to MORE things that teachers need to monitor, and this takes away time from the student/teacher relationship – which is one of the most important factors in school success. Teachers need more time to interact with students, not devices and glasses. Also, shouldn't we make sure that the academic and learning benefits of school devices are proven before we pour more money and resources into making school devices safer?

**They say:** Schools need to teach kids how to use devices responsibly, so they can learn to self-regulate.

**In fact:** Children do not have a fully developed frontal lobe until their mid-20s. The frontal lobe is responsible for self-management, impulse control, and planning. Therefore, developmentally speaking, children cannot be expected to self-regulate device use. Schools should instead focus on developmentally appropriate methods of teaching and learning. This can, and should, include digital literacy and computer skills, but this does not require constant use of a device throughout the school day.

## Evidence from Recent Studies:

### *Cognition*

- **Cognitive development:** An NIH study is following roughly 12,000 participants over time to understand how media use and other factors influence a person's development. Preliminary results show a correlation between screen use and premature thinning of the cerebral cortex.(1)

- **Gray matter atrophy:** Multiple studies have shown atrophy (shrinkage) in gray matter (areas of the brain where "processing" occurs) in individuals with internet/gaming addiction. Areas affected included the frontal lobe, which governs executive functions such as planning, prioritizing, organizing, and impulse control.(2)

- **_Limited screen time tied to better cognition in kids:_** Children who meet Canadian recommendations for screen time, sleep, and exercise [have better cognition](#) than their peers who don't meet the recommendations – and screen time seems to have the largest effect.(3)

- **_Association between screen time and children's performance on a developmental screening test_**: Higher levels of screen time were associated with [poor performance on a screening measure](#) assessing children's achievement of developmental milestones at 36 and 60 months.(4)

### _Eye Health_

- **_Blue light can harm the eyes_**: The rise in personal electronics is dramatically increasing exposure to blue light, raising new concerns about a variety of eye health risks. Blue light penetrates more deeply into the eye than other colors and can harm the retina.(5)

- **_Myopia on the rise_**: Childhood myopia has more than doubled over the last 50 years. The possible culprit? Too much screen time and not enough sunlight.(6)

- **_Digital eye strain/computer vision syndrome_**: Instances of [digital eyestrain](#) and computer vision syndrome have increased. These can cause eye discomfort, fatigue, blurred vision and headaches, dry eyes, and eye strain. The above review notes that asthenopia (or eye strain) is also associated with learning difficulties.(7)

### _Sleep_

- **_Sleep quality and screens_**: Screen use is linked with [delayed bedtimes and shorter total sleep time](#). Poor sleep causes daytime tiredness, which is linked with "poor school performance and a host of psychological problems."(8)

- **_Melatonin_**: Blue light suppresses melatonin production and shifts circadian rhythms, affecting sleep cycles.(9)

### _Musculoskeletal Effects:_

- **Text Neck**: Bending over handheld devices puts increased stresses on the neck area, possibly contributing to pain and a "text neck" diagnosis.(10)

### _Heart Health and Obesity:_

- A 2018 American Heart Association American study says smartphones, tablets, TVs and other screen-based devices are making kids more sedentary – and sedentary behavior is tied to overweight and obesity in young people.(11)

# References:

1 Screen Media Activity and Brain Structure in Youth: Evidence for Diverse Structural Correlation Networks from the ABCD Study. By Martin P. Paulus, MD, et al, *HHS Public Access*, April 29, 2019.
2 See, for example, Zhou 2011, Yuan 2011, Weng 2013, and Weng 2012.
3 Limited Screen Time Tied to Better Cognition in Kids. By Amy Orciari Herman, *NEJM Journal Watch*, September 27, 2018.
4 Association Between Screen Time and Children's Performance on a Developmental Screening Test. By Sheri Madigan, Dillon Browne, Nicole Racine, et al., *JAMA Pediatrics,* January 28, 2019.
5 Seeing Blue: The Impact of Excessive Blue Light Exposure. By Heather Flint Ford, OD, *Review of Optometry,* April 15, 2016.
6 Too much screen time is raising rate of childhood myopia. Keck School News (USC School of Medicine), January 22, 2016.
7 Digital eye strain: prevalence, measurement and amelioration. By Amy L. Sheppard and James S Wolffsohn. BMJ Open Ophthalmology, Volume 3, Issue 1.
8 Digital Media and Sleep in Childhood and Adolescence. By Monique K. LeBourgeois et al. *Pediatrics*, November, 2017.
9 Blue light has a dark side. The effect blue light has on your sleep and more. Harvard Health Letter, Published: May, 2012. Updated: August 13, 2018.
10 Musculoskeletal neck pain in children and adolescents: Risk factors and complications. By Jawad Fares, Mohamad Y. Fares, and Youssef Fares, *Surgical Neurology International,* May 10, 2017.
11 Sedentary Behaviors in Today's Youth: Approaches to the Prevention and Management of Childhood Obesity: A Scientific Statement From the American Heart Association, By Tracie A. Barnett, et al., *Circulation,* August 6, 2018.

# Further Reading and Resources:

Guide to Classroom School Safety by Cindy Eckard, Screens and Kids.

W.H.O. Says Limited or No Screen Time for Children Under 5. *The New York Times*, April 24, 2019.

Cut Back on Screen Time in 2019. CNN, December 29, 2018.

Limit Screen Time among Kids, Experts Caution. Heart.Org, August 6, 2018.

Documented Health Risks for Students who use Digital Devices Daily. Cindy Eckard, Screens and Kids (Blog), December 17, 2016.

Gray Matters: Too Much Screen Time Damages the Brain. *Psychology Today*, February 27, 2014.

# To Take Action:

Tools for Parents

Tools for Educators