STRATEGIC RESEARCH AND PERSPECTIVES SERIES

Screen Use and Neurological and Behavioral Health in United States Youth

Longitudinal evidence for preadolescents and adolescents and priorities for clinical and school policy

Jayne J. Smith, MSN · MBA · RN

White Paper | October 2026 | jaynejsmith.com

POSITION

Youth digital-health policy should measure functional health (sleep, mood, attention, and the capacity to disengage) rather than hours alone. Prevention should proceed now through sleep protection, routine clinical screening, and product-design accountability, while public claims stay faithful to what the evidence shows.

Strategic imperatives

- **Regulate patterns, not just minutes.** Bedtime use, nighttime interruptions, and problematic use carry clearer signals than total screen time.
- **Protect sleep as a clinical priority.** Prospective evidence links specific bedtime behaviors to poorer sleep one year later.
- **Hold design accountable.** Notification defaults and recommendation systems should be evaluated for adverse outcomes, not only engagement.
- **Communicate with precision.** Current imaging evidence does not support claims that ordinary screen use causes widespread structural brain damage.

Executive perspective

Digital media deserves attention in youth health because certain patterns of use are associated with later depressive symptoms, attention difficulties, and disturbed sleep. The evidence does not justify treating all screen activities as equivalent or describing every brain-imaging difference as injury. Effective prevention focuses on what young people do online, when they do it, whether they can disengage, and what activities are displaced.

United States longitudinal evidence is especially informative in early adolescence through the Adolescent Brain Cognitive Development (ABCD) study. Older-adolescent research adds

information, but results from children who enter a cohort at nine or ten cannot automatically be extended to every seventeen-year-old. Several papers reuse ABCD participants; they are different analyses of a shared cohort rather than fully independent replications. [1-6]

This paper addresses roughly ages nine through eighteen and distinguishes neurological measurements from psychiatric symptoms and everyday functioning. Its recommended approach combines sleep protection, developmentally appropriate media plans, mental-health assessment, and accountability for product design.

Defining the exposure

Screen time is an imprecise umbrella measure. Educational work, creative production, video calls, gaming, and passive social-media browsing differ in purpose and context. Total hours may identify heavy use, but a useful assessment also examines bedtime use, interruptions, distress, harmful content, and interference with relationships or schoolwork.

Problematic use refers to difficulty controlling engagement or functional consequences, and should be assessed separately from duration. One young person may spend many hours on a device for school, while another experiences substantial impairment from a shorter but distressing interaction. These examples illustrate an assessment principle rather than diagnostic criteria.

Longitudinal behavioral findings

Nagata and colleagues followed an ABCD sample of 11,876 children entering at ages nine to ten over four annual waves. Within-person increases in social-media use above a participant's usual level predicted greater depressive symptoms the following year at two intervals (standardized coefficients 0.07 and 0.09). Depressive symptoms did not predict later use in that model. The associations were modest and do not establish social media as the sole cause of depression or that all users experience harm. [1]

Ra and colleagues studied 2,587 adolescents without significant initial ADHD symptoms. More frequent digital-media activities were associated with subsequent ADHD symptoms over approximately two years. Self-reported symptoms differ from a clinician-confirmed diagnosis, and emerging attention problems, shared vulnerability, and unmeasured influences remain possible explanations. [2]

A prospective ABCD sleep analysis of 9,398 participants aged eleven to twelve found that several bedtime behaviors, including nighttime communication or social-media use and

leaving the ringer on, were associated with adverse sleep outcomes one year later. The findings support asking about timing and interruptions rather than relying only on a daily total, though they do not prove that one universal cutoff will improve sleep for every adolescent. [3]

A 2026 study of 8,119 ABCD participants found that problematic mobile-phone and social-media use were associated with later depressive and behavioral symptom scores, suicidal behaviors, sleep disturbance, and substance initiation. Problematic gaming was associated with a narrower set of outcomes, including depressive and attention symptoms, suicidal behaviors, and sleep disturbance. These adjusted prospective associations support assessing functional interference beyond duration, while leaving causation and clinical diagnosis unresolved. [4]

