

VIEWPOINT

ARTIFICIAL INTELLIGENCE AND PEDIATRIC CARE

Adolescent Health and Generative AI—Risks and Benefits

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The use of generative artificial intelligence (AI) technologies, which refers to the use of AI to generate new content, such as text, images, and videos, has become common behavior among those who live in the US. Adolescents and young adults in particular are quickly adopting the usage of generative AI in their everyday lives, whether interacting with OpenAI's ChatGPT or Dall-E, holding conversations with AI-powered chatbots, like Character.AI, or using new integrations of generative AI in traditional tools, like AI overviews in Google search. However, adolescence is a sensitive period for youth development, making adolescents particularly vulnerable during this period to health effects,¹ and previous media research has shown screen time and social media leading to a range of mental health symptoms, sleep effects, and cardiometabolic risk in adolescents.² Therefore, research on generative AI's effect on teens' health is vital to protecting adolescents during this critical period, especially as generative AI is unique compared to other forms of media due to its highly engaging and interactive nature. Yet, due to the relatively recent introduction and growth of generative AI usage, little to no empirical evidence exists on its health effects. In this Viewpoint, we aim to explore how generative AI tools, as described earlier, may affect adolescent health and well-being in the following domains: health information, cognition, critical thinking, mental health, body image, social connection, physical activity, and sleep (Table), while also exploring opportunities for future research.³ Although the term *generative AI* does not capture all uses of AI, such as social media algorithms or content recommendation engines, generative AI captures a significant portion of the newest AI technologies that are capable of generating new, novel content, with which adolescents increasingly interact daily, and that may confer both risks and benefits to their health and well-being.

Health Information, Cognition, and Critical Thinking

Although AI chatbots can be a source of reliable, easily accessible health information, with its use in nutrition education leading to positive changes in body mass index, weight, and body fat percentages,⁴ AI may also misinform adolescents by producing inaccurate health information and reducing critical thinking as adolescents rely on AI tools instead of their own thoughts and ideas, which may inhibit young people's cognitive development. Training data can include online misinformation, creating models that deliver inaccurate health information to adolescents and reinforce cognitive biases that adolescents have about themselves and others. For example, AI tools may suggest that a teen struggling with body image undergo a restrictive diet plan. When many teens are still developing the health literacy and fact-checking skills to question these AI-generated suggestions, they may take the content as fact and engage in harmful eating patterns. However, generative AI may also free up adolescents' time to focus on more creative cognitive tasks by perform-

Table. Potential Benefits and Harms of Generative Artificial Intelligence (AI) on Adolescent Health Outcomes

Outcome	Potential	
	Benefits	Harms
Health information	<ul style="list-style-type: none"> Source of reliable, easily accessible health information 	<ul style="list-style-type: none"> Risk of inaccurate health information dissemination Potential manipulation of health information by bad actors
Cognition	<ul style="list-style-type: none"> Potential to improve education quality Potential to facilitate collaborative learning and skill development Potential to free adolescents to focus on more important learning (eg, creative cognitive tasks, social learning) Perform tedious calculations and time-consuming tasks 	<ul style="list-style-type: none"> Further cognitive biases Cognitive offloading to AI tools Certain cognitive struggles (eg, overcoming personal struggles) cannot be performed by AI
Mental health	<ul style="list-style-type: none"> Broaden access to mental health support Displacement of time spent on negative uses of other technologies (eg, doomscrolling social media, or passive use) 	<ul style="list-style-type: none"> Displacement of traditional therapy Lack of empathy and authentic connection from AI tools Dissemination of inaccurate mental health information
Body image	<ul style="list-style-type: none"> AI enhancement of images or videos of an adolescent could lead to greater body satisfaction (eg, an adolescent uses generative AI to enhance their own selfies) 	<ul style="list-style-type: none"> Comparisons to hyperrealistic images of bodies that are unattainable in real life
Social connection	<ul style="list-style-type: none"> Interactions with generative AI may reduce perceptions of loneliness 	<ul style="list-style-type: none"> AI cannot replicate human connection and may displace authentic human connection AI often agrees with users, potentially reinforcing bad behaviors Relationships with AI often do not involve negotiations or sacrifice, key aspects of relationships
Sleep and physical activity	<ul style="list-style-type: none"> Health information to promote physical activity and sleep (eg, exercise routines, sleep hygiene) 	<ul style="list-style-type: none"> Displacement of sleep Displacement of physical activity

ing tedious, time-consuming tasks. Further, developers can improve the training data and develop ways to filter misinformation to reduce misinformation from AI models and improve adolescents' critical thinking skills.

Mental Health

AI could broaden access to mental health support but also harm mental health. Twelve percent of adolescents use AI for mental health and emotional support.⁴ AI can assist with mental health diagnosis

or refer resources to users,⁵ but therapy and counseling are traditionally built on human interaction and connection. Chatbots often do not respond constructively to mental health inputs and may encourage self-harm or suicide in struggling adolescents.^{6,7} In a recent case, an adolescent disclosed his suicidality to ChatGPT (OpenAI). At times, ChatGPT deterred him from seeking help and also provided information on suicide methods. He subsequently died by suicide.⁸

Body Image

Separately, generative AI may change adolescents' body image. AI can produce hyperrealistic images of bodies that are physically unattainable in real life and often do not represent a diversity of body types, worsening body image concerns.⁹ Conversely, AI enhancement of an adolescent's images could lead to greater body satisfaction.

Social Connection

Generative AI usage cannot fully replicate human connection and may displace authentic human connection. One-third of adolescents use generative AI for social connection.⁴ Although AI can replicate empathy, AI cannot form the physical presence essential to relationships.^{6,7} AI typically affirms with user perspectives, depriving adolescents of opportunities to navigate disagreements, an important part of developing social skills and resilience. Relationships with AI also do not involve negotiations or sacrifice, key aspects of relationships.⁶ Conversations with AI can displace human connection.

Physical Activity and Sleep

Sleep and physical activity are vital to adolescents' health and development. However, AI usage may displace sleep and physical activity by increasing adolescents' screen time and sedentary

behavior but also be beneficial to physical activity and sleep through its potential incorporation into health education tools.

Future Research Directions

AI usage is becoming more ubiquitous as young people adapt to changing times. However, past media research has often lagged behind changing adolescent trends, with research on the effects of social media and smartphone usage on adolescent health still ongoing almost 20 years past their initial introduction. Research in the current moment across the theoretical domains explored in this Viewpoint will allow researchers to stay ahead of changes in adolescent usage of AI and help inform the work of technologists, policymakers, clinicians, and public health professionals in implementing appropriate guardrails to protect young people's health during the growing rollout of generative AI tools. In the process, researchers must be wary to avoid the mistakes made with other types of technology research, like monocausal determinism and labeling generative AI usage in absolutes of beneficial or harmful to adolescent health.¹⁰ For example, it is possible that generative AI usage is simply reducing time spent in negative media behaviors, such as doomscrolling, or the act of continually scrolling through depressing or worrying content on cell phones or news sites, which may mitigate the harmful effects through media-media displacement. By targeting research on both AI's potential positive and negative implications on adolescent well-being, a proactive approach will allow the academic community to harness AI's potential benefits while minimizing the risks to support adolescent development and promote healthy outcomes. Research in these areas may also inform technology developers' efforts to improve generative AI model training data to prevent misinformation and inform policymakers on effective policies and implementation to ensure appropriate and safe use of generative AI.

ARTICLE INFORMATION

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