

Position Statement

Digital media: Promoting healthy screen use in school-aged children and adolescents

Canadian Paediatric Society, Digital Health Task Force, Ottawa, Ontario

Correspondence: Canadian Paediatric Society, 100–2305 St Laurent Blvd, Ottawa, Ontario K1G 4J8. E-mail info@cps.ca, website www.cps.ca

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Abstract

Digital media are integrated into the everyday lives of children and adolescents, with potential benefits and risks for learning, mental and physical health, and for social life. This statement examines the cognitive, psychosocial, and physical effects of digital media on school-aged children and adolescents, with a focus on family routines, context, and activities. Evidence-based guidance for clinicians and families involves four principles: healthy **management**, **meaningful** screen use, positive **modelling**, and balanced, informed **monitoring** of screen time and behaviours.

Keywords: *Adolescents; Children; Development; Digital media; Family; Health; Screen use*

BACKGROUND

Digital media are integrated into the everyday lives of children and adolescents, and health care providers are often asked about the effects of screen use on mental and physical health, and on family life. Current evidence shows that digital media differ in their impacts on cognition, psychosocial function, and physical health, and that benefits and risks are nuanced. This statement provides evidence-based guidance for clinicians on promoting healthy screen use in school-aged children (5 to 12 years old) and adolescents (up to 19 years). It follows a previous CPS statement on preschool exposure to screens (1).

A literature search of Medline and the Cochrane Library databases from January 2013 to February 2019 used the terms

Useful definitions

‘Screen time’ refers to time spent with any screen, including smart phones, tablets, television, video games, computers, or wearable technology.

‘Digital media’ refers to content transmitted over the Internet or computer networks on all devices, unless particular ones are specified.

‘digital media’ OR ‘screen time’ AND ‘physical health’, ‘mental health’, and ‘psychosocial’. Limits were applied for age (5 to 19 years), English language, and publication within the past

6 years, with a focus on journal articles, reviews, systematic reviews, and meta-analyses. A search of the grey literature was also conducted, using paediatric and psychological association websites, reference lists, and information from screen research and advocacy organizations in Canada, Europe, and the USA.

Harmful online behaviours, such as sexting and cyberbullying, are beyond the scope of this document. And although high screen use levels have been associated with underlying or, possibly, not-yet-diagnosed neurodevelopmental disorders (2,3), potential benefits and risks for this population also fall beyond the scope of this statement.

SCHOOL-AGED CHILDREN: IMPACTS ON DEVELOPMENT AND MENTAL HEALTH

Three-quarters of Canadian parents are concerned about how much time children spend using media, reporting that 36% of their 10- to 13-year-olds spent 3 hours or more per day using digital devices for reasons unrelated to school work (4). A national survey in 2013 reported one-third of students in Grades 4 to 11 are concerned about the amount of time they spend online (5). However, school-aged children are increasingly required to use digital media

Received: February 11, 2019; Accepted: May 8, 2019

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at home and in school (6). Media habits change throughout childhood (7), as time spent watching educational television (TV) peaks, typically in preschool, and entertainment TV, video games, and social media take up more leisure time, usually by age 8 (7,8).

Potential benefits

- Cable or online programs that are age-appropriate, co-viewed with family, and watched with purpose and limits, can be immersive, informative, screen experiences (9,10).
- Screen media can improve children's academic performance, enrich knowledge and literacy skills and help develop positive relationships with teachers and peers (11–13). Screen-based programs and approaches can encourage both autonomous and collaborative learning, and stimulate inquiry (13,14). Dynamic software and quality apps and games can increase proficiency and reduce learning gaps in mathematics (15,16).
- Cooperative or competitive video games, played with family and friends, can reflect and function as traditional play, offering opportunities for identity, cognitive, and social development (7,17–19). Many children—especially boys—regularly socialize through games (5,7). Some video gaming has been positively associated with increased sense of well-being, prosocial behaviour, and fewer conduct problems (19,20).
- Recreational screen time at low levels (1 hour per day) has been associated with lower depression risk compared with no screen time (21).
- Digital technology can help children make and maintain friendships, and early research suggests these relationships may be more diverse and gender-inclusive than those offline (22).

Risks

- Exposure to age-inappropriate or violent content, having a TV in the bedroom, and background TV can negatively affect development and behaviour (23,24). Watching TV for more than 3 hours daily at 5 years of age predicted increasing conduct problems by age 7 (25). Higher rates of recreational screen use are reported in children with higher depressive symptom levels and lower levels of physical activity (PA) (26).
- Minority or marginalized students may have less access to quality Internet-based learning resources (which stimulate active, creative, and critical engagement versus passive consumption), or the devices needed to access them (6). Not all families or schools have the necessary resources to curate and limit children's screen use. Economically disadvantaged and minority students and families consume significantly more media overall (27–29).
- School-aged children often use a centrally located, shared family tablet or laptop at home for homework, gaming or socializing, but two recent Canadian surveys found they are often unsupervised (4,5). Beyond lost opportunities to learn,

play, and interact with family, solitary screen use greatly increases risk for exposure to negative or harmful content (4,5). Also, research has shown that children may be overconfident about being able to protect themselves online (5).

