Person-Centered Preventive Healthcare: Reaching Adolescents to Deliver Preventive Services

Agency for Healthcare Research and Quality

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Reaching Adolescents to Deliver Preventive Services

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Public Availability Notice

List of Acronyms

AHRQ	Agency for Healthcare Research and Quality
CPS	clinical preventive services
FQHC	Federally Qualified Health Center
KII	key informant interview
PCPHC	Person-Centered Preventive Healthcare
STI	sexually transmitted infection
TEP	technical expert panel
USPSTF	U.S. Preventive Services Task Force

Executive Summary

Background

Adolescence is a critical time for establishing health behaviors. Tobacco, alcohol, and drug use, and sexual activity often begin during adolescence. Mental health conditions, including depression and anxiety, are common among adolescents and often lead to poorer academic and health outcomes. Clinical preventive services (CPS) are preventive care services such as screening, counseling, vaccination, and preventive medication that can help people lead longer, healthier lives. CPS, especially those related to mental health, tobacco, alcohol and drug use, and sexually transmitted infections (STIs), are important for adolescents' long-term health and well-being. However, well-child visits are often underutilized among adolescents, and adolescent may face difficulty accessing services once they graduate from high school or move out of their family home. As a result, there are opportunities to improve the delivery of CPS during primary care visits as well as additional venues that could be used to provide CPS to adolescents. Given this context, the Agency for Healthcare Research and Quality (AHRQ) commissioned this report as part of a larger Person-Centered Preventive Healthcare (PCPHC) project to explore strategies for delivering CPS to adolescents both within and outside of primary care and through technology.

Methods

We conducted an environmental scan, facilitated a technical expert panel (TEP) meeting, and conducted key informant interviews (KIIs) with adolescents to generate a whole-person, adolescent-focused perspective on the delivery of CPS to adolescents. The scan was structured with two guiding questions and summarized information about interventions to improve delivery of CPS by setting. The scan served as a starting point for discussion at the TEP meeting. The TEP meeting included 13 individuals: seven clinicians, two researchers, three public health and policy experts, and one federal representative. We also conducted three KIIs with individuals between the ages of 18 and 24 years to elicit additional perspectives. We used an iterative, inductive approach to identify patterns and overarching themes in the data. Finally, we identified suggestions for future research that may improve the delivery of CPS to adolescents.

Results

We identified four overarching themes related to a whole-person, adolescent-focused perspective on the delivery of CPS to adolescents.

CPS in the Context of Adolescent Development and Health Behaviors

During adolescence, individuals take increasing ownership of their health and healthcare, including CPS, often gradually, but sometimes suddenly because of reaching the age of majority or moving away from home. Experts and key informants (KIs) discussed how navigating the transition to adulthood is challenging. Physical and psychosocial development proceed along a

spectrum that does not neatly coincide with the structures and resources available to young people. Establishing trusted patient-provider relationships with new providers or without the assistance or involvement of parents can be difficult. Experts and KIs discussed several key issues including understanding and accommodating adolescent development; supporting age-appropriate risk-taking and decision making; appropriately bundling or separating specific CPS to address specific topics or concomitant risk factors; and contextualizing CPS within adolescents' healthcare overall.

Improving Delivery of CPS in Traditional Primary Care

Although experts noted that there were options to improve delivery of CPS in settings beyond primary care, they also felt that traditional well-child visits were likely underutilized in terms of their delivery of CPS. They pointed to a need for better integration of health records and data sources, improving the youth friendliness of primary care settings, and normalizing confidential conversations between an adolescent and provider over time.

Parental Engagement and Inclusion

Experts and KIs pointed to the ways in which positive parental engagement can support the health and well-being of adolescents, including through trusting, nonjudgmental, and supportive environments where young people feel comfortable raising health concerns. Alternatively, family environments that discourage talking about certain topics, such as mental or sexual and reproductive health, can leave adolescents to seek out other, potentially less reliable sources of information. Although experts and KIs expressed confidence in the appropriate segmentation and privacy protections of adolescents' medical records, the information available through billing and insurance may expose information that adolescents would prefer to keep private.

Reaching Adolescents Beyond Primary Care Settings

Although primary care remains a critical mechanism for delivering CPS to adolescents, experts agreed that there are both needs and opportunities to expand where and how these services are delivered. Schools and school-based health clinics were discussed as critical, nonclinical settings for this population, by the nature of the broad access that schools have to young people. Experts pointed to a number of exemplar school districts that have worked to integrate health services. Experts also noted that there can be extensive variation in what is possible in school settings depending on local laws, the political context, and parent and educator engagement. In addition to schools, experts recommended other locations where adolescents gather or seek services, such as alternative healthcare settings (e.g., mobile health units, health departments, Federally Qualified Health Centers, dental offices), community organizations (e.g., churches, libraries, youth centers), and other settings to reach adolescents who are not in traditional school settings.

