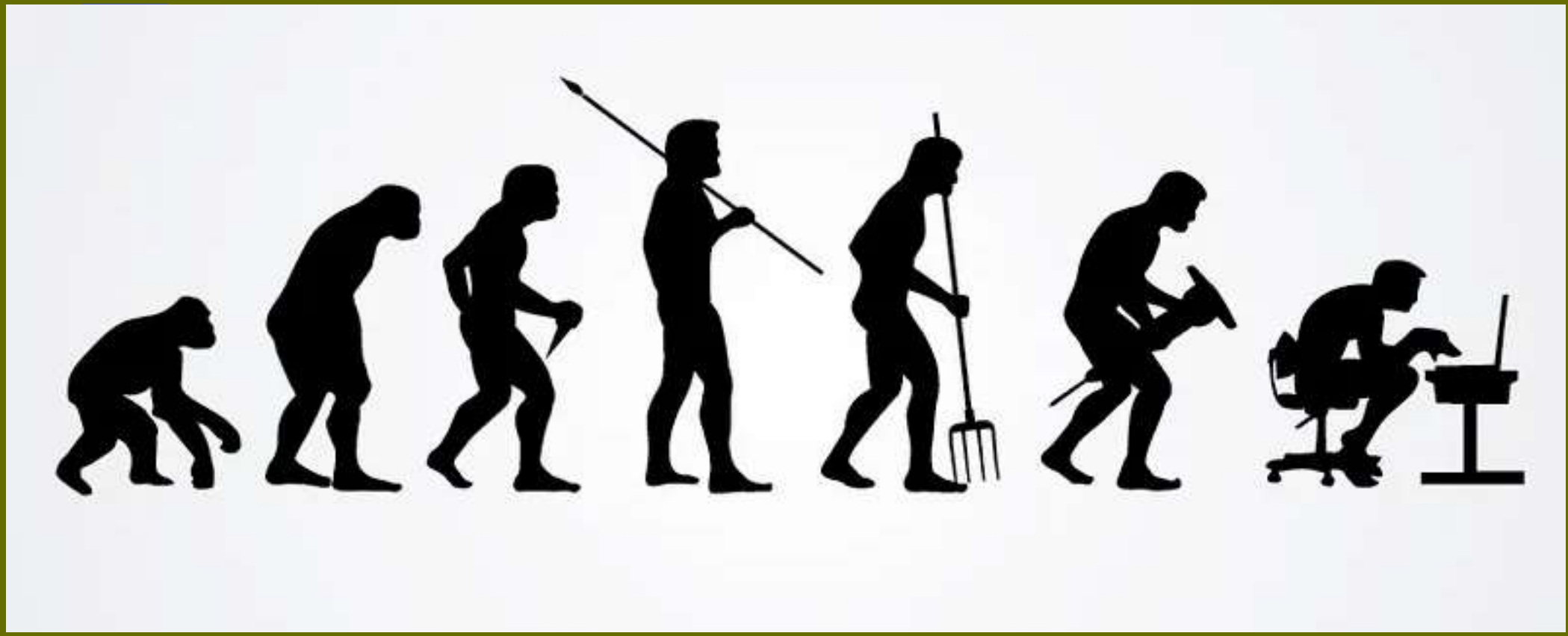
How do we keep children healthy?

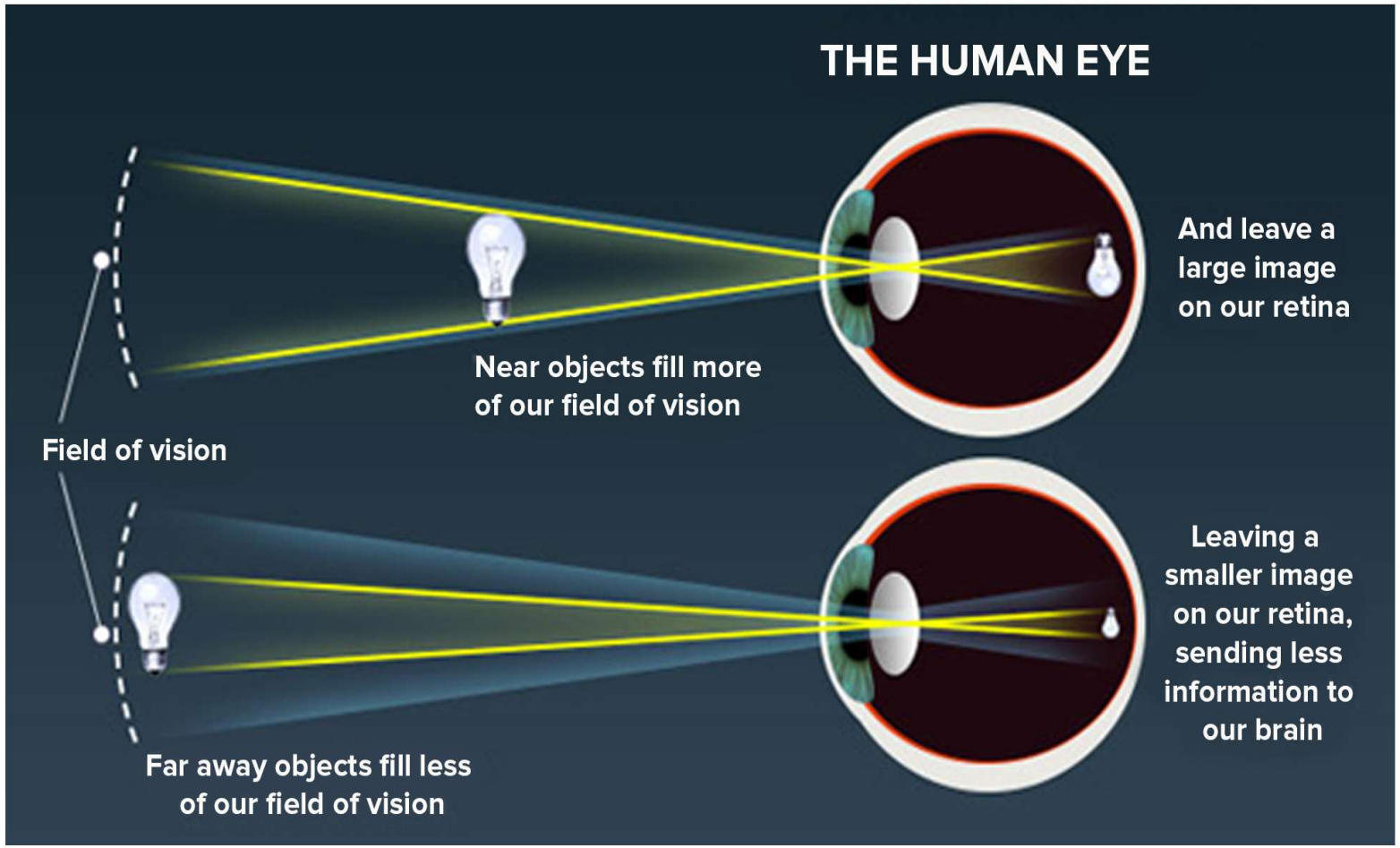
Screentime: effects on the eye

Dr Caroline Gooding

The Ear and Eye Clinic

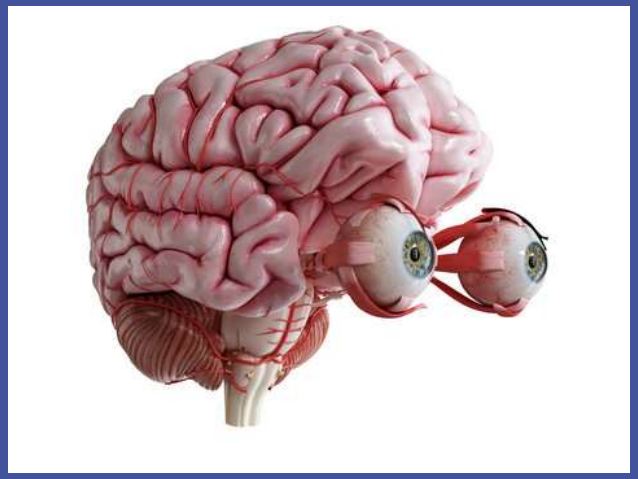
WITS Up To Spaed July 2025

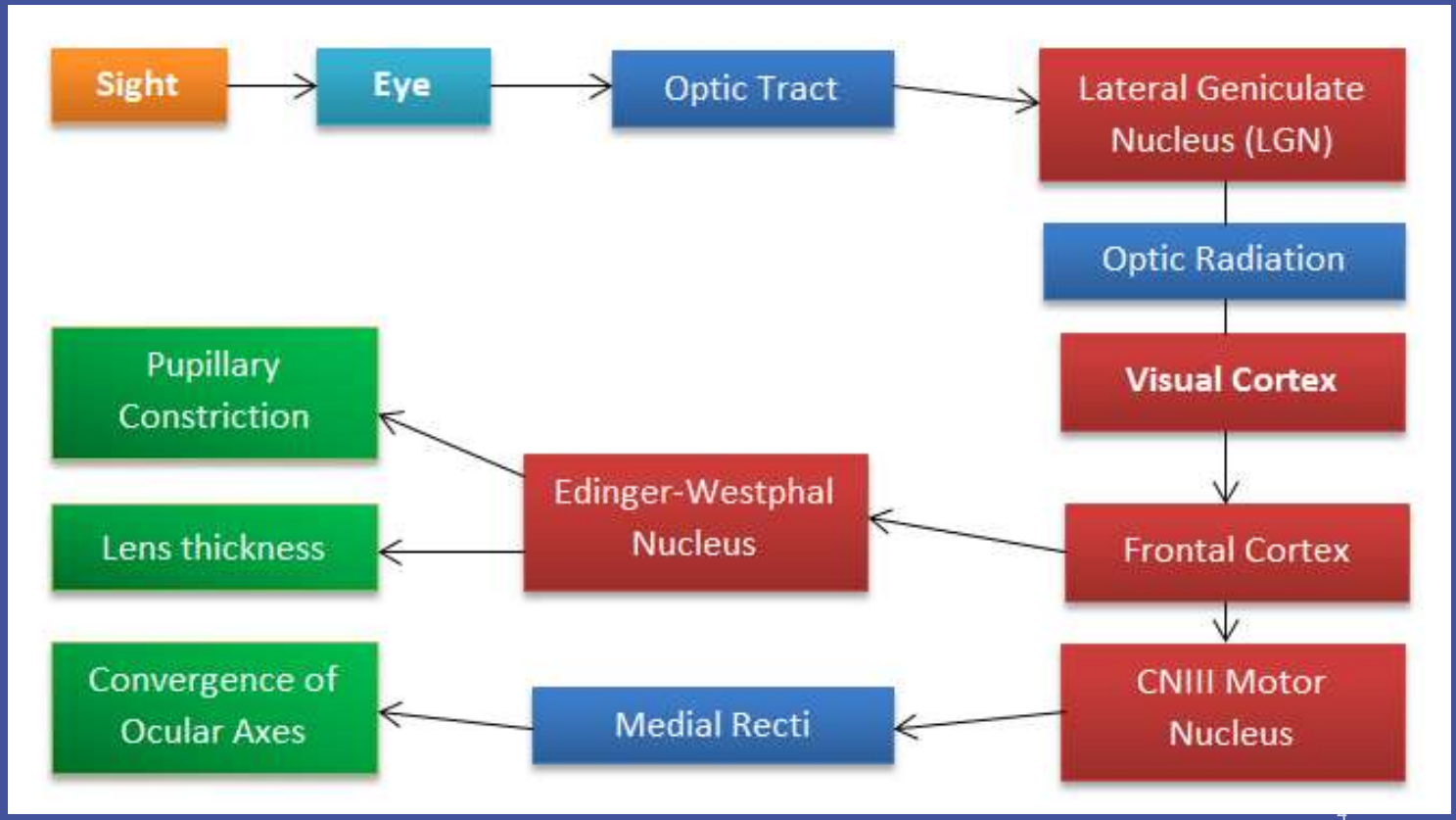



THE HUMAN EYE
Field of vision
Near objects fill more of our field of vision
And leave a large image on our retina
Far away objects fill less of our field of vision
Leaving a smaller image on our retina, sending less information to our brain

The physiology of focusing on a near object

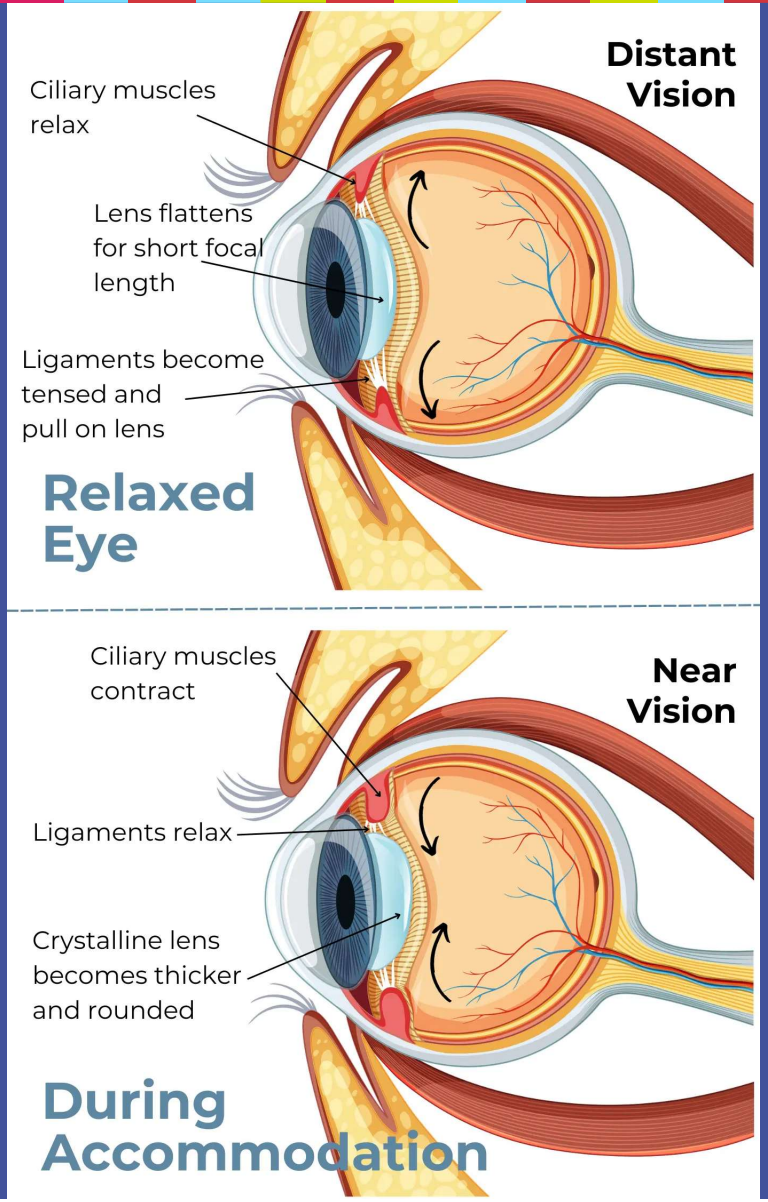
Good vision + good accommodation + good convergence





The physiology of focusing on a near object

Accommodation reflex requires constriction + convergence

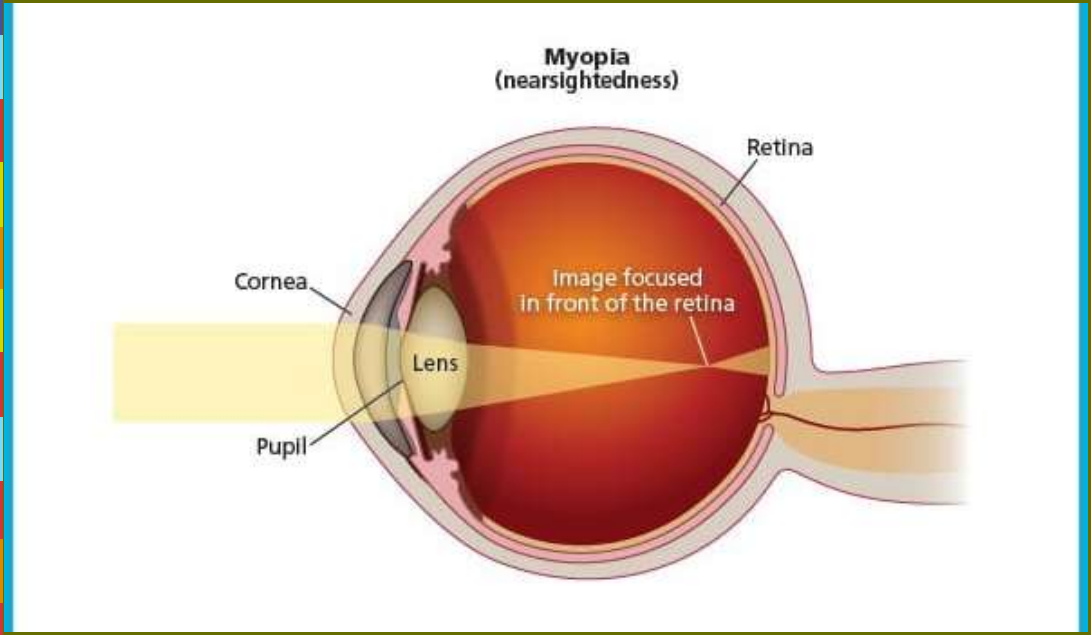


The physiology of focusing on a near object

What does excessive screen time do to the eyes?