- Although dividing attention between two or more devices simultaneously ('media multitasking') makes learning especially difficult (30), children 5 to 8 years old routinely try (31). Multitasking has an immediate negative impact on both concurrent learning (in class or at home) and academic outcomes in children aged 12 years and younger. It can disrupt reading efficiency, impair problem-solving, and may undermine children's confidence in their own ability to do homework (32–34).
- A stronger association between depressive symptoms and leisure-time screen-based sedentary activities is emerging from research in younger children, who appear to be more vulnerable to negative socio-cognitive outcomes from heavy screen use than teens (26,35).

ADOLESCENTS: IMPACTS ON DEVELOPMENT AND MENTAL HEALTH

Screen *time* remains a defining factor in the research of healthy media use. If high school students nationwide are like their peers in Ontario and Alberta, they spend more than 7.5 hours per day on various screens, with 20% of high-schoolers spending 5 hours or more per day on social media alone (36,37). However, research suggests that teens are less susceptible to the negative effects of high screen time levels (i.e., over 6 hours per day) than younger children (17,21,38). In adolescents, zero screen use *or* excessive use are associated with negative effects, while moderate use (typically reported as between 2 and 4 hours per day) is associated with some cognitive and psychosocial benefits (11,17,39–41). The type (video game, TV, smartphone, computer) and timing (weekday or weekend) of screen use determined different effects on mental well-being in a non-linear fashion (39,42). Content, context, and individual traits are other defining factors when assessing screen use effects. Evidence is not clear whether increased technology use may cause lower well-being or whether lower well-being results in increased technology use. There are likely unaccounted factors affecting both technology use and adolescent well-being (42).

The digital world can influence many adolescent milestones, including social connectedness with peers, sense of identity, independence from family, navigating the socio-cultural world, and developing autonomy (17,29,43–45). However, being constantly online can contribute to feelings of alienation and social exclusion. Key developmental mechanisms of friendship and identity formation, such as self-disclosure (10,29,46,47) and experimenting with novel identities or roles, can influence online relationships either positively or negatively. One

in 10 teens has reported 'frequently' using the Internet to 'pretend to be someone else' (44). But most studies and surveys have found that adolescents communicate online with offline friends far more than with strangers and that, overall, their online behaviours and presentations of self closely mirror their offline activities, interests, and personalities (44,48,49).

Parents often ask health care providers about the effects of screen time and technology use on family life. One cross-sectional analysis of 12- to 18-year olds showed that although time spent on digital technology displaced face-to-face interactions with parents, it did not reduce quality of parent-child relationships (17,44,45,49). More recent research suggests that when relationships are strong offline, newer technologies confer additional benefits (10,49,50), and frequent online contact appears to strengthen parent-teen relationships (44,50,51). Parents report the biggest sources of conflict over media are the amount of time spent on screens and rules about when and how devices are used (4).

Potential benefits

- Friendship is the leading motivator for adolescent life online, with older teens communicating most frequently with offline friends, and younger teens being more open to making new friends online (47). Media use appears to improve self-concept in teens by enhancing perceived friendship quality (35,44,48,52). Staying constantly 'in touch' through texting, instant messaging, and social networking is increasingly believed to fulfill a developmental 'need to belong' (53).
- Social media can be validating, when thoughts and experiences are shared with peers, or affirming, when teens get help to 'bounce back' from social rejection or isolation (44,54,55). In a recent UK survey, 68% of teen respondents said they had benefited from social support online during tough or challenging times (39,56). Social media sites can avert stigma and be safe, supportive places to explore sexuality and self-identity (48).
- Positive effects on well-being, defined as positive emotions, psychosocial functioning, and a sense of life satisfaction, are reported with moderate (around 2 to 4 hours per day) screen use (39).
- Online communication may encourage isolated or socially anxious adolescents to engage in self-disclosure with peers and new contacts, which can enhance feelings of social connectedness and reduce depressive symptoms. These findings suggest that positive effects of communicating online may be stronger in adolescents who have less social support or are more uncomfortable socializing face-to-face (18,35,45-47,54,55,57,58).
- Studies of action video game play in older children and teens have found short term, game-specific increases in some cognitive skills, including attention, visual, and representational processing (20,59) but also, notably, in executive function and visual spatial working memory (8,20,60). Recent research increasingly links game play with enhanced well-being, problem-solving skills, positive intergroup relations, and PA (17,19,25,39,61,62).