The use of technology to deliver healthcare services continues to be more widely accepted and adopted by adolescents. Experts and KIs discussed that many young people are open to the use of technology to access both health information and health services. Experts discussed

three primary issues around technology: the integration of technology into healthcare workflows, the use of virtual care delivery, and dissemination of health-related information.

Finally, although there are an abundance of efforts working to address delivery of care to adolescents, experts agreed that there are significant challenges regarding the evaluation and sustainability of these efforts and that more work is needed to understand how to scale, evaluate, and sustain interventions that have been shown to have a positive impact.

Discussion

Our findings point toward a need for an adolescent-focused model of CPS delivery that meets individuals where they are both physically and developmentally. The current political and policy context makes a universal model for CPS delivery to adolescents challenging, and many organizations that serve young people are looking for guidance on how to improve services for this population. Although we identified a small number of programs and interventions that serve as exemplars for successful CPS delivery, experts emphasized the need to move beyond demonstrating proof of concept and focus on how to disseminate successful strategies and scale them to a larger population. Although many healthcare interventions are naturally focused on a specific setting (e.g., clinics, schools, community centers), it is important for any future approaches to consider the range of places where adolescents can be reached and how they intersect.

Across settings and services, the need for trusting relationships—between adolescents, parents, providers, healthcare systems, and schools, among others, was a recurring theme. Without strategies that address underlying issues, such as mistrust of the healthcare system or the mindset that doctor's visits are for addressing illness and not prevention, interventions designed to increase and improve delivery of CPS may have limited reach. The risk factors for mental health, substance use, and STIs are often intertwined and holistic strategies that help individuals manage multiple risks at once may be more fruitful and efficient.

Several suggestions for future research emerged:

- Engaging youth directly as paid experts in research.
- Developing and implementing better training and education for providers on how to work with families to normalize confidential conversations with adolescents.
- Addressing the need for additional support in accessing CPS for the most vulnerable youth.
- Developing strategies and funding mechanisms for scaling interventions that work.
- Expanding the definition of "health outcomes" for youth to reflect outcomes (e.g., high school graduation) that have an impact on their long-term health and well-being.

Section 1: Introduction

1. Introduction

Adolescence is a pivotal period in the life course, marked by significant physical, emotional, and social changes. During this time, individuals form behaviors and habits that can profoundly influence their health trajectory into adulthood. Clinical preventive services (CPS), encompassing screening, counseling, vaccination, and preventive medication, are useful for identifying and addressing emerging health concerns and promoting long-term health and well-being.[1, 2]

The Agency for Healthcare Research and Quality (AHRQ) produces evidence to improve the safety, quality, and accessibility of healthcare. To fulfill this mission, AHRQ funds work to evaluate the effectiveness and safety of preventive services and to enhance implementation of evidence-based healthcare. Further, AHRQ also supports equitable and person-centered approaches in healthcare. AHRQ commissioned the Person-Centered Preventive Healthcare (PCPHC) project to gather evidence and input from stakeholders to advance equitable, person-centered implementation of preventive services. The topic of reaching adolescents to deliver preventive services is one of eight topics explored under this project.

1.1 Preventable Conditions Among Adolescents

The health needs of adolescents experiencing mental health challenges, engaging in substance misuse, or facing reproductive health issues often go undetected and untreated, leading to adverse outcomes in adulthood. Furthermore, adolescence is characterized by overlapping risk factors and behaviors.[3, 4] Early detection of mental health conditions like anxiety and depression can facilitate timely behavioral and pharmacologic interventions.[5] Research indicates that a substantial proportion of individuals who develop daily smoking habits or substance dependencies begin experimenting with these substances during their teenage years.[6] Identifying problematic substance use early allows for timely counseling and access to recovery services, thereby mitigating the risks of chronic substance use disorders, addiction, and potential fatalities.