- Myopia
- Accommodative spasm
- Squints

What is myopia?



- **Myopia (nearsightedness)** is when close-up objects look clear but distant objects are blurry.
- Some studies have found that increased near work and less time spent outdoors in childhood both increase the risk for myopia.

Who gets myopia?

Genetics

The risk of myopia in children increases when parents are myopic.[2] The risk is nearly:

1 in 2

When **both** parents are myopic.

1 in 3

When **one** parent is myopic.

1 in 4

When **neither** parent is myopic.

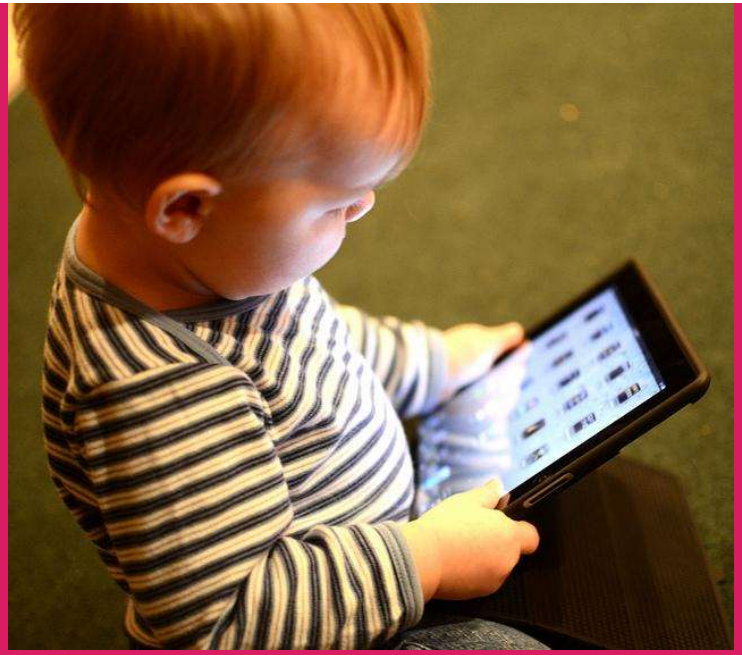
Lifestyle

Modern lifestyles may influence the development of myopia:

Low levels of outdoor activity.[3,4]

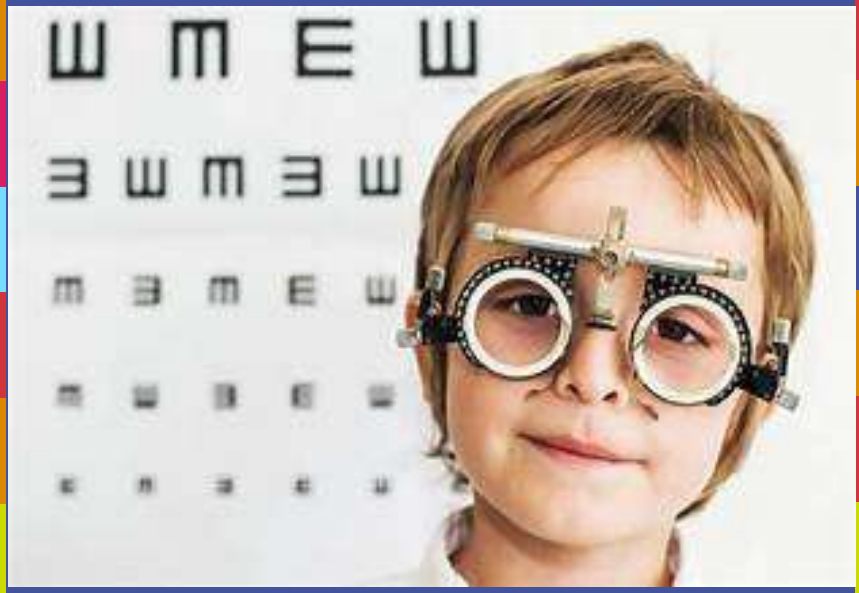
Prolonged near tasks such as reading and gaming on portable devices.[3,5]

Poor lighting levels.[3,5]

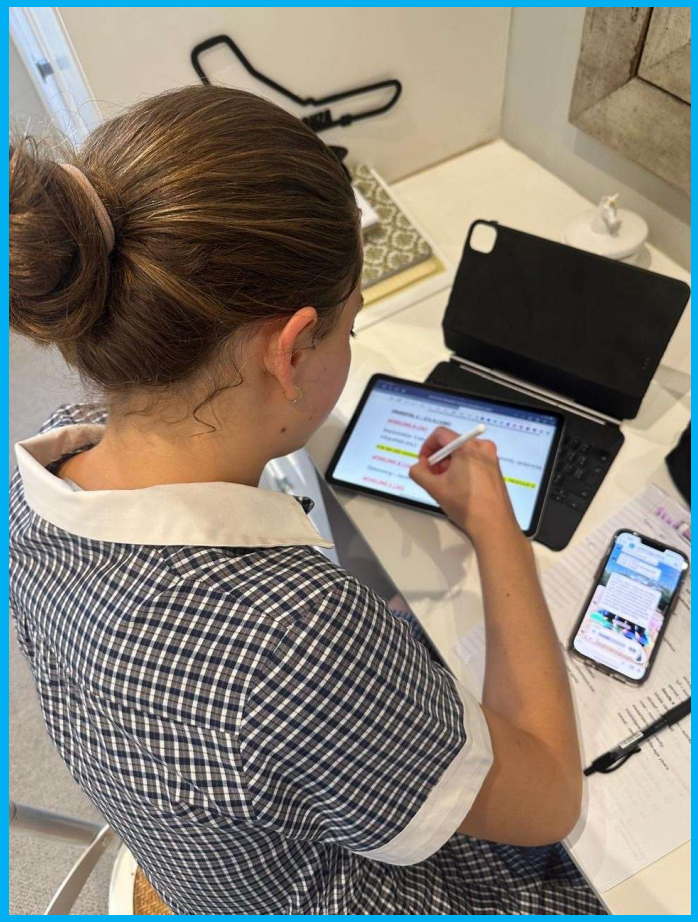


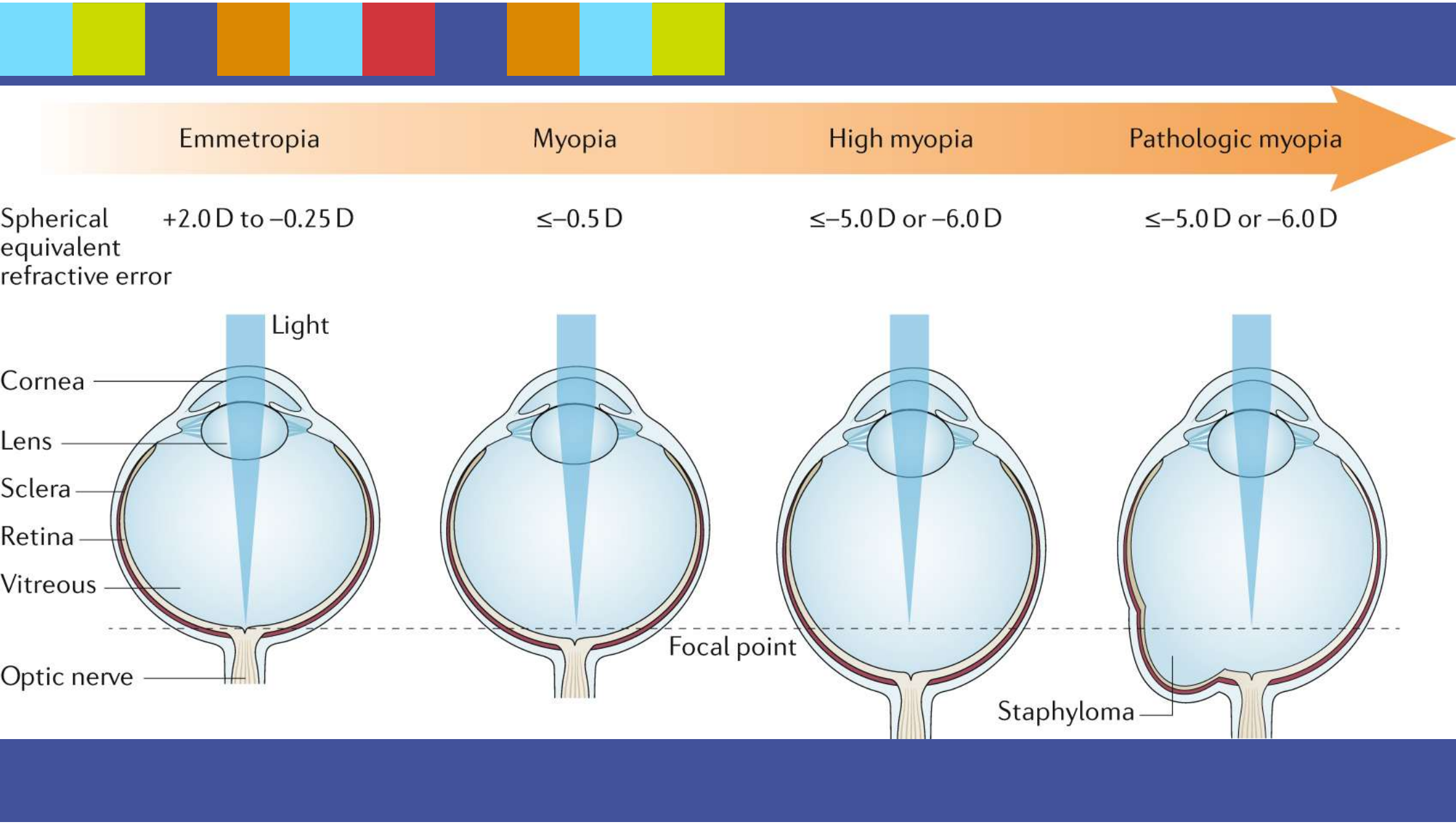
The impact of screen time on the developing eye.

- Children **under the age of 10** are most susceptible to eye damage from prolonged use of visual media.
- Lots of near work while the eyes are developing will interpret **nearsightedness as a normal state**.
- Your eyes only stop growing between 18-20 years of age.

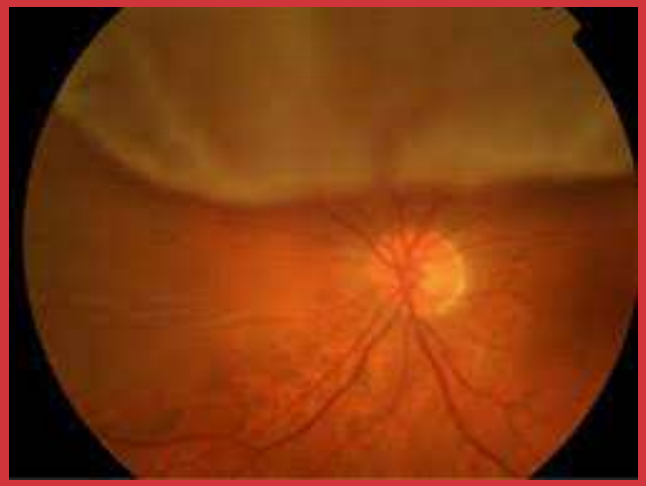


Excessive near work during the school day and after school.

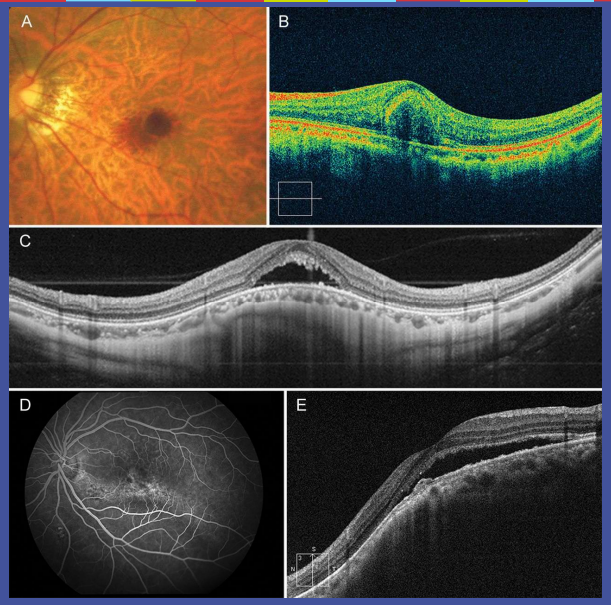



Emmetropia
Myopia
High myopia
Pathologic myopia
Spherical equivalent refractive error
+2.0 D to –0.25 D
≤–0.5 D
≤–5.0 D or –6.0 D
≤–5.0 D or –6.0 D
Light
Cornea
Lens
Sclera
Retina
Vitreous
Optic nerve
Focal point
Staphyloma

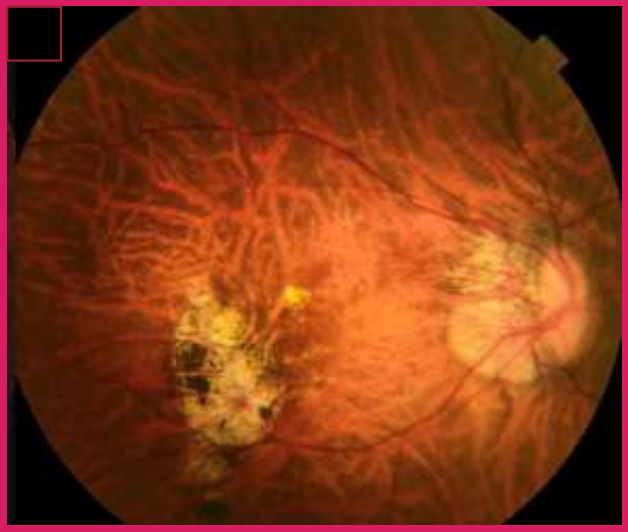
Pathological myopia
> -6.0D or axial length > 26 – 26.5mm