Risks

- Parental awareness of and involvement in their children's online activities is a key moderator of excessive use and other risky behaviours (4,5,63). However, at least one survey suggests that family rules governing screen use are declining, especially after Grade 7, for boys, and regarding meeting online acquaintances in person or visiting inappropriate sites (5).
- Many adolescents report spending 'too much' time online. Half of teens in a large 2016 survey in the USA reported feeling 'addicted' to their mobile devices (64). Also, being the receiver (or sender) of instant messages with negative content has been correlated with internalizing symptoms of anxiety or depressive disorders (65).
- There is a small but significant association between excessive screen time (more than 6 hours/day) and feelings of depression in teens (17,21,38). One Dutch study found that adolescents having few or no close friends who passively 'surfed' (rather than connecting with people) online experienced more depression and anxiety over a 1-year period (35). For teens reporting stronger friendships, there was no such effect (17,35,38).
- Frequent media multitasking has been linked to lower English and math scores, weaker working memory, lower sustained attention, and greater impulsivity in adolescents (32,60,66,67). Over half of US students have reported often or sometimes using social media while doing homework (68), and some research suggests that adolescents who are more prone to habitual multitasking may be the least able to learn effectively (60).
- Studies have suggested that the time spent gaming matters, though only at very high levels. Adolescents who spend more than 50% of their daily free time playing e-games have reported slight negative effects on overall well-being, as well as conduct problems, hyperactivity, peer problems, and emotional problems (17,19). Thus, when video game play exceeds a certain threshold, its positive influences diminish or disappear (17).
- Because the adolescent brain is still learning to control impulses, regulate emotions, and assess risks and consequences, adolescents may be developmentally predisposed to take risks online (69,70). Socially anxious or depressed adolescents communicate online more often with strangers (46,53,54) and tend to self-disclose more (44). Both boys and girls disclose personal information online (17,43,44). A Canadian survey indicated that 43% of students in Grades 4 through 11 have engaged online with people they do not know offline, and 29% have posted their contact information (boys do this more than girls). Still, almost all boys (90%) and girls (89%) agreed with the statement 'I know how to protect myself online' (5).
- Parents perceive decreased family time and closeness in homes where many devices are used, and too much technology can erode family connectedness (49).

IMPACTS ON PHYSICAL HEALTH

The most immediate risk to physical health associated with screens is from being distracted (texting or using headphones) while driving, walking, jogging, or biking. Research has consistently shown that screen use can adversely affect readily measured indicators of health (41), such as weight and sleep.

Physical activity

While screen use alone may not directly displace PA, research tends to confirm that already inactive adolescents spend more time using screens (17,41,71). Current evidence also suggests that screen time impacts health more than overall sedentary time, but while longer and more frequent screen and TV viewing are significantly associated with unfavourable body composition and lower fitness measures (41,72), this relationship is not necessarily causal, nor is it consistent (41,73). For example, while one Canadian study of 9- to 11-year olds associated increased screen time with small reductions in PA and a slightly less healthy diet (74), a longitudinal study of 11- to 13-year olds found screen-based sedentary behaviours *not* to be associated with less engagement in leisure-time PA (17,75,76). One recent longitudinal study of 14- to 24-year-olds found a positive relationship between *moderate* (1 to 4 hours per day) Internet use and participation in sports and clubs (77).

Weight

Compared with the mixed evidence of screen use effects on PA levels, the connections between eating or snacking while viewing (78–81) and weight gain are clearer (41). In children and adolescents, TV viewing has also been inversely associated with fruit and vegetable consumption and positively associated with total energy intake, energy-dense drinks, snacks, and fast food, with strength of association being small to moderate for children's studies (82). Several recent studies (82–88) have linked screen-based sedentary behaviour with unhealthy dietary intake. TV watching can suppress satiety signals (82), while fast food, sweetened beverage and restaurant ads contribute to intake (78). Thus, diet and sedentary behaviour in young people may better explain associations between screen time and weight gain than displacement of PA (41,82).

Sleep

Screens in the bedroom interfere with sleep duration and quality. While the number of bedroom TVs has declined in recent years, the presence of other screens has increased (74,78,88–90). In 2014, 39% of Canadian students with cellphones (girls and boys) reported sleeping with them, including 51% in Grade 11, and 20% in Grade 4 (5). Evidence is growing that newer technologies, along with TV, are displacing sleep time, causing emotional arousal, inhibiting melatonin release, and disrupting sleep rhythms (44). One study (91) found that trying to sleep near a

TV (or with a TV in the room), and video or computer game play before bed, were all associated with shortened sleep duration and self-reported insufficient sleep or rest. Playing games on a mobile phone at bedtime was found to have the same effect (92).