Screening not only identifies individuals who may benefit from treatment but also provides an opportunity for counseling to address risky behaviors. However, CPS related to mental health, substance use, and sexual health require tailored approaches. Adolescents' decision-making processes, perceived risks, and readiness for behavior change are dynamic and influenced by various factors, including developmental stages, peer and parental influences, and community contexts.[7-9]

The U.S. Preventive Services Task Force (USPSTF) recommends several CPS for adolescents related to mental health, alcohol, tobacco, and other drugs, and sexually transmitted infections (STIs) (see **Table 1**) based on evidence that these services have a net benefit on health outcomes. The USPSTF recommendations are intended for use by primary care clinicians working in primary care settings.[1]

Table 1. Selected USPSTF Clinical Preventive Service Recommendations Applicable to Adolescents

Recommendation	Grade*	Ages, if Specified	Target Population, if Applicable
Mental Health			
Anxiety in Children and Adolescents: Screening[10]	B	8 to 18 years	Children and adolescents who do not have a diagnosed anxiety disorder or are not showing recognized signs or symptoms of anxiety
Depression and Suicide Risk in Children and Adolescents: Screening[11]	B†	12 to 18 years	Adolescents who do not have a diagnosed mental health condition or are not showing recognized signs or symptoms of depression or suicide risk
Tobacco, Alcohol and Substance Use			
Unhealthy Drug Use: Screening[12]	B‡	18 years or older	Does not apply to individuals who have a currently diagnosed drug use disorder or are currently undergoing or have been referred for drug use treatment
Tobacco Use in Children and Adolescents: Primary Care Interventions to Prevent Initiation of Use[13]	B§	School-aged children and adolescents	Individuals who have not started to use tobacco
Unhealthy Alcohol Use in Adolescents and Adults: Screening and Behavioral Counseling Interventions[14]	B‡	18 years or older	Does not apply to individuals who have a current diagnosis of or who are seeking evaluation or treatment for alcohol abuse or dependence
Sexually Transmitted Infections			
Chlamydia and Gonorrhea: Screening[15]	B	24 years or younger	All sexually active women
Hepatitis B Virus Infection in Adolescents and Adults: Screening[16]	B	Not specified	People at increased risk for infection
Sexually Transmitted Infections: Behavioral Counseling[17]	B	Not specified	All sexually active adolescents
Hepatitis C Virus Infection in Adolescents and Adults: Screening	B	18 to 79 years	Clinicians can also consider screening people at ages younger than 18 years who are at high risk (e.g., past or current injection drug use)
HIV Infection: Screening[18]	A	15 to 65 years; Adolescents younger than 15 years who are at risk	Routine universal screening for age 15 years and older; risk-based screening for individuals younger than age 15 years

(continued)

Table 1. Selected USPSTF Clinical Preventive Service Recommendations Applicable to Adolescents (continued)

Recommendation	Grade*	Ages, if Specified	Target Population, if Applicable
Prevention of HIV Infection: Preexposure Prophylaxis[19]	A	Not specified	People at increased risk for HIV infection
Syphilis Infection in Nonpregnant Adolescents and Adults: Screening[20]	A	Not specified	People who have ever been sexually active and are at increased risk

* The USPSTF assigns one of five letter grades (A, B, C, D, or I) to services. **A**: high certainty that the net benefit is substantial; **B**: high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial; **C**: moderate certainty that the net benefit is small; **D**: no net benefit or greater harm than benefit; **I statement**: current evidence is insufficient to assess the balance of benefits and harms of the service.[21]
† B grade applies to depression screening only. Suicide risk screening is an I grade.
‡ I statement for adolescents younger than 18 years for screening for unhealthy drug or alcohol use and for primary care-based counseling interventions to reduce unhealthy use.
§ I statement for tobacco cessation interventions among school-aged children and adolescents who use tobacco.
Abbreviations: HIV, Human Immunodeficiency Virus; USPSTF, U.S. Preventive Services Task Force.

1.2 Challenges in Preventive Service Delivery to Adolescents

Primary care clinic visits provide an opportunity for early identification of risky behaviors and mental health conditions, but many adolescents do not receive recommended CPS during their routine medical care.[22] Studies have examined numerous factors that can contribute to disparities in access to and utilization of health services, including age, gender,[23] race/ethnicity,[24] income, parental attitudes,[25] insurance coverage [26] and source of usual care.[27] Vulnerable groups such as adolescents living in rural areas,[28] LGBTQIA+,[29] and those with lower household incomes may face additional barriers to accessing preventive services. Although initiatives like the Affordable Care Act have expanded insurance coverage, rates of preventive service receipt among young adults remain relatively low.[30] Social drivers of health, including insurance status, county of residence, and household income, contribute to disparities, with underutilization of preventive care visits and missed services disproportionately affecting vulnerable populations such as homeless teens, racial or ethnic minorities, and those involved in the juvenile justice or child welfare systems.[31] [32]

1.3 Project Objective

Given the context of suboptimal and inequitable receipt of CPS among adolescents, we aimed to identify promising person-centered strategies to improve the receipt of recommended CPS in adolescents, especially those related to STI screening, mental health, and substance use. The goal of this work was to identify barriers and challenges, successful strategies, and areas where additional work or research is needed to better reach adolescents.