Retinal detachments



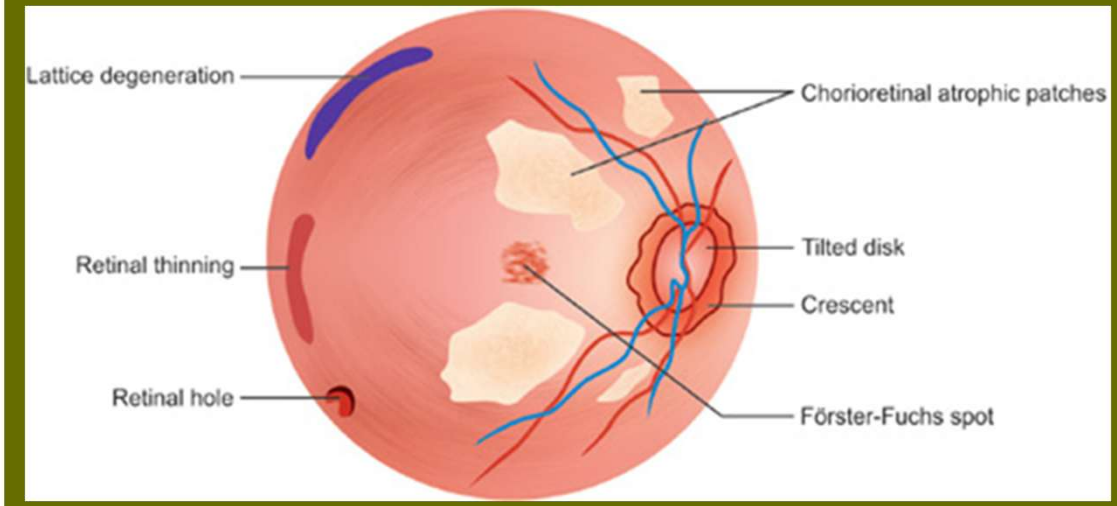
Choroidal neovascularisation

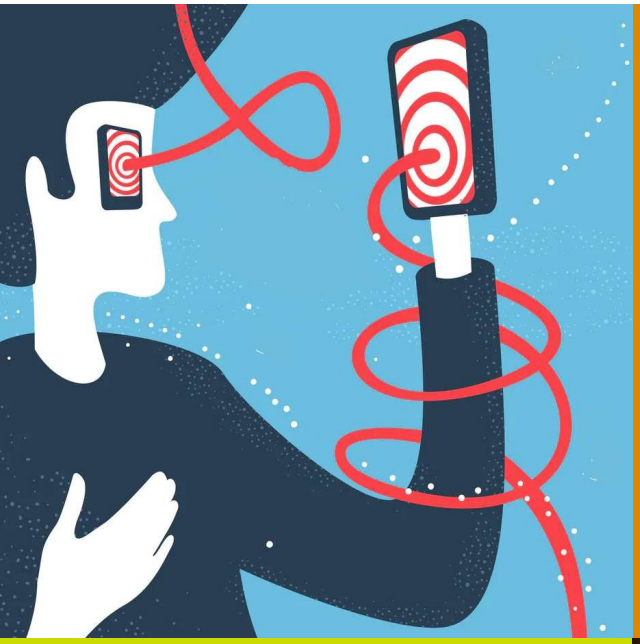


Chorioretinal & macular atrophy

Complications of high myopia

LEVEL OF MYOPIA	CATARACTS	GLAUCOMA	RETINAL DETACHMENT	MYOPIC MACULOPATHY
-1.00 TO -3.00 D	2X	2X	3X	2X
-3.00 TO -6.00 D	3X	3X	9X	10X
OVER -6.00 D	5X	14X	22X	41X





How big is this problem?

ar Latest *The Atlantic*

HEALTH

In 2050, Half the World Will Be Nearsighted

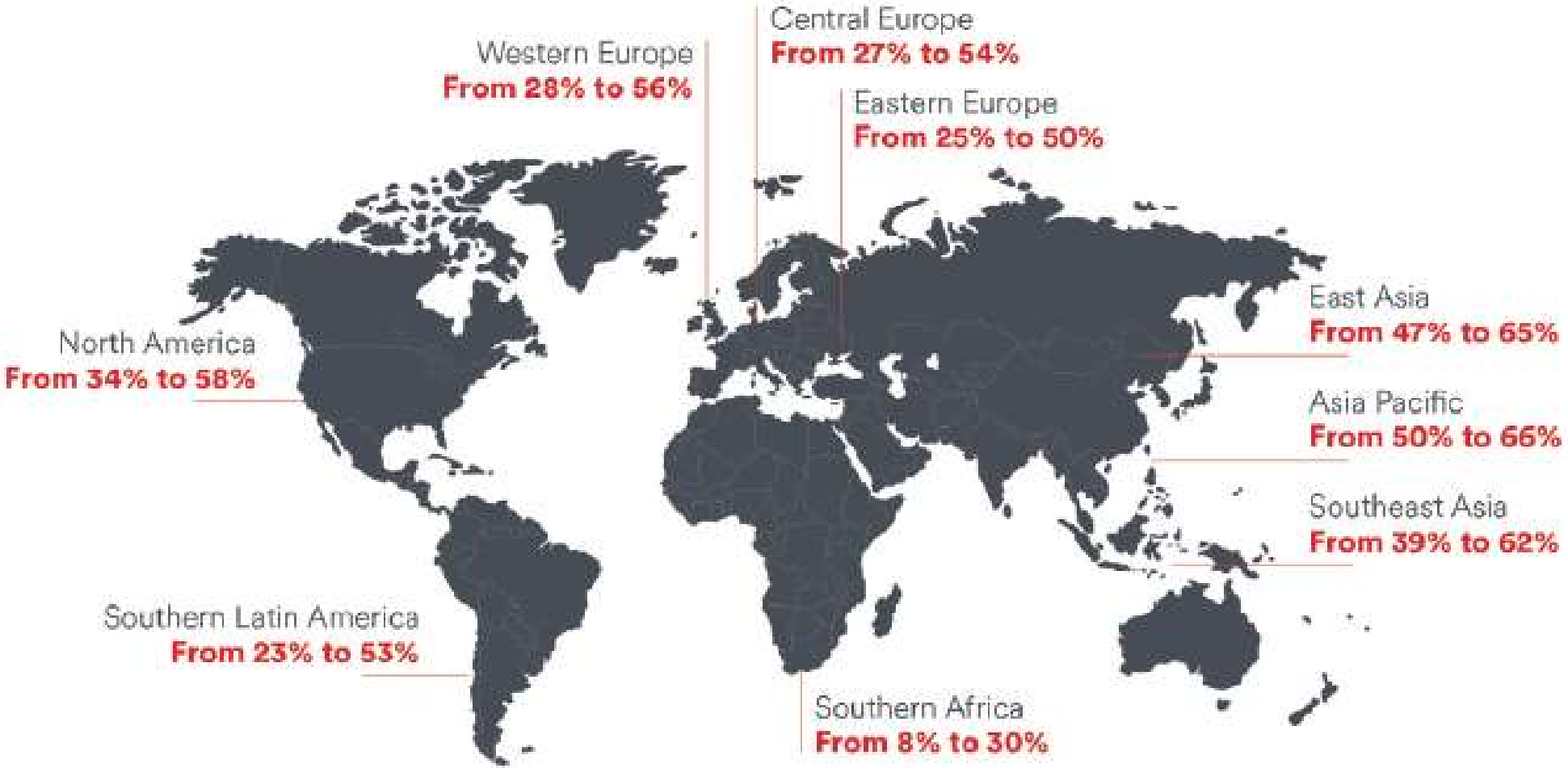
Researchers expect eyesight to worsen across the globe thanks to more screens and less time outdoors.

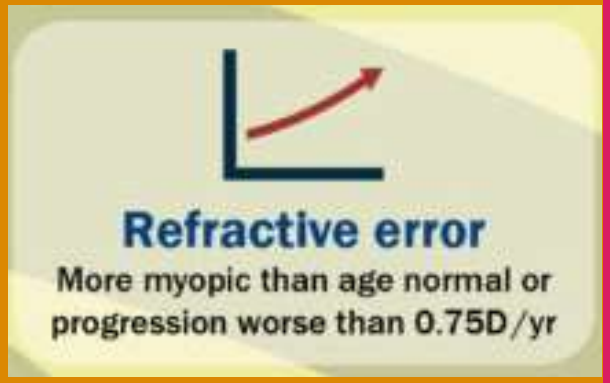
By Julie Beck

Myopia is the **most common ocular disorder** worldwide, it is the **leading cause of visual impairment in children**, and its incidence is increasing rapidly.

The numbers are staggering!

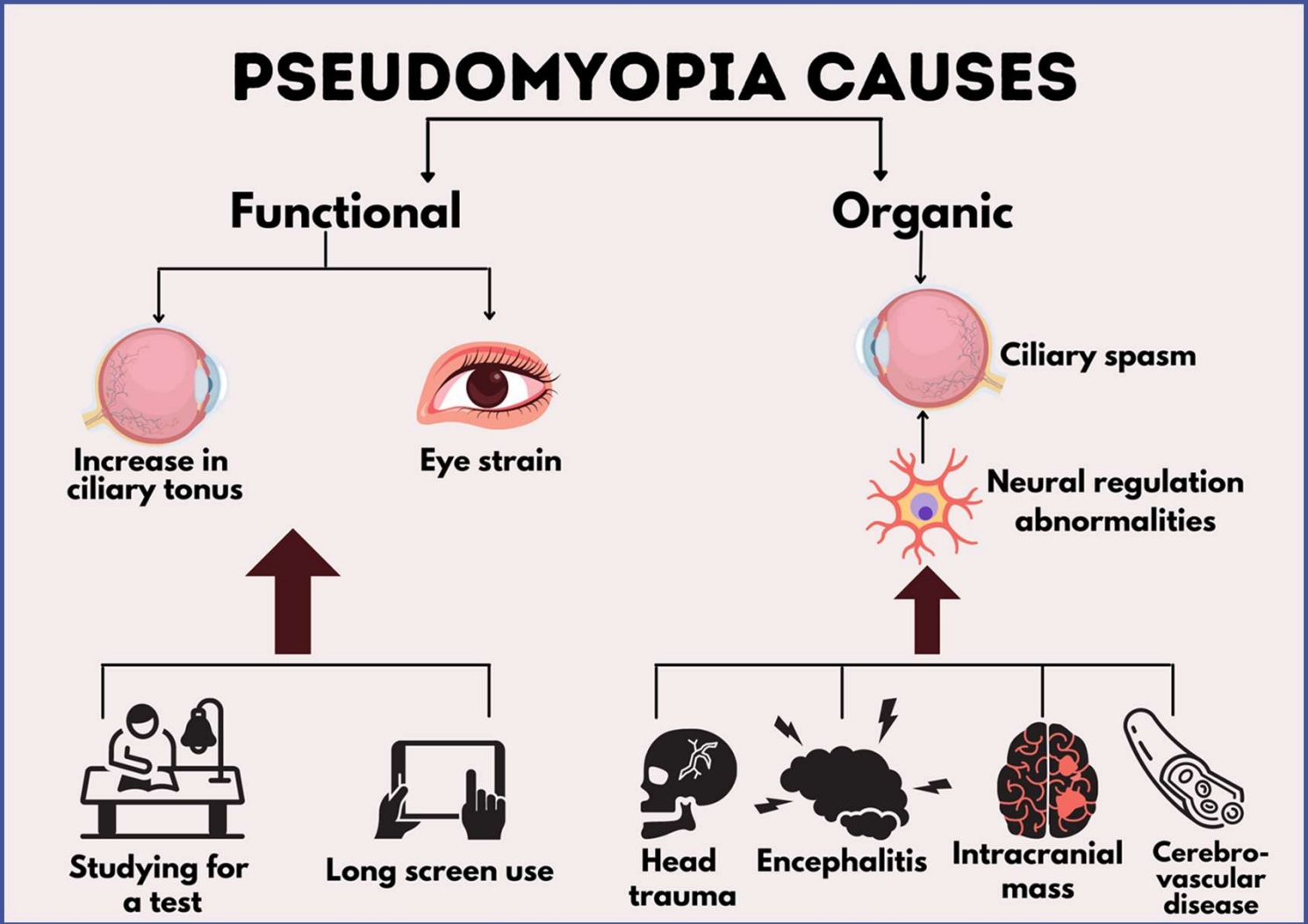
- Meta-analysis in *Ophthalmology* of 145 studies involving 2.1 million total participants
- In **2010**, **2 billion** people had myopia (**28.3%** of the world's population) & 277 million had high myopia (4% of the population).
- It predicts that by **2050**, **4.8 billion** people will be myopic (**49.8%** of the world's population) & 938 million people will have high myopia (9.8% of the population).
- This is an increase of 140% between 2010 and 2050.
- Myopia increased by 66% from the 1970s to the early 2020s.
- Highest number of cases in **high income countries** – North America and Asia


Western Europe
From 28% to 56%
Central Europe
From 27% to 54%
Eastern Europe
From 25% to 50%
East Asia
From 47% to 65%
North America
From 34% to 58%
Asia Pacific
From 50% to 66%
Southeast Asia
From 39% to 62%
Southern Latin America
From 23% to 53%
Southern Africa
From 8% to 30%

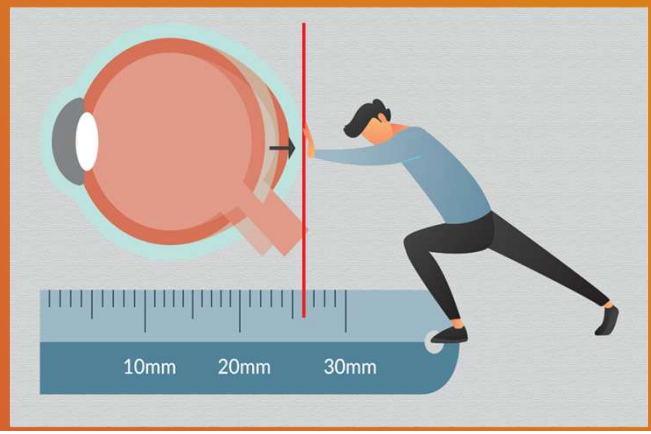


An increase in years of formal education and access to technology across society may account for higher myopia rates in recent years.

Pseudomyopia

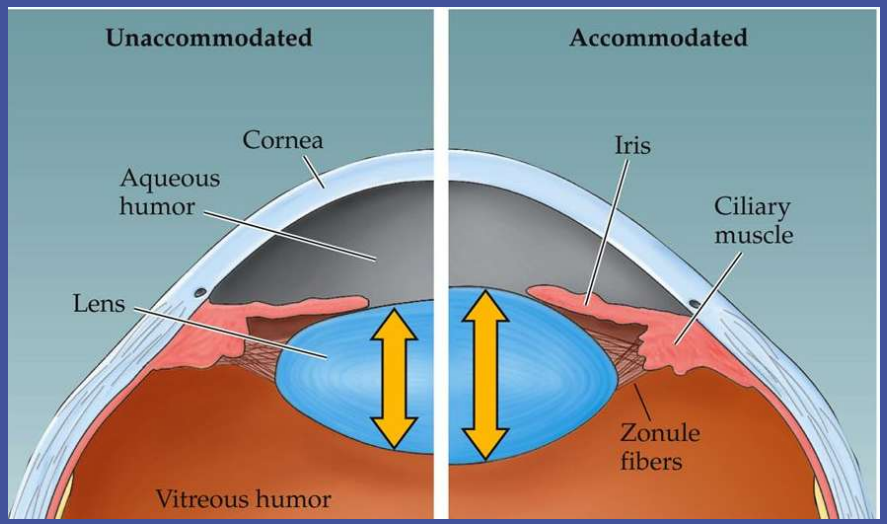


Therapeutic management of myopia



What is an accommodative spasm?

- The eye's focusing mechanism becomes overactive and locked in a near vision position.
- Occurs after prolonged near work in children and young adults.