Study	Age and follow-up	Finding relevant to practice	Causal limit
Nagata and colleagues 2025 [1]	Baseline nine to ten; three-year follow-up	Increased social-media use preceded greater depressive symptoms	Observational; modest effect sizes
Ra and colleagues 2018 [2]	Baseline fifteen to sixteen; about two years	Frequent digital-media activities preceded ADHD symptoms	Symptoms were not confirmed diagnoses
Nagata and colleagues 2024 [3]	Baseline eleven to twelve; one year	Bedtime use patterns predicted poorer sleep	Residual confounding and self-report
Nagata and colleagues 2026 [4]	Early adolescence; prospective ABCD follow-up	Problematic use predicted mental-health, sleep, and substance outcomes	Associations, not diagnoses or causation
Nivins and colleagues 2024 [5]	Baseline about ten; four years	Selected brain-development measures showed little change by media use	Imaging does not establish clinical injury

What brain imaging can and cannot show

Nivins and colleagues examined four-year brain development in ABCD, accounting for socioeconomic and genetic factors. They reported no alteration in the assessed cortical or striatal developmental measures attributable to individual digital-media categories in their model; social-media use was associated with a very small cerebellar trajectory difference. The study does not support a claim that ordinary screen use causes widespread structural brain damage, nor does it rule out effects on sleep, mood, or unmeasured brain processes. [5]

Miller and colleagues' exploratory longitudinal analysis of screen-media activity and functional brain organization found no significant impact on neural maturation over two years. A null result for these measures and this period does not establish that every platform, activity, or exposure level is harmless. It shows why policy should not rest on a single scan finding or an oversimplified claim about rewiring the brain. [6]

Imaging studies involve many possible comparisons and sensitive analytic choices. A correlation with cortical thickness, volume, or connectivity requires replication and evidence of functional importance before it can be described as injury. Randomized or well-designed quasi-experimental evidence is needed to determine how much an intervention changes a clinical outcome.

Mechanisms and competing explanations

Sleep displacement, emotional arousal, social comparison, and online harassment offer plausible routes to distress. Access to support, communication, and learning can also benefit young people. The 2023 Surgeon General advisory describes both opportunities and risks, and the 2026 screen-use advisory places further emphasis on healthy sleep, family expectations, age-appropriate access, and offline activities. These are evidence-informed policy perspectives rather than proof that every recommended action has the same measured effect. [7,8]

Family stress, pre-existing symptoms, socioeconomic conditions, and peer relationships can influence both screen habits and health. Reverse causation is also possible: a distressed adolescent may seek more online interaction. Studies that separate within-person change from stable differences improve interpretation but cannot eliminate all time-varying confounding.

Policy and strategic recommendations

Stakeholder	Recommended action	Measure of success
Federal and state policymakers	Require independent evaluation of youth-facing notification defaults, recommendation systems, and reporting tools	Published adverse-outcome and well-being metrics alongside usage
Technology developers	Default to quiet overnight hours for minors and publish well-being outcomes from product changes	Reduced nighttime notifications among youth accounts

Stakeholder	Recommended action	Measure of success
Pediatric and behavioral health clinicians	Ask about bedtime access, nighttime interruptions, distressing content, loss of control, and functional interference	Share of well visits with a functional screen history
School districts	Distinguish entertainment from assigned and accessibility use; evaluate any phone policy on learning, sleep, behavior, and equity	Pre-specified outcomes reported after implementation
Families	Set a predictable overnight device plan and reduce unnecessary notifications, with a measurable goal and follow-up	Fewer nighttime interruptions reported

A screen-history question should not replace broader assessment of depression, anxiety, attention, and sleep, or imply that devices explain every symptom. Family plans should account for age, disability accommodations, educational needs, and access to supportive relationships. Schools that restrict phones should preserve alternative ways to contact caregivers and obtain support. Recommendations for developers are governance proposals, not descriptions of uniform legal obligations.

Strategic lens

Healthcare improvement. A brief, functional screen history integrated into pediatric and behavioral-health visits is a scalable, low-cost prevention step that connects digital habits to sleep and mental-health care.