Potential benefits

- Some screen activities promote PA. Studies have associated exergaming (e.g., Wii boxing) with increasing PA levels, energy expenditure, oxygen uptake, and heart rate, as well as with raising percentage of total PA and reducing waist circumference and sedentary time (39,93–95).
- Digital technologies that help to track PA, control weight, and improve diet can promote healthy lifestyles (78,96). Smartphone-based activities like geocaching provide motivation for PA (39). One recent Canadian survey found that 20% of girls and 16% of boys sought information online for physical health issues (5), particularly during their high school years.
- Active video games can increase PA and decrease obesity measures in the short term, especially when part of a comprehensive weight control program and played as a team (78).

Risks

- Texting while driving is a serious danger and an all-to-common practice among older adolescents (65). In a recent survey, over 33% of students in Grades 10 to 12 reported texting while driving at least once in the past year. By Grade 12, this percentage had climbed to 46% (97).
- The relationship between screen media exposure and obesity risk in children and adolescents depends on multiple (though modifiable) factors: sedentary behaviours, time spent on screens, eating while viewing, food and beverage advertising, and shorter sleep duration (78,98).
- Having media in the bedroom is associated with increasing sedentary time, obesity risk, cardiometabolic risk, lower PA rates, and shorter sleep duration (99).
- Delayed bedtime and shorter sleep duration are consistent across media type and age group, with associated negative effects on learning, memory, mood, and behaviour (100).
- Even children who are not excessive screen media users have reported experiencing eye problems, headaches, not eating, and fatigue (101). Canadian ophthalmologists recently emphasized the need for regular breaks from prolonged screen use, limits based on age and need, and a screen-free hour before bedtime (102).
- Repetitive strain injury or musculoskeletal complaints are starting to be seen more commonly in clinical practice.
- Frequent sending and receiving of instant text messages can interfere with sleep (97,103,104). Children may be more vulnerable than teens to physiological responses from central nervous system arousal and sleep disruption (26).

- There is a correlational link between social media use and appearance anxiety, body image concerns, and disordered eating in adolescents (104–106).

RECOMMENDATIONS

Families, and children or adolescents within families, have different digital media considerations. While the physical and mental health issues associated with screen use are a routine part of counselling during health care visits, research examining direct impacts or causality is ongoing.

Health care providers can promote healthy digital media use by counselling every family to remember four essential 'Ms':

MANAGE screen use. Advise parents to:

- Make and regularly review or revise a Family Media Plan, including individualized time and content limits.
- Continue to be present and engaged when screens are used and, whenever possible, co-view and talk about content with children and teens.
- Discourage media multitasking, especially during homework.
- Learn about parental controls and privacy settings.
- Obtain their child's or teen's passwords and login information for devices and social media accounts, to help ensure safety online, and to follow online profiles and activities if concerns arise.
- Speak proactively with children and teens about acceptable and unacceptable online behaviours.

Encourage **MEANINGFUL** screen use. Advise parents to:

- Prioritize daily routines, such as interacting face-to-face, sleep, and physical activity over screen use.
- Prioritize screen activities that are educational, active, or social over those that are passive or unsocial.
- Help children and teens to choose developmentally appropriate content and to recognize problematic content or behaviours.
- Be a part of their children's media lives. For example, join in during video game play and ask about their experiences and encounters online.
- Advocate for schools, child care centres, and after-school programs to consider developing their own plan for digital literacy and screen use.

MODEL healthy screen use:

- Encourage parents to review their own media habits, and plan time for alternative hobbies, outdoor play, and activities.
- Remind parents and adolescents of the dangers of texting or using headphones while driving, walking, jogging, or biking.
- Encourage daily 'screen-free' times, especially for family meals and socializing.
- Ask whether screens are 'off' when not in use, including background TVs.

- Remind parents and teens to avoid screens at least 1 hour before bedtime and discourage recreational screen use in bedrooms.

MONITOR for signs of problematic screen use at any age, including the following:

- Complaints about being bored or unhappy without access to technology.
- Oppositional behaviour in response to screen time limits.
- Screen use that interferes with sleep, school, or face-to-face interactions.
- Screen time that interferes with offline play, physical activity, or socializing face-to-face.
- Negative emotions following online interactions or video games or while texting (107).

Let parents know that the occasional occurrence of these signs may be expected, and does not necessarily indicate problematic screen use.

Acknowledgements

The development of this statement was made possible through an unrestricted grant from TELUS Wise. This statement was reviewed by the following Canadian Paediatric Society committees: Mental Health and Developmental Disabilities, Community Paediatrics, and First Nations, Inuit and Métis Health. Thanks also to Jennie Strickland, for statement drafting, and to Roxana M. Barbu, for reviewing the literature.

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CANADIAN PAEDIATRIC SOCIETY DIGITAL HEALTH TASK FORCE

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