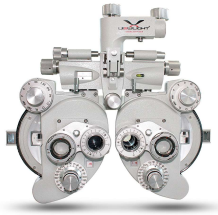
Number	Symptoms
1	Blurred vision for near tasks
2	Headaches/eyestrain/dull orbital pain/pulling sensation around the eyes
3	Loss of comprehension/avoidance of near work
4	Watering or conjunctival or eyelids irritation, sensitivity to light
5	Eye fatigue/dizziness/sleepiness
6	Blurred vision worse after reading/near work
7	Difficulty focusing from far to near, or near to far
8	Holds reading material close or farther way
9	Difficulty sustaining attention on near point tasks; distance blur after performing near work

Treatment of accommodative spasms

Baseline clinical testing

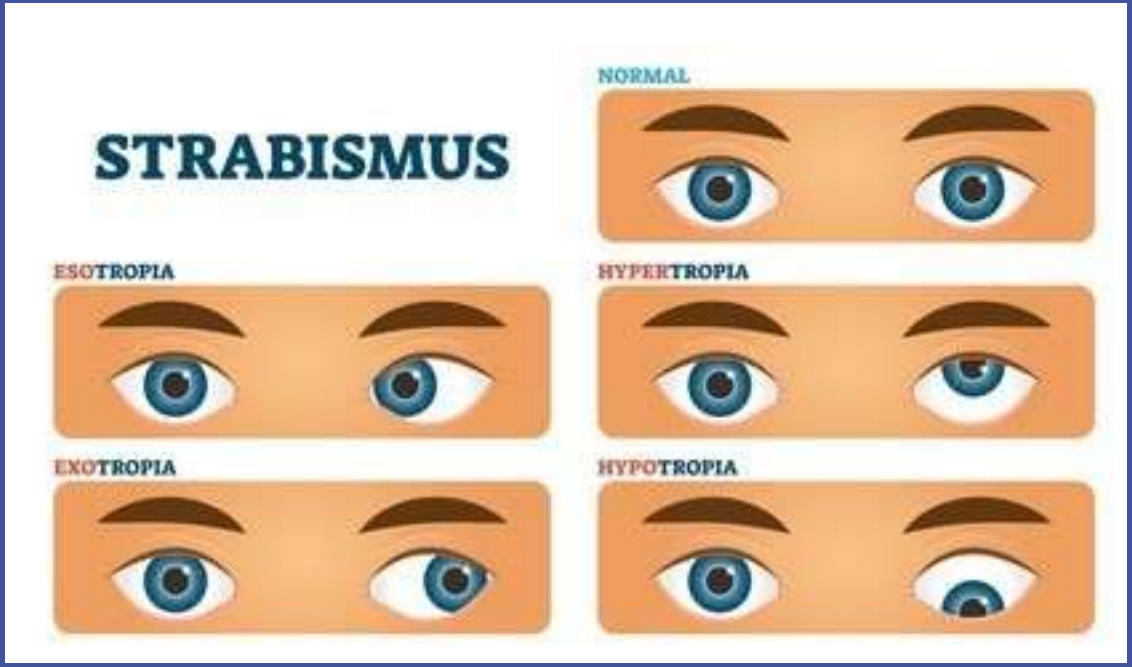
Cycloplegic refraction

With +1.00 DS near addition



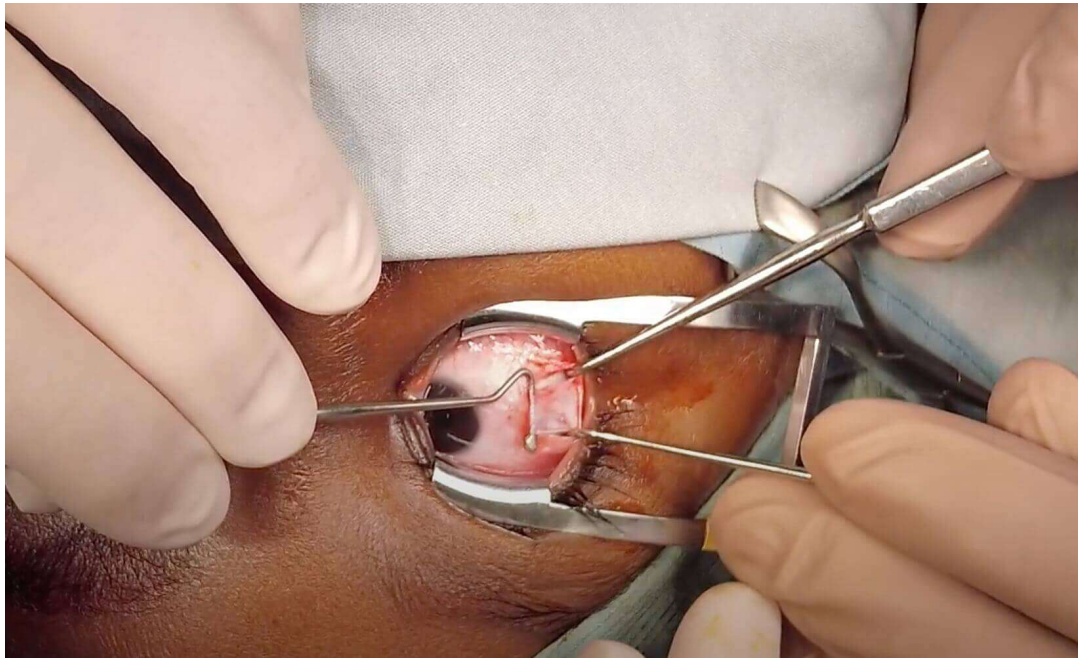
Post Vision therapy

New onset squints: esotropia > exotropia

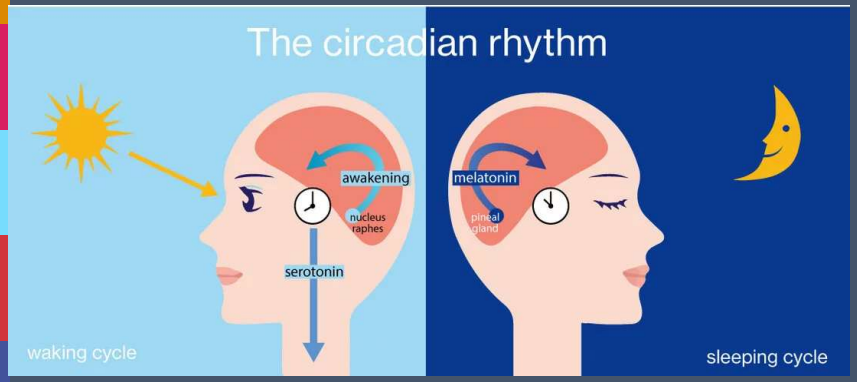


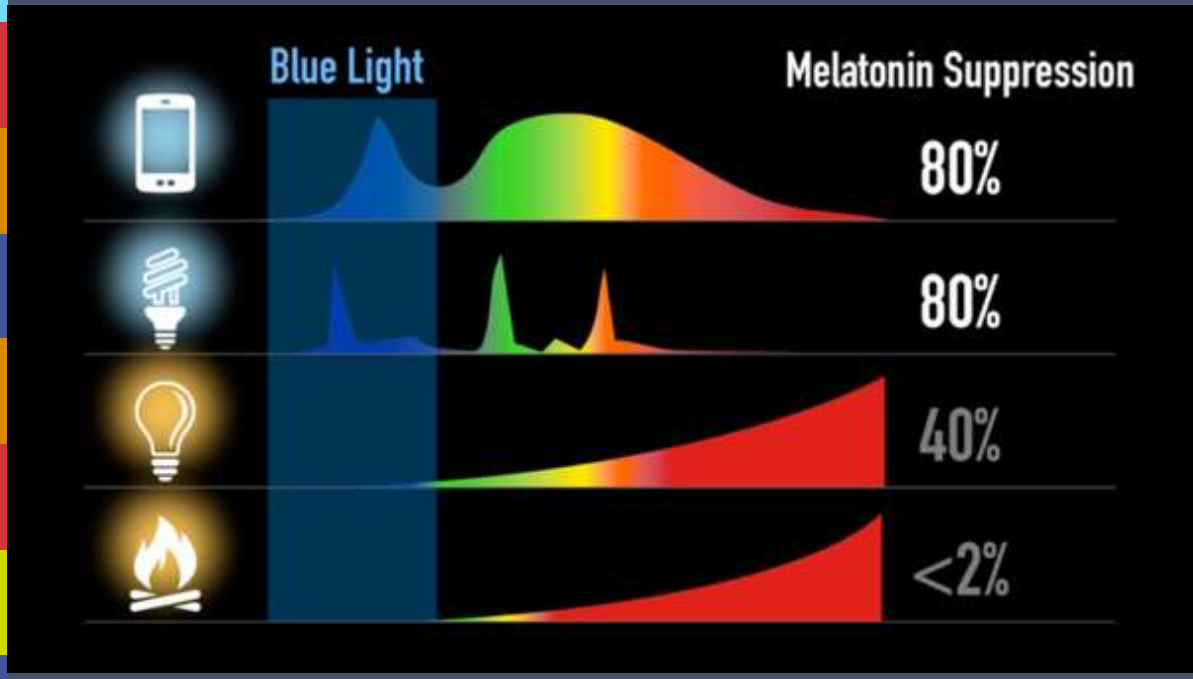
- Develops after binocular vision has developed.
- Need to exclude other brain pathology-MRI.
- Usually caused by undercorrected myopia.

Management of squints



Blue light and Melatonin suppression





How exposure to **blue light** affects your brain and body

BY DISRUPTING MELATONIN, **SMARTPHONE LIGHT** RUINS SLEEP SCHEDULES. THIS LEADS TO ALL KINDS OF **HEALTH PROBLEMS:**

The disruption to your sleep schedule might leave you distracted and impair your **MEMORY** the next day.

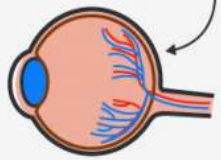
A poor night's sleep caused by smartphone light can make it **HARDER TO LEARN.**

Over the long term, not getting enough sleep can lead to **NEUROTOXIN** buildup that makes it even harder for you to get good sleep.

People whose melatonin levels are suppressed and whose body clocks are thrown off by light exposure are more prone to **DEPRESSION.**

By disrupting melatonin and sleep, smartphone light can also mess with the hormones that control hunger, potentially increasing **OBESITY RISK.**

There's some evidence that blue light could damage our vision by harming the **RETINA** over time — though more research is needed.



Researchers are investigating whether or not blue light could lead to **CATARACTS.**

There's a connection between light exposure at night and the disturbed sleep that come with it and an increased risk of breast and prostate **CANCERS.**

SOURCES: Nature Neuroscience; Harvard Health Publications; ACS, Sleep Med Rev, American Macular Degeneration Foundation; European Society of Cataract and Refractive Surgeons; JAMA Neurology

TECH INSIDER

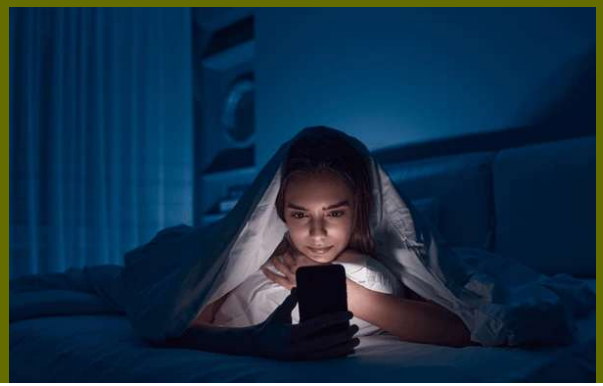
Screentime and sleep

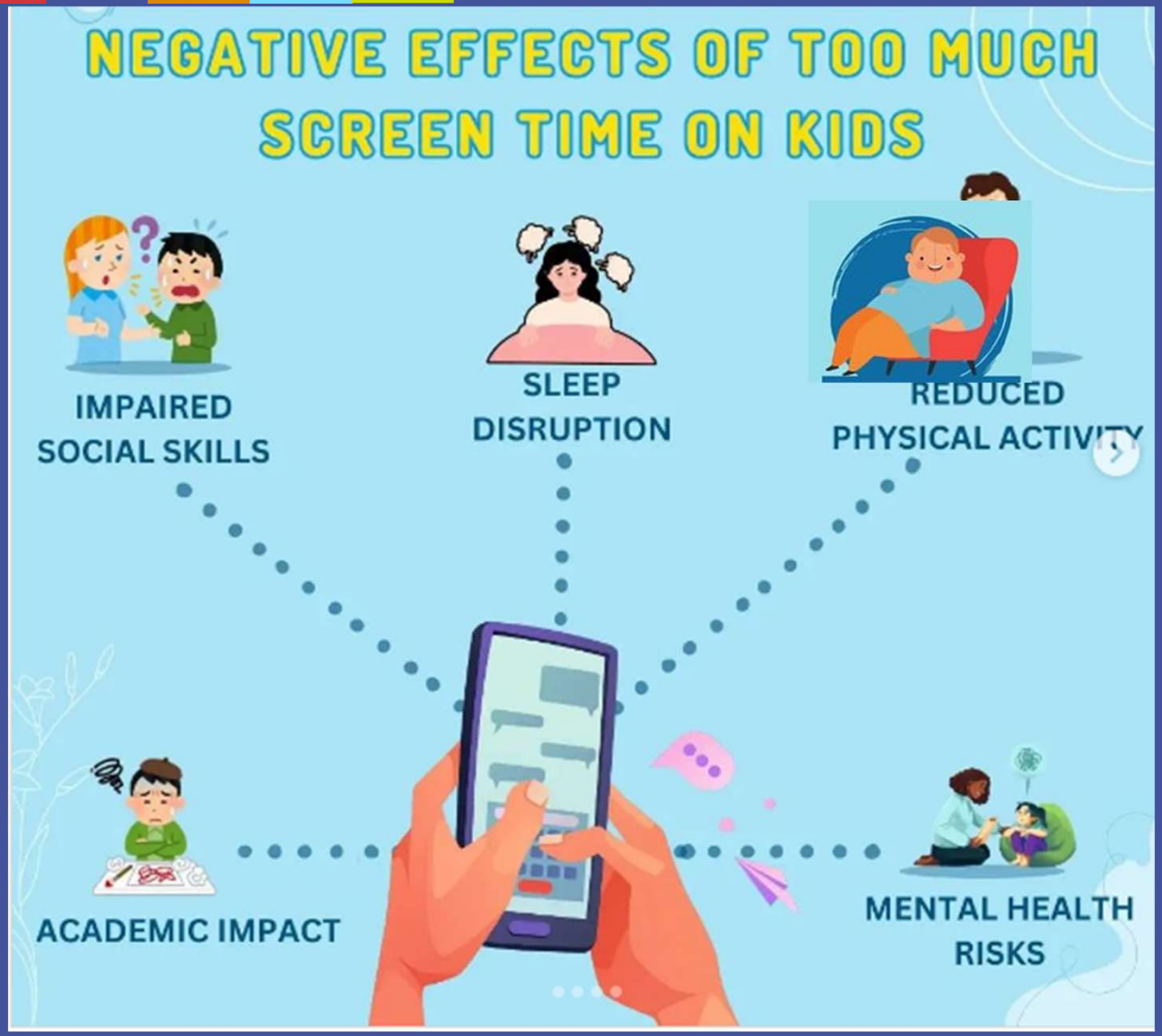
Screen Use at Bedtime and Sleep Duration and Quality Among Youths

Bradley Brosnan, Jillian Haszard, Kim Meredith-Jones et al.

Published in JAMA Paediatrics on 3 September 2024.

- Screen time once in bed impairs sleep. It delayed sleep for about half an hour and reduced the amount of sleep they got that night.
- All types of screen time were associated with delayed sleep onset but particularly interactive screen use.
- So the simple message might be to keep those devices out of the bedroom.



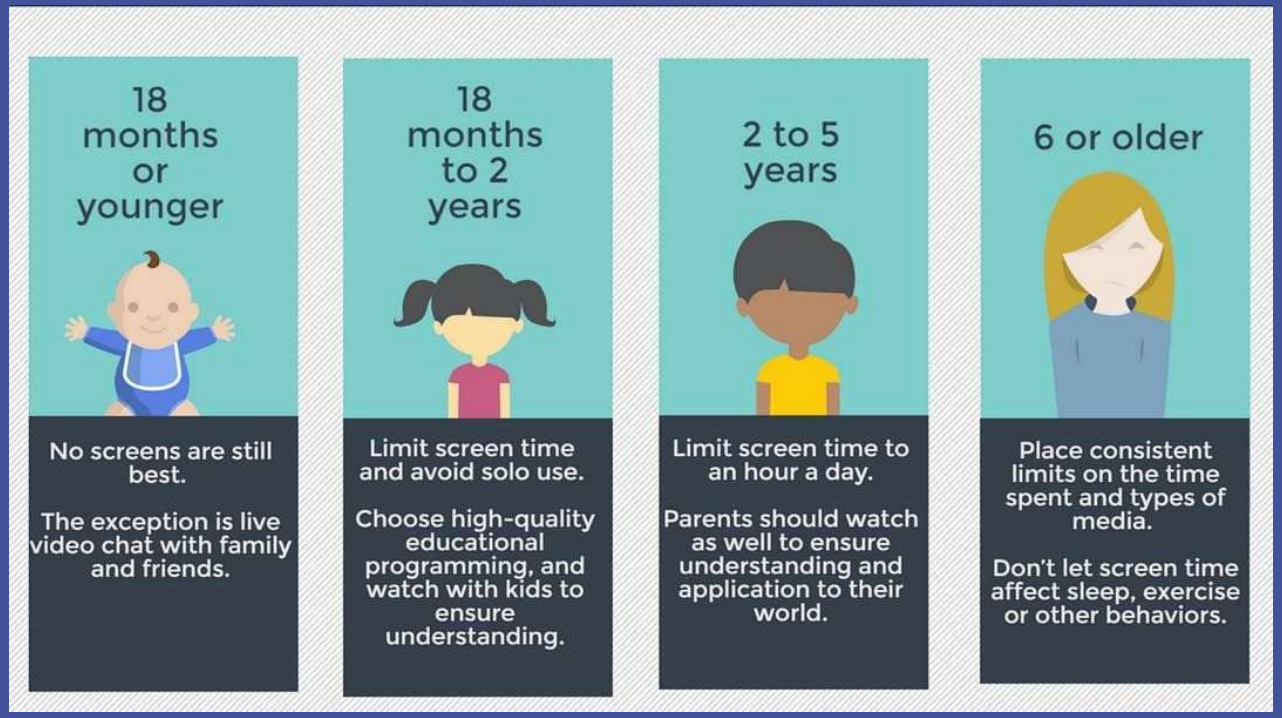

NEGATIVE EFFECTS OF TOO MUCH SCREEN TIME ON KIDS
IMPAIRED SOCIAL SKILLS
SLEEP DISRUPTION
REDUCED PHYSICAL ACTIVITY
ACADEMIC IMPACT
MENTAL HEALTH RISKS

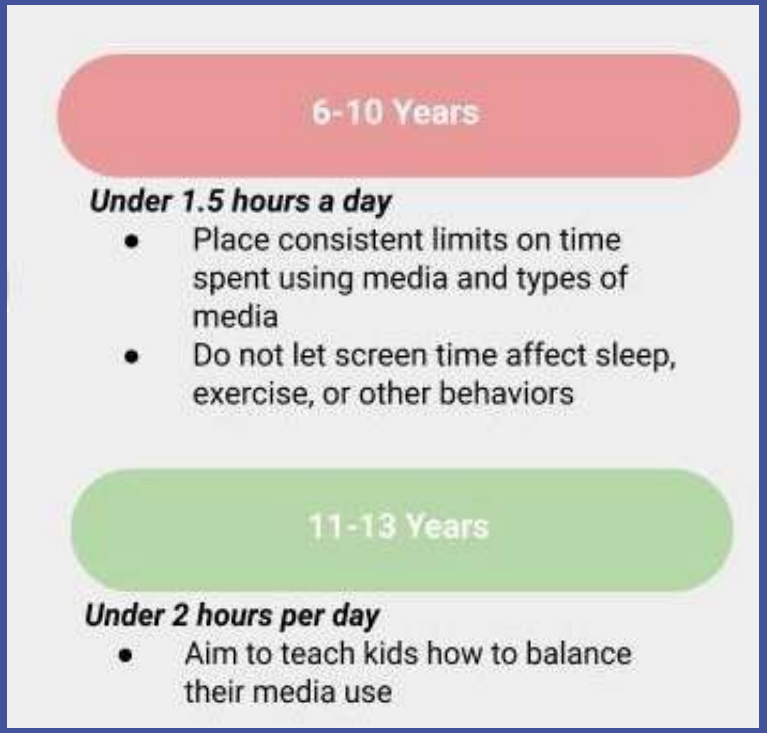
Addiction Center
https://www.addictioncenter.co...