Healthy environments. Young people now develop within digital environments as well as physical ones. Stewardship of those environments, through design defaults and protected time for sleep and offline activity, is a public-health responsibility.

Scientific advancement. Consented device logs combined with repeated clinical measures would move the field beyond self-reported hours toward the precise, content- and timing-aware evidence that policy needs.

Research and outcome framework

Future studies should combine consented device logs with repeated measures of content, timing, sleep, symptoms, and functioning. Objective duration improves measurement but cannot show whether an interaction helped or harmed without context. Studies should

preregister outcomes and account for multiple comparisons, attrition, and shared-cohort reuse.

Intervention trials could compare changes in nighttime notifications, scheduled breaks, or recommendation settings, confirming that exposure actually changed and that clinical benefits persist. Older teenagers need additional attention because early-adolescent evidence dominates many cited analyses.

The recommended decision standard is functional health rather than hours alone: sleep disruption, distress, school participation, and the capacity to disengage. Prevention can proceed while uncertainty remains, provided public claims distinguish associations, symptoms, diagnoses, and neurological injury.

Research approach

This paper is a targeted narrative evidence synthesis for strategic decision-making, with sources reviewed on 1 October 2026. It prioritizes peer-reviewed longitudinal research and federal public-health guidance. It is not a systematic review or original empirical study. Study findings are distinguished from the author's recommendations, and observational associations do not establish individual causation. Clinical concerns about a specific young person should be evaluated by a qualified clinician.

References

[1] Nagata JM et al. Social Media Use and Depressive Symptoms During Early Adolescence. JAMA Network Open. 2025;8:e2511704. doi 10.1001/jamanetworkopen.2025.11704. https://pubmed.ncbi.nlm.nih.gov/40397441/

[2] Ra CK et al. Association of Digital Media Use With Subsequent Symptoms of Attention-Deficit/Hyperactivity Disorder Among Adolescents. JAMA. 2018;320:255-263. doi 10.1001/jama.2018.8931. https://pubmed.ncbi.nlm.nih.gov/30027248/

[3] Nagata JM et al. Bedtime Screen Use Behaviors and Sleep Outcomes in Early Adolescents: A Prospective Cohort Study. Journal of Adolescent Health. 2024. https://pubmed.ncbi.nlm.nih.gov/39046391/

[4] Nagata JM et al. Prospective Associations Between Early Adolescent Problematic Screen Use, Mental Health, Sleep, and Substance Use. American Journal of Preventive Medicine. 2026;70:108248. doi 10.1016/j.amepre.2025.108248. https://pubmed.ncbi.nlm.nih.gov/41677479/

[5] Nivins S et al. Long-term impact of digital media on brain development in children. Scientific Reports. 2024;14:13030. doi 10.1038/s41598-024-63566-y. https://pubmed.ncbi.nlm.nih.gov/38844772/

[6] Miller J et al. Impact of digital screen media activity on functional brain organization in late childhood: Evidence from the ABCD study. Cortex. 2023;169:290-308. doi 10.1016/j.cortex.2023.09.009. https://pubmed.ncbi.nlm.nih.gov/37976871/

[7] Office of the US Surgeon General. Social Media and Youth Mental Health. Advisory. 2023. https://www.hhs.gov/surgeongeneral/reports-and-publications/youth-mental-health/social-media/index.html

[8] Office of the US Surgeon General. Live Real Life: Advisory and Toolkit on the Harms of Screen Use. Webpage reviewed September 29, 2026. https://www.hhs.gov/surgeongeneral/reports-and-publications/screen-use-harms/index.html

About the author

Jayne J. Smith, MSN, MBA, RN, is a nurse executive with more than 15 years of combined clinical, operational, and financial leadership experience. Her nursing leadership spans multi-site home health, assisted living, memory care, long-term care, hospice, and case management in rural communities, alongside prior multi-state business leadership in strategy, human resources, and operations. She is completing a Doctor of Nursing Practice. Her work focuses on evidence-based strategy at the intersection of healthcare quality, prevention, rural health, and the environmental and supply-chain conditions that shape population health.

This paper reflects independent analysis and does not represent the position of any current or former employer. It is offered for education and policy discussion and is not medical, legal, or regulatory advice.