Phone Addiction: Warning Signs And Treatment

22 Jul 2024 — Phone addiction is the obsessive and compulsive use of a mobile phone, despite the usage...

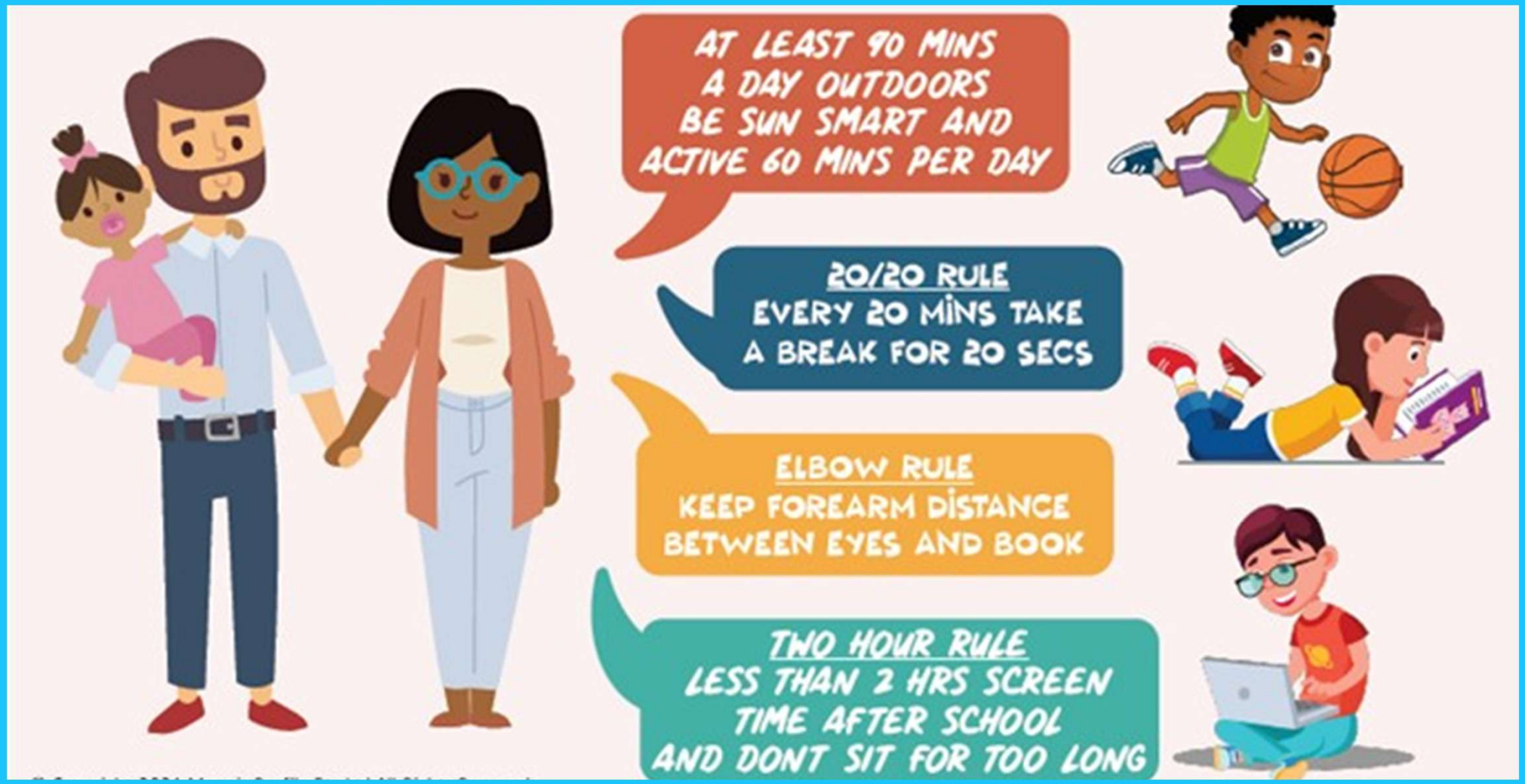
How much screen time is acceptable? AMERICAN ACADEMY OF PAEDIATRICS GUIDELINES

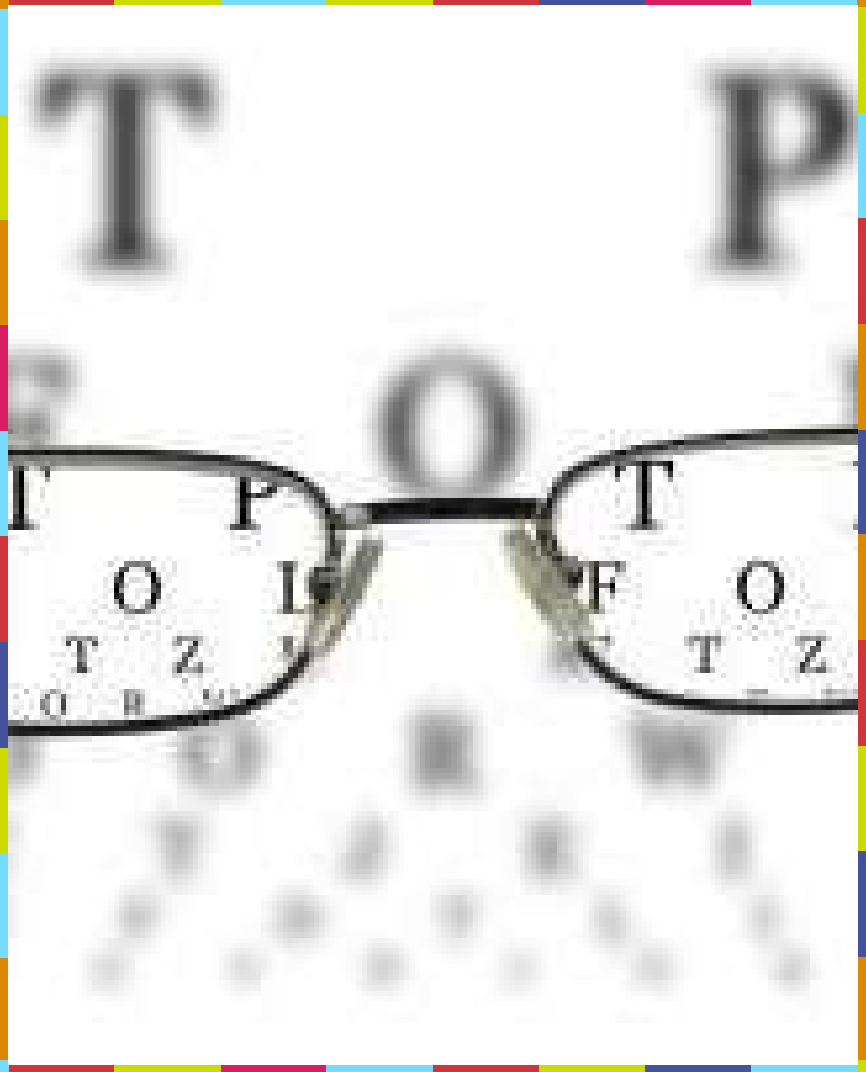




Guidelines


0 - 18 MONTHS
• This young kid SHOULD HAVE NO ACCESS to any kind of screen
18 - 24 MONTHS
• A SHORT PERIOD of educational screen time watched with a caregiver
• Most babies' brain develops by the age of 2. It is important that kids this age explore the environment and experience the world around them with sight, texture under their fingertips, smell, and feel with interacting and playing.
2 - 5 Year Olds
• 1 HOUR per day on weekdays, and mostly 2-3 hours on weekends
• This young kid should limit their screen time on educational content - learning colors, letters, shapes, etc.) There are many apps provided for kids this age they will enjoy
6 - 17 Year Olds
• 2 HOURS a day of recreational screen time. This means that they will need to use it more for homework and school obligations in general

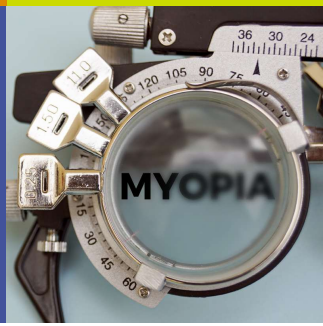

AT LEAST 90 MINS
A DAY OUTDOORS
BE SUN SMART AND
ACTIVE 60 MINS PER DAY
20/20 RULE
EVERY 20 MINS TAKE
A BREAK FOR 20 SECS
ELBOW RULE
KEEP FOREARM DISTANCE
BETWEEN EYES AND BOOK
TWO HOUR RULE
LESS THAN 2 HRS SCREEN
TIME AFTER SCHOOL
AND DONT SIT FOR TOO LONG



Conclusion

- Reduce the amount of screentime to **< 2 hours/day**.
- Try not use your phone straight after near work.
- **20:20:20** rule.
- Keep your bedroom a phone-free zone for **an hour** before bedtime.
- If you can watch something on the **tv** rather than the phone, it will benefit your eyes.
- Please get your eyes checked if your vision is poor or deteriorating/headaches/painful.

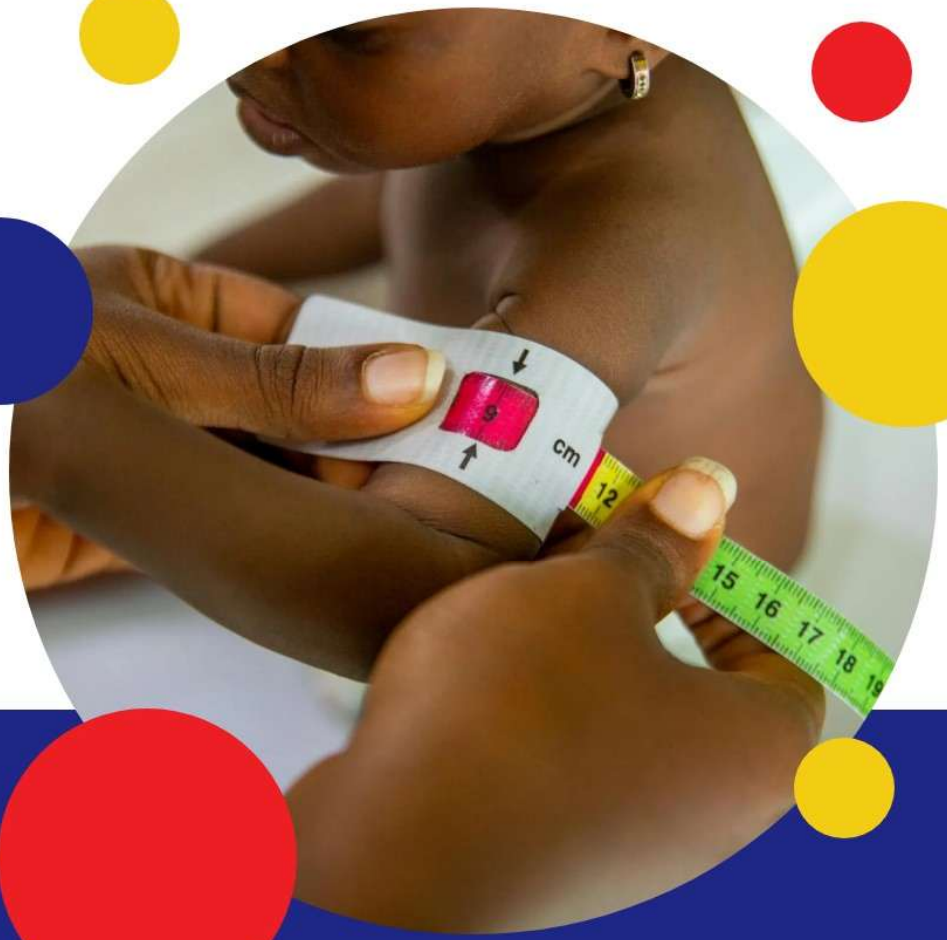
THANK YOU



WITS UPTO SPAED CONFERENCE

25 - 27 July 2025

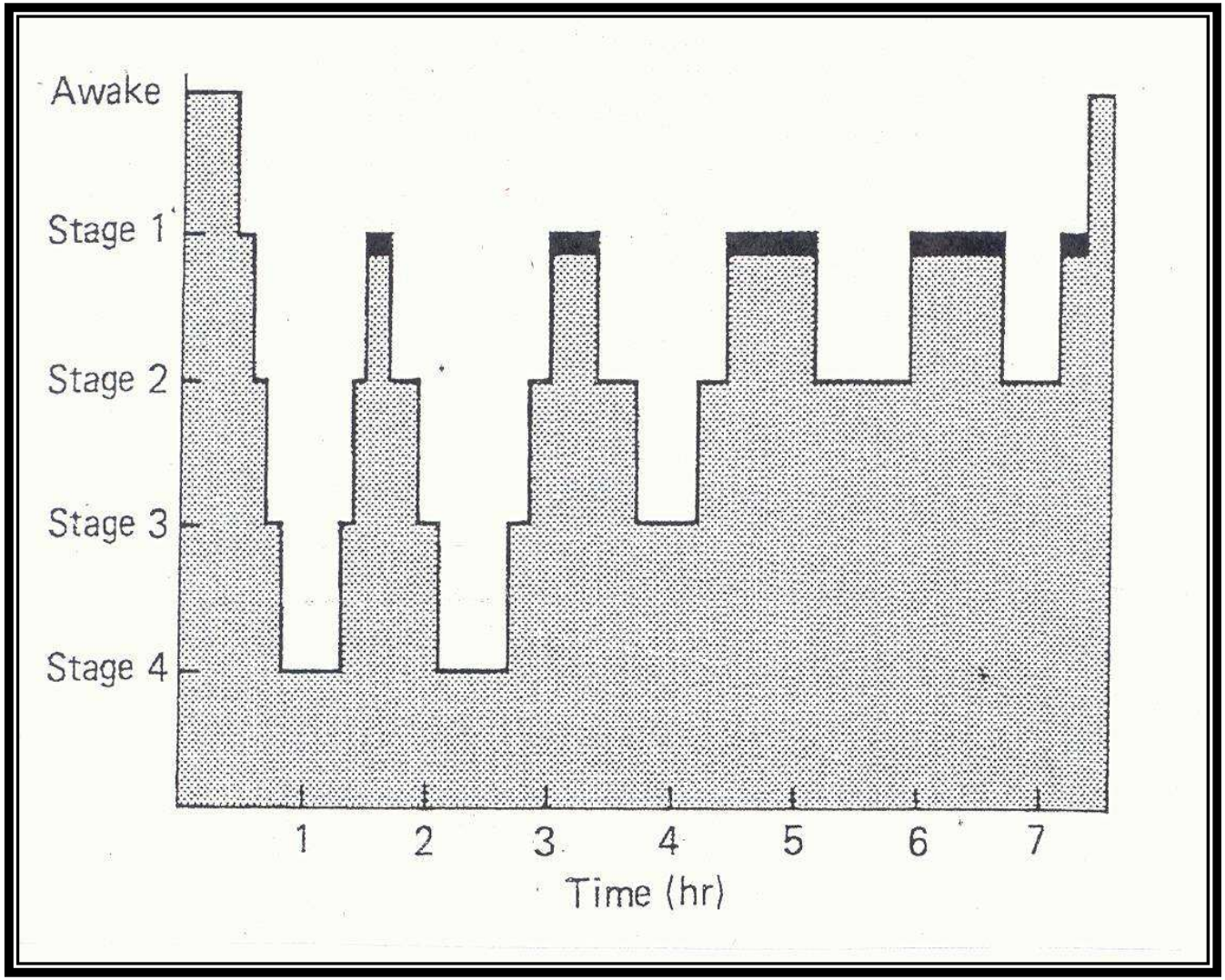
The Wanderers Club, Johannesburg



Welcome Day 2

SLEEP DISORDERS
PROF A. VENTER

TO SLEEP, PERCHANCE TO DREAM


Awake
Stage 1
Stage 2
Stage 3
Stage 4
1
2
3
4
5
6
7
Time (hr)

Sleep disorders

- Organic causes
- Duration of sleep
- Incorrect management of a child
- Other causes:
  - Fear
  - Concerns/worries
  - Separation anxiety
  - Excitement
  - Negativism
  - Social circumstances

SLEEP DISORDERS

Test crying:

Young babies' cry just after being put to bed. Do not react to this!

Generic management of children who wake up/cry/get up often at night:

- Determine a *specific time* to go to bed.
- Go through *rituals* with the child before this time
- Put child in bed, read a story (if applicable), pray, etc. Parents may lie in bed with child during this period.
- Now *switch lights off* – nightlight may be left on.
- *Child must lie down*, not talk.

Generic management of children who wake up/cry/get up often at night:

- ***Parents are not allowed to lie*** **down with child on bed at this stage.**

- **Parents sit in a chair next to bed until child goes to sleep.**

- **If child gets up, let him lie down again, tuck him in and soothe him (verbally).**

- **Every time child wakes up the *ritual is repeated*.**

- **The child should have a good sleeping pattern by 7 days.**

Generic management of children who wake up/cry/get up often at night:

- "Crying out" - not recommended
- Sedation only in exceptional circumstances

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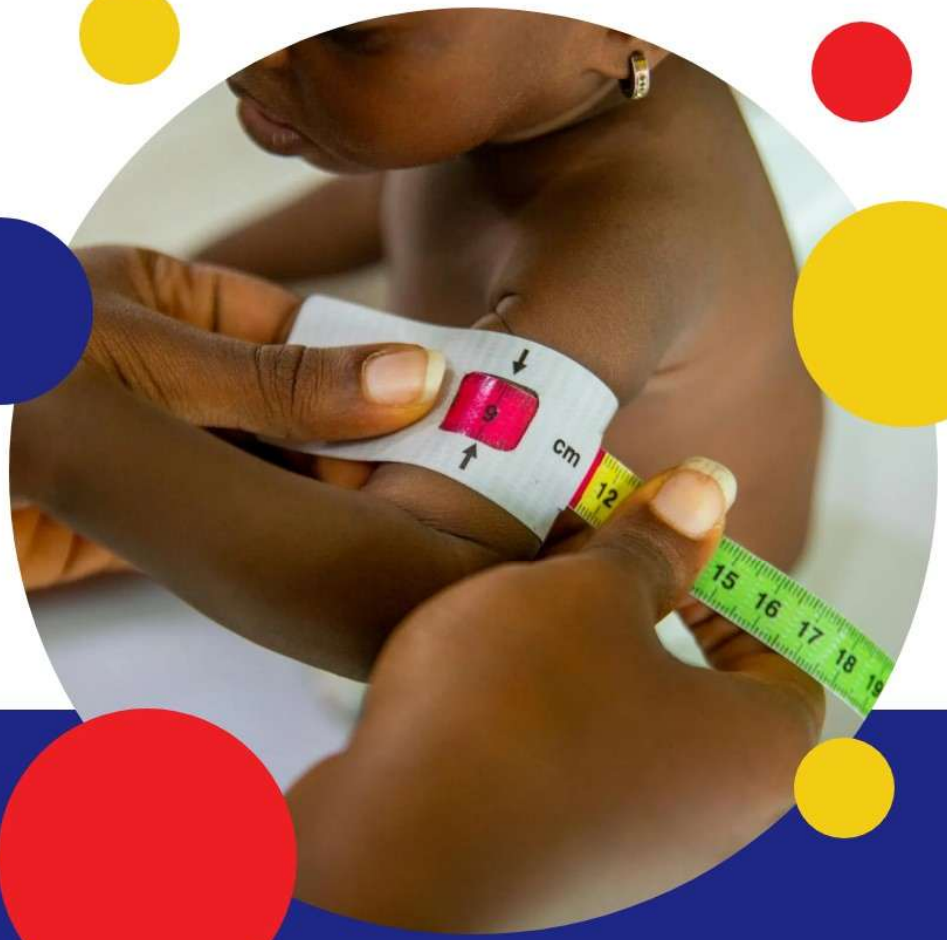
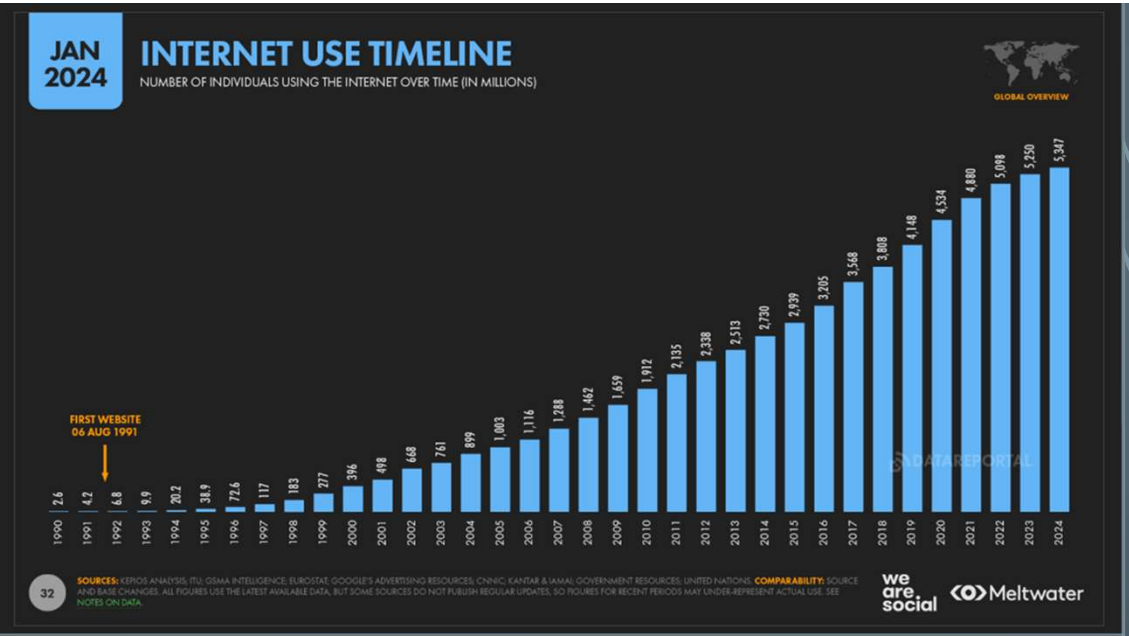
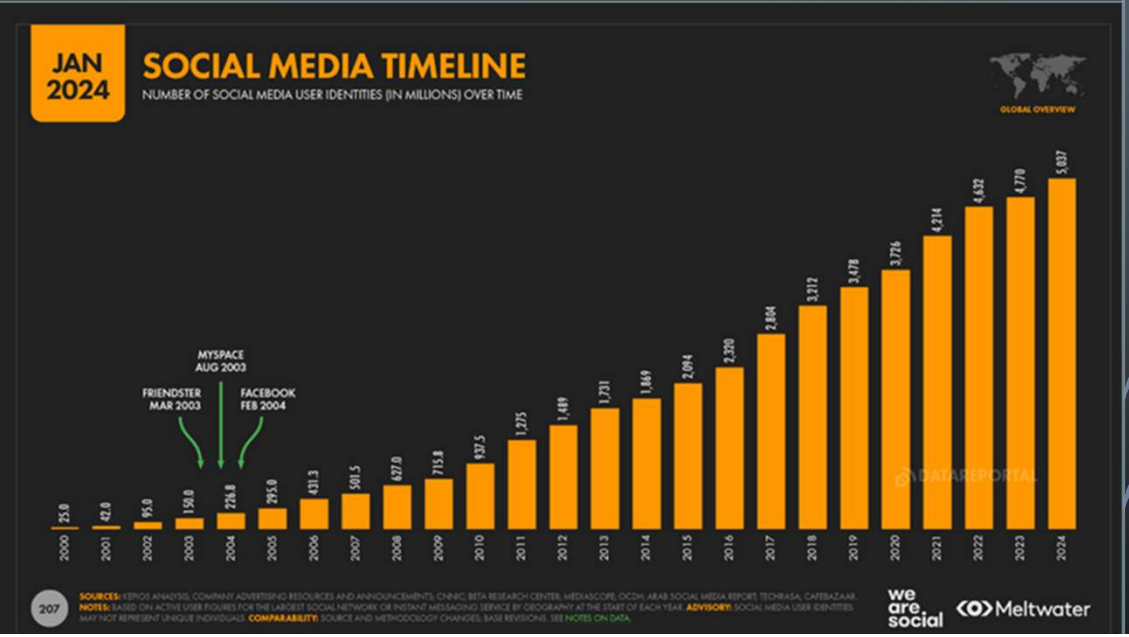


Welcome Day 2

SCREEN TIME & NEURODEVELOPMENT

SAJAL PILLAI-DILSOOK

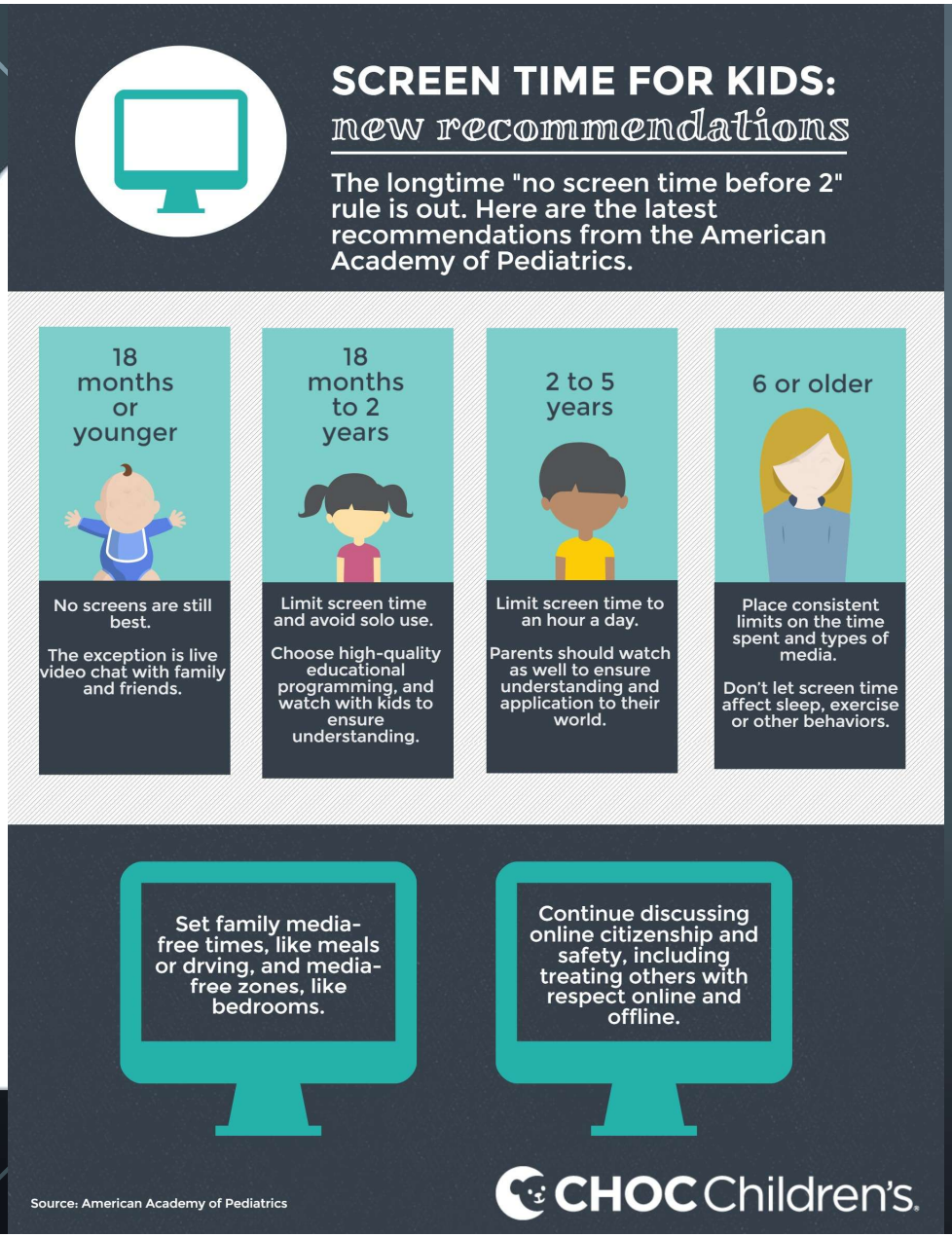




WHAT IS SCREEN TIME?

- Surge in technological advancement
- Array of devices
- Time spent by an individual using any of the aforementioned devices
  - Hours per day
- Active vs passive
- Multiscreening

Digital 2024: Global Overview Report, S Kemp



RECOMMENDATIONS

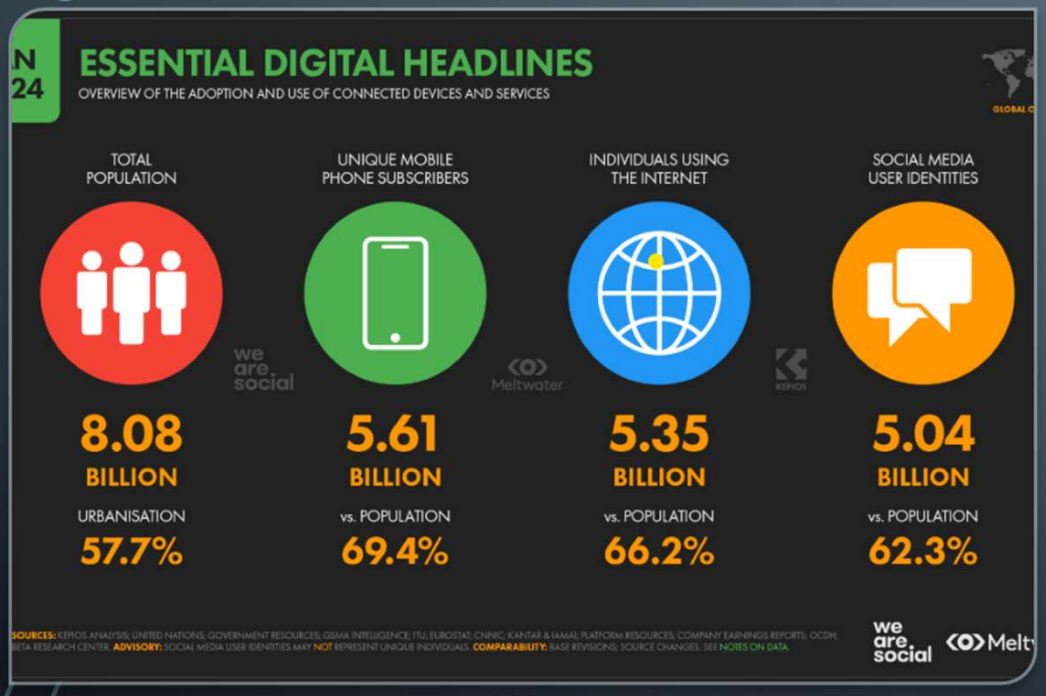
WHO

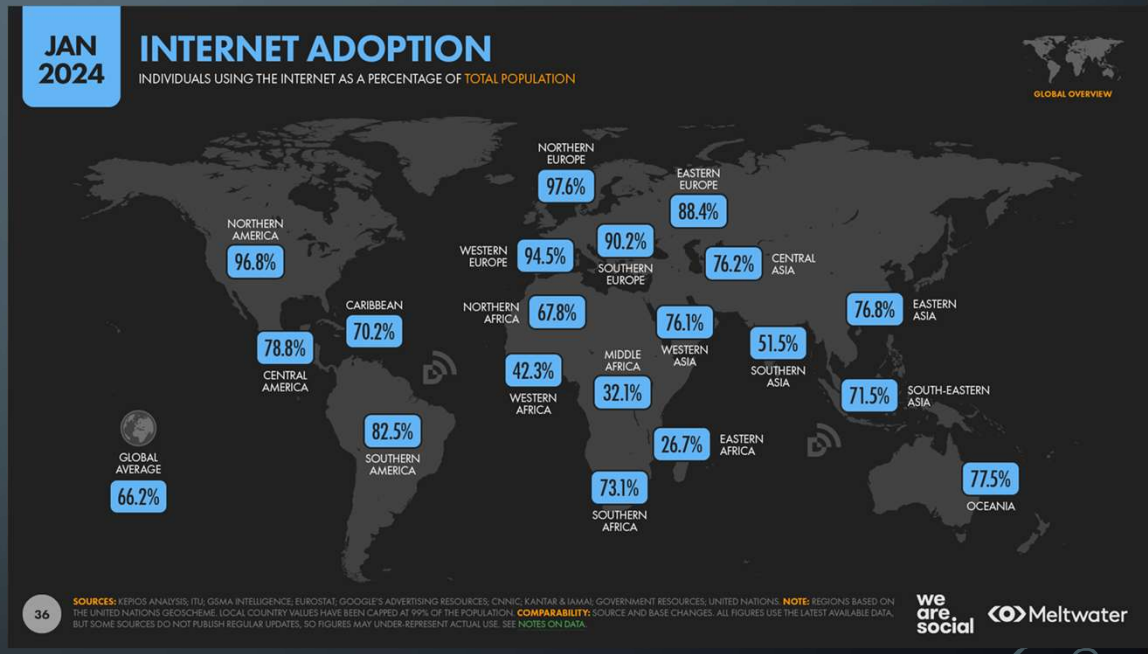
- < 2yrs – no screen time
- 2 - 5yrs – ≤ 1 hour
- 6 – 17yrs - ≤ 2 hours

SASOP (April 2025)

- As per WHO BUT ≤ 2 hours for adults as well!

EPIDEMIOLOGY: GLOBAL





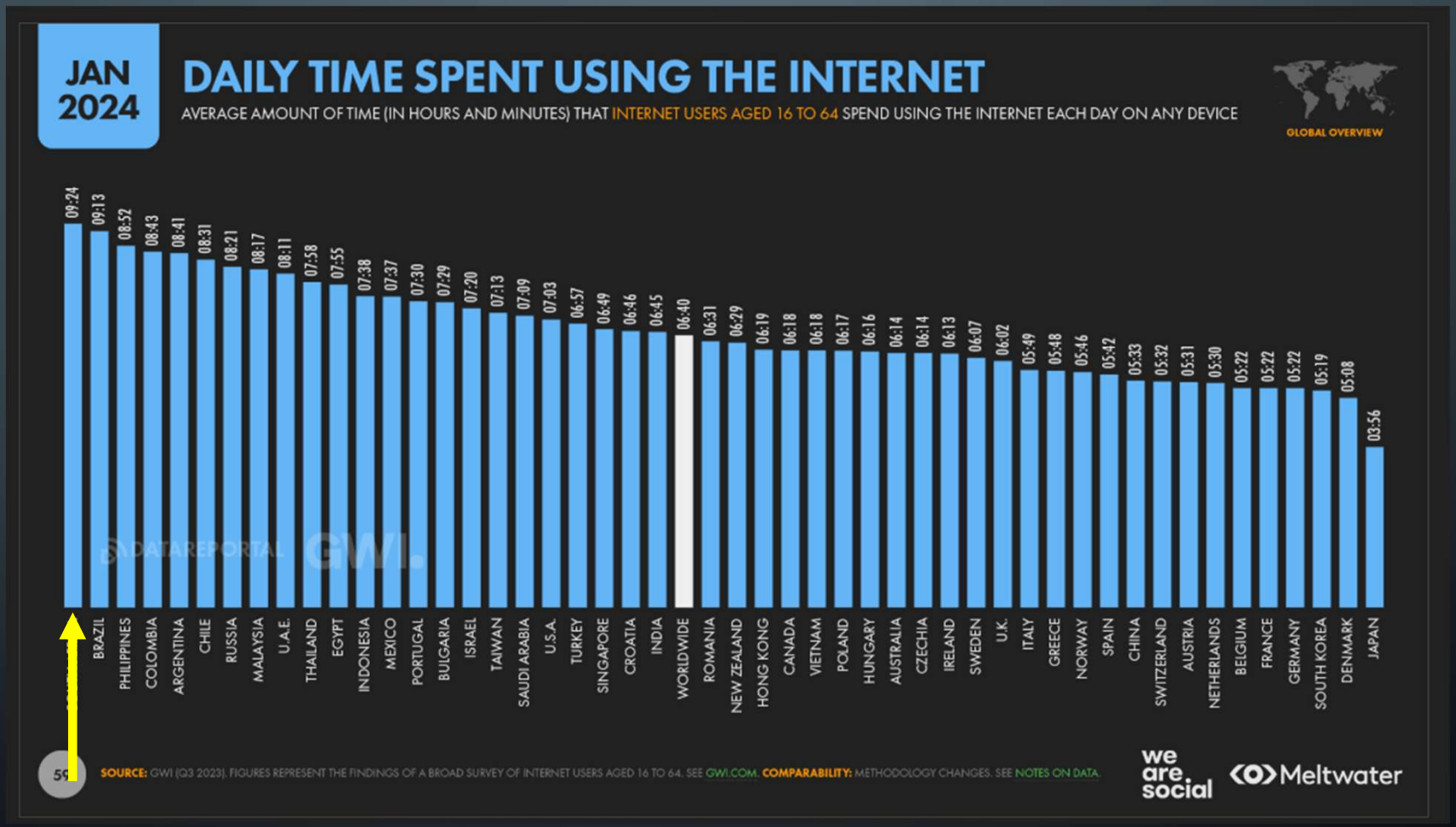
Digital 2024: Global Overview Report, S Kemp

EPIDEMIOLOGY: USA

- 91% of children: home computer
- 98% of children: home mobile device
- average screentime 8-18yr = 7.38hrs per day (increasing)
- average screentime 0-8yrs = 2 ¼ hrs per day
- average daily screentime of pre-school children = 4.1hr per day

- Average age of 1st exposure = 2.25 yrs
- Earliest exposure at 3 months of age

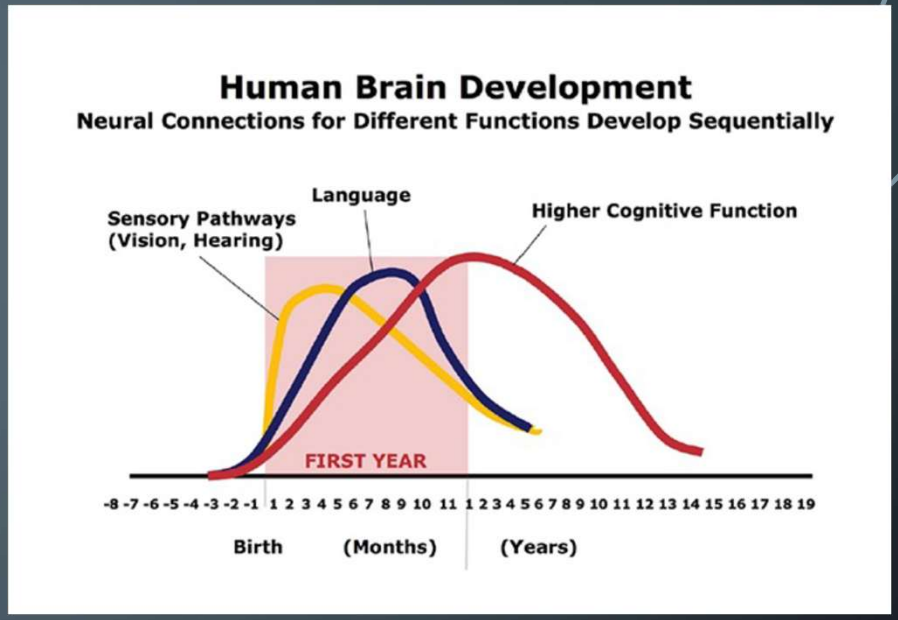
EPIDEMIOLOGY: SOUTH AFRICA

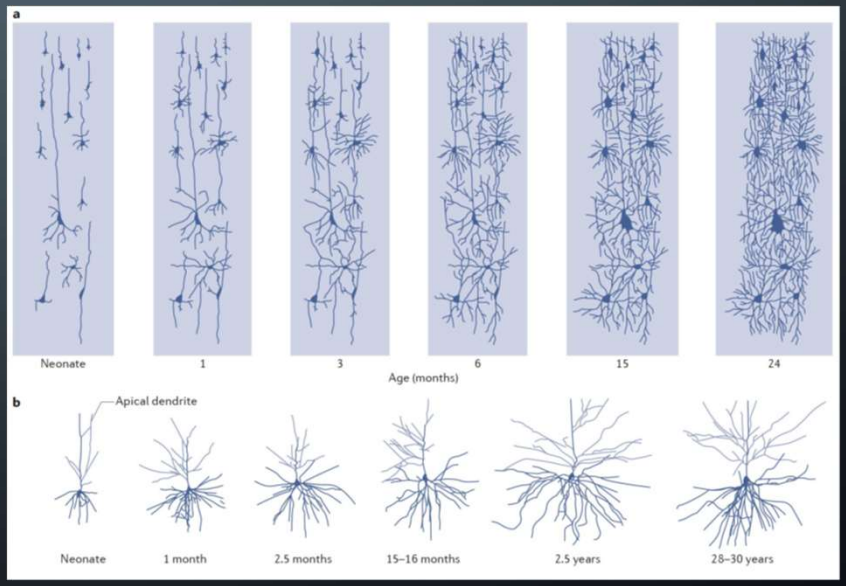


NEURAL CHANGES

- Anatomical
  - Decreased grey matter volume
  - Decreased white matter integrity & connectivity
  - Modifications to the amygdala
- Chemical
  - Serotonin
  - Dopamine
  - Acetylcholine

NT deficiency





Brain Development—How you can help.

Important!! Remember to balance stimulation with rest and quiet time to process it all!

Frontal Lobe—Concrete Thinking (3 to 12 years)

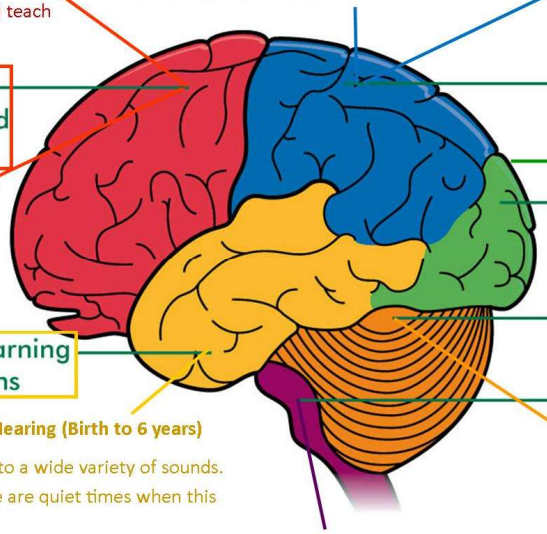
Have your child sort and categorize objects.
Encourage problem-solving. Let your child be frustrated sometimes as they figure something out.
Help your child notice patterns. ("When you do X, this always happens." "After we do Y, we always...")
In your child's elementary school years (age 5—12) teach reading and writing (not essential to start earlier)

Parietal Lobe—Language (Birth to 6 years)

Talk, sing, and read to your child.
Listen to your child and respond.
Read the same stories or sing the same songs over and over so your child learns to memorize.
Follow your child's attention and talk about what they are looking at or doing.

Parietal Lobe—Touch (Birth to 6 years)

Carry your baby, touch your child, hold hands, hug, massage
Give your child lots of objects to hold and manipulate.
Let them touch soft things, rough things, slimy things, etc.
Let your child explore the world hands-on—pulling, pushing, pouring, stroking, picking up, dropping, turning, twisting, opening, and closing.



Prefrontal Cortex—Judgment (12—22 yrs)

Give choices (when your child is calm... they can't make choices when stressed or upset).
Talk to your child about plans. Let them make plans.
Help your child break down big tasks into little steps.
Give your child some freedom to try out their ideas, and learn from their mistakes.

Occipital Lobe—Vision (Birth to 2 years)

Provide interesting things to look at.
Play games where the child follows things with his/her eyes. Roll the ball, throw the ball.
Look at pictures and small items up close.
Play "I spy" and "where's waldo" and games where they search for visual differences.
Make sure your child has plenty of outdoor time to develop distance vision.

Limbic System - Emotions (8 mos to 2 yrs)

Show unconditional love.
Experience joy with your child.
Respond in consistent ways.
Talk to your child about emotions. Teach vocabulary to understand how they feel.

Temporal Lobe—Hearing (Birth to 6 years)

Expose your child to a wide variety of sounds. Also, be sure there are quiet times when this system can rest.
Listen to music, play music, let your child experiment with instruments / noisemaking.

Play games where you practice being loud/ quiet, echo tunes back and forth, etc.

Brain Stem—Survival Mechanisms (Developed at Birth)

During pregnancy: reduce stress, minimize alcohol and tobacco. Maximize healthy diet, including omega-3 fats

After birth: Help your child feel safe, emotionally and physically. If a child is frightened or stressed, the brain goes into survival mode (brain stem function), and the rest of the brain can't grow and develop. When a child feels safe and happy, the child can learn.

Cerebellum—Balance & Coordination (Birth to 1 yr)

First 6 months: carry your baby in your arms or a sling to let them experience more variety of movement than in a stroller. Dance with them. Sing songs and move their arms and legs for them.

Throughout life: Let them move! A lot! In lots of different ways. Take your child to the playground and the swimming pool. Let them climb trees and rocks. Let them run, throw, jump, and kick.

Note: Timeframe given is the "sensitive period" when that part of the brain is growing and developing *the most*. The brain grows and changes throughout our lifetimes, so your child will benefit by all these kinds of stimulation throughout life.

RISK FACTORS

- Low level of parental education
- Low socioeconomic status
- Using screens as a “babysitter”
- Increased caregiver use of screens
- Children having their own devices

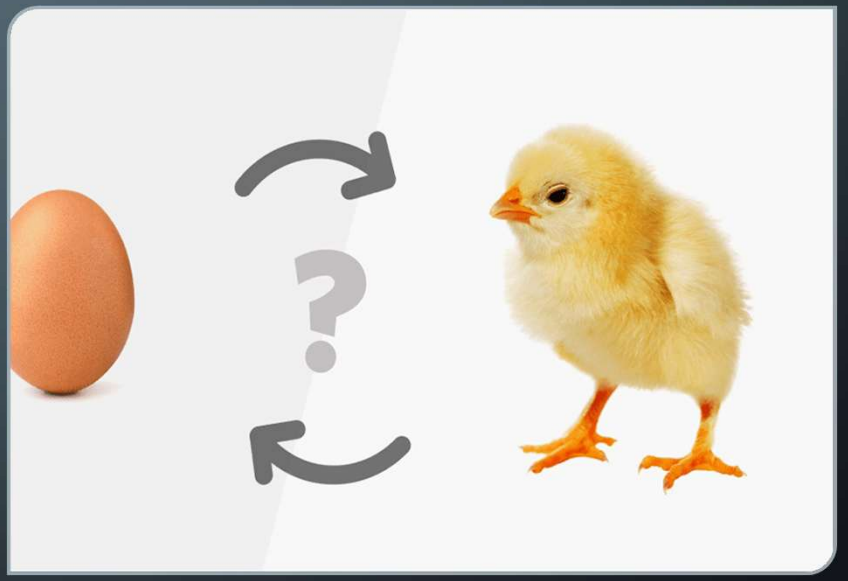
CHILDREN WITH ASD

- Increased likelihood to engage with screens
  - Caregiver factors
  - Patient factors

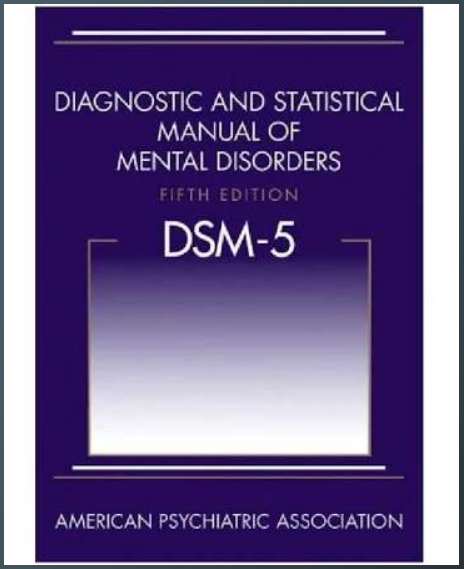
- Increased sensitivity to developing negative effects of screentime
- Effects are worse at lower durations

- Note: risk of developing autistic-like behaviours increases with
  - Younger age of exposure
  - Longer the daily duration of exposure

- 30% increased risk of developing ASD in 3yr old boys **IF**
  - Screentime >2hrs per day when <1yr old



IS IT A DISORDER?



- "digital heroin" / "electronic cocaine"
- Electronic Screen Syndrome "screen addiction"
  - Not yet recognized by DSM V
  - Characterised by excessive screen exposure & behavioural/mood changes
  - State of hyperarousal
- Internet Gaming Disorder
  - Appendix of DSM V
  - Gaming takes precedence over other interests & daily activities

EFFECTS ON DEVELOPMENT

- Early exposure = predictor for developmental delay
- Delayed language development
- Reduced cognitive ability
- Delayed sensory integration
- Impaired social interaction
- Emotional dysregulation

IMPACT ON LANGUAGE DEVELOPMENT

- Limited amount of joint attention
- Frequent interruptions during communication cycles
- No/inadequate linguistic feedback from screen or caregiver
- Lack of responsive caregiving due to caregiver's screen use
- *Video deficit phenomenon*

EFFECTS ON BEHAVIOUR

- Increases
  - Aggression
  - Risk-taking behaviour
  - Bullying & violence
- Associated with:
  - ADHD
  - OCD
  - Anxiety
  - Depression
- Poor
  - Coping skills
  - Ability to concentrate
  - Academic performance

EFFECTS ON SLEEP

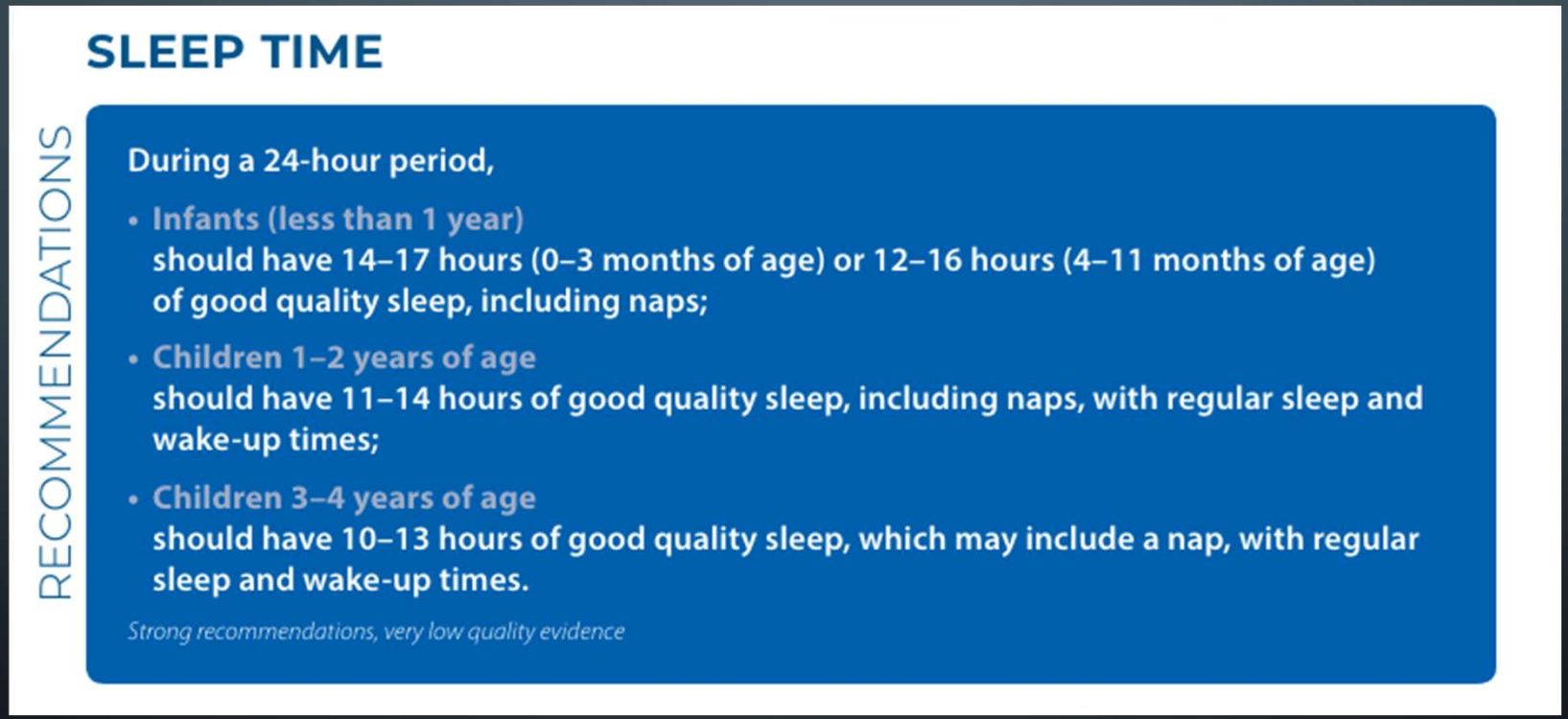
- Sleep dysregulation
  - Decreased duration
  - Increased sleep latency
  - Poor sleep quality

- Daytime somnolence
- Exacerbates/triggers aggression, irritability, self-injurious behaviour
- Affects brain maturation
- Compromises the ability to learn

- *Blue light hypothesis*

- Longer screen exposure & closer proximity to bedtime >>> worse sleep quality

SLEEP RECOMMENDATIONS

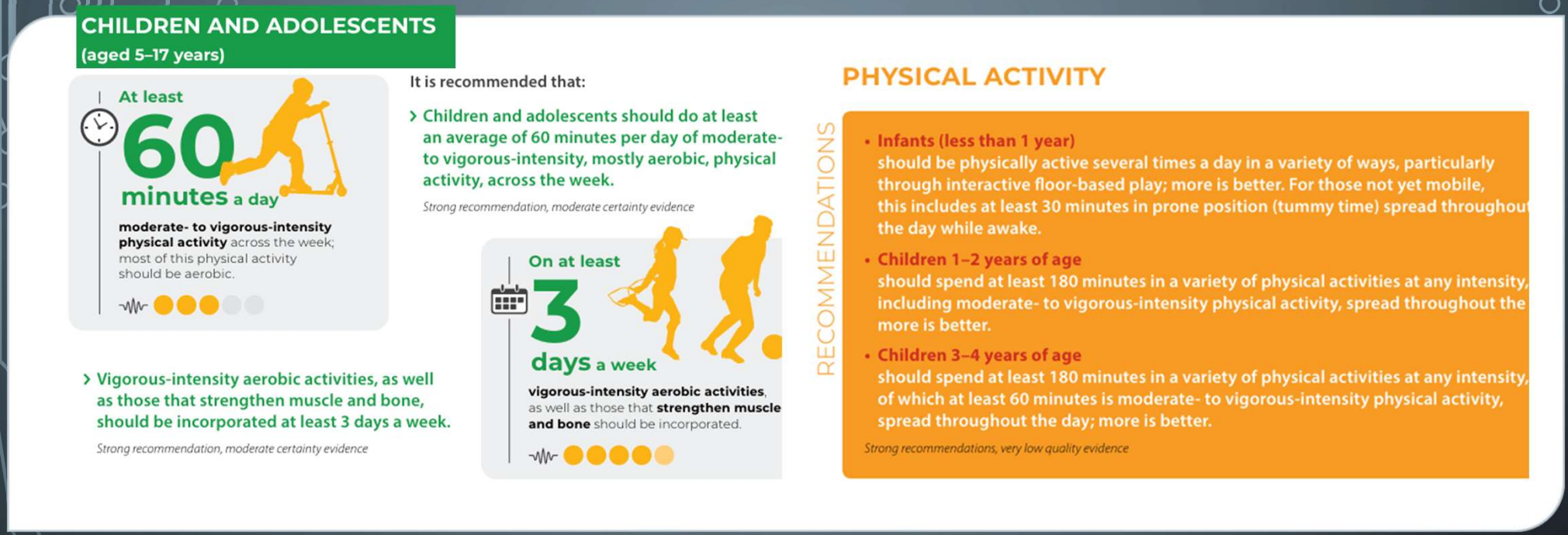


WHO Guidelines on physical activity, sedentary behaviour & sleep for children under 5 years of age 2019

EFFECTS ON PHYSICAL HEALTH

- Screentime encourages a sedentary lifestyle
- Exposure to food advertisements
- Screen exposure while eating dimishes attention paid to satiety cues

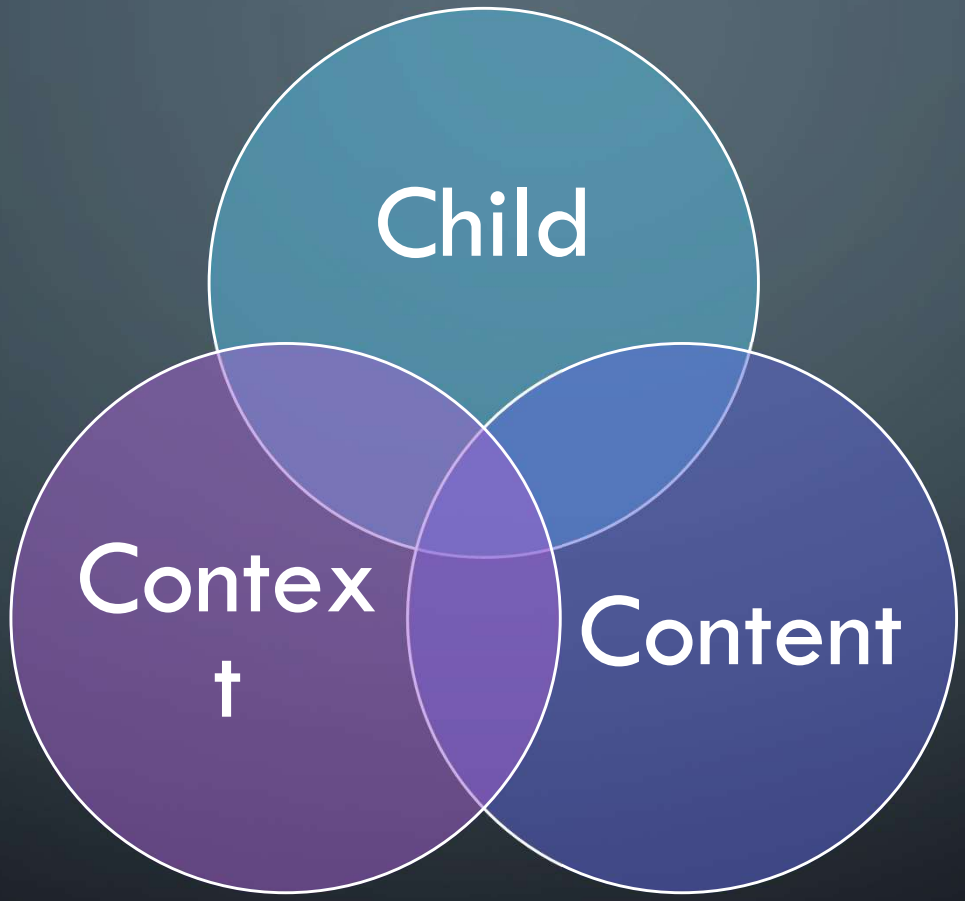
Obesity



PHYSICAL ACTIVITY RECOMMENDATIONS

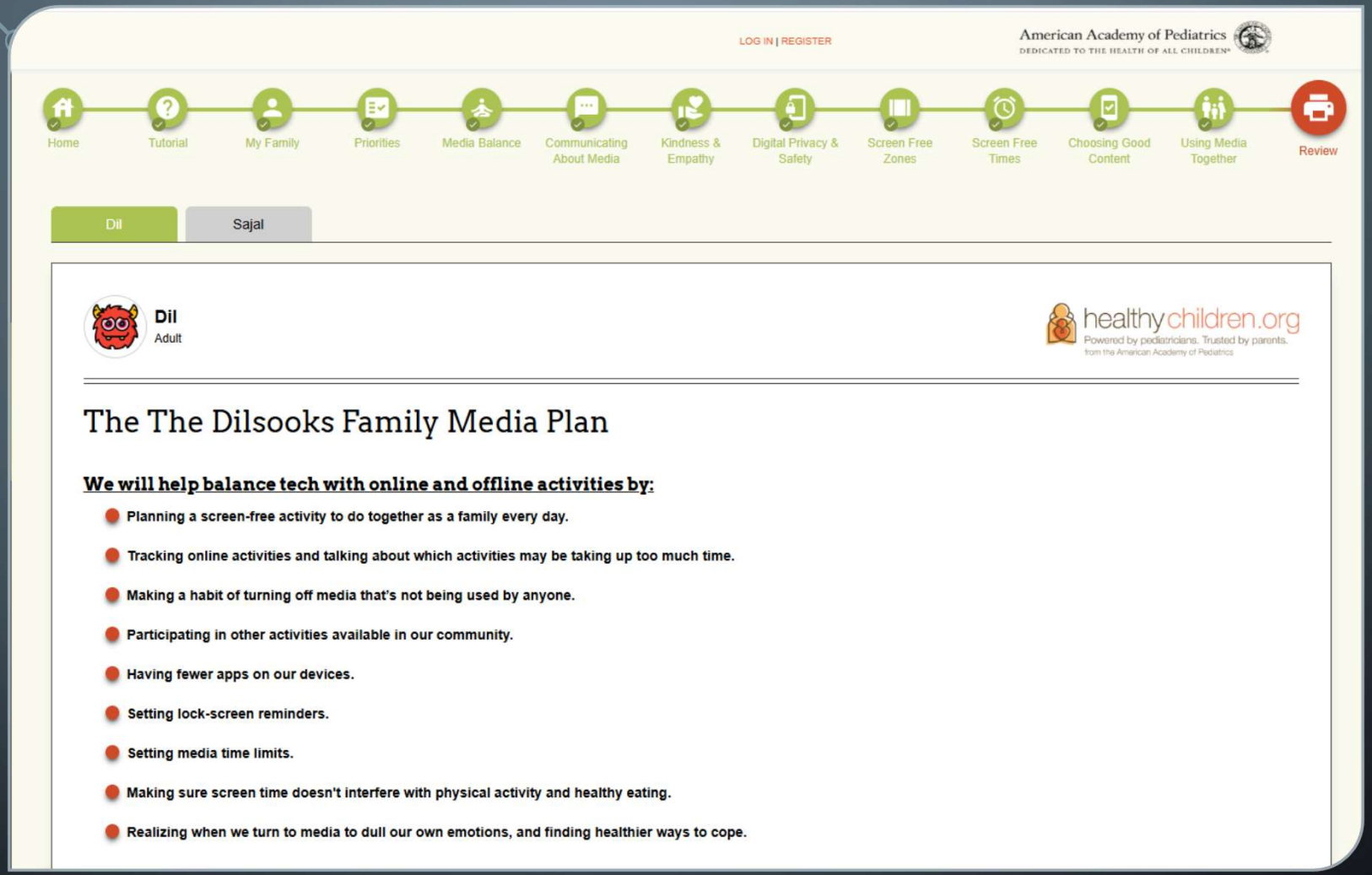
WHO Guidelines on physical activity & sedentary behaviour 2020

FACTORS TO CONSIDER



OTHER RECOMMENDATIONS

- Create unplugged spaces & times at home
- Do not replace sleep, play, exercise, reading aloud, social interactions with screentime
- Avoid allowing children to use media by themselves
- Avoid using media as the only way to calm a child down
- No screens 1 hr before bedtime



AAP FAMILY MEDIA PLAN

TAKE HOME MESSAGE

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THANK YOU FOR LISTENING!