Section 2: Methods

2. Methods

In this section, we briefly describe the methods used to conduct this project. We provide a detailed description in the **Methods Appendix**. The CPS topics of interest were those recommended with a grade of A or B by the USPSTF for adolescents (**Table 1**). The scope of topic was developed in consultation with the USPSTF, and we intentionally focused on the CPS that are more likely to be stigmatized. The PCPHC project's 30-member Stakeholder Panel informed our approach and provided feedback on the findings and dissemination suggestions.

2.1 Environmental Scan

We conducted an environmental scan to identify relevant, representative published and grey literature to inform subsequent technical expert panel (TEP) discussions on the topic of reaching adolescents to deliver CPS. We specified two guiding questions for this scan:

1. What are existing models and strategies for delivering CPS (i.e., screening, counseling, preventive medication) related to mental health; alcohol, tobacco, and other drugs; and sexually transmitted infections to adolescents in settings other than traditional primary care office settings?
2. How has technology been leveraged to connect adolescents with CPS?

We used a combination of bibliographic literature database searches and additional targeted grey literature searches to identify relevant publications, models, and programs. Details of the literature search strategy are in the **Methods Appendix**. We screened the retrieved articles against criteria that aligned with the guiding questions and prioritized existing reviews to provide a high-level summary. We organized information by setting as most of the identified reviews addressed CPS by setting (e.g., school, emergency department/hospital, community) rather than by condition/topic. We summarized the studies addressing technology-based CPS delivery separately. Lastly, we synthesized the findings across settings and conditions into implementation-specific themes and cited illustrative examples.

2.2 Technical Expert Panel Meeting

We convened a TEP that included 13 experts: seven clinicians, two researchers, three public health and policy leaders, and one federal agency representative. We developed discussion questions for the TEP meeting based on the environmental scan, focusing on identifying person-centered strategies to improve the receipt of recommended CPS in adolescents, especially those related to STI screening, mental health, and substance use. Specifically, we were interested in identifying strategies or components that could be scaled or disseminated, as well as identifying issues related to coordination and collaboration across different organizations and constituencies. The TEP met virtually for 3 hours via Zoom in January 2024. We used the XLeap virtual meeting platform during the TEP meeting to capture written responses to discussion questions and provide an additional forum for TEP members to share their thoughts. The names and affiliations of persons who participated on the TEP are provided in the **Methods Appendix**.

2.3 Key Informant Interviews

We conducted three 1-hour key informant interviews (KIIs) with individuals ages 18 to 24 years to gather additional information on this topic and ensure the adolescent/young adult voice was represented in our findings. KIs were recruited through two youth advocacy organizations. We conducted the KIIs via Zoom using a semi-structured interview guide in February 2024. The names and affiliations of persons who participated in the interviews are also provided in the **Methods Appendix**.

2.4 Synthesis of Information

We synthesized data from across the three data sources using an iterative, inductive approach to identify patterns and overarching themes in the data.[33] Finally, we identified suggestions for future research and activities that can support the delivery of CPS to adolescents.

Section 3: Results

3. Results

This section is organized around four overarching themes:

1. **CPS in the Context of Adolescent Development and Health Behaviors**
2. **Improving Delivery of CPS in Traditional Primary Care**
3. **Parental Engagement and Inclusion**
4. **Reaching Adolescents Beyond Primary Care Settings**

Within each overarching theme, we identify subthemes supported by specific statements, examples, and, in some cases, illustrative quotes.

3.1 CPS in the Context of Adolescent Development and Health Behaviors

Experts and key informants discussed how navigating the transition to adulthood is challenging and that improving delivery of CPS needs to consider adolescent development. Physical and psychosocial development proceed along a spectrum that does not neatly coincide with the structures and resources available to young people. During adolescence, individuals take increasing ownership of their health and healthcare, including CPS—often gradually, but sometimes suddenly due to reaching the age of majority or moving away from home. Establishing trusted patient-provider relationships with new providers or without the assistance or involvement of parents can be difficult.

> "We are artificially using age 18 as a legal definition to define a child and adolescent as opposed to adult."
>
> —TEP member

One expert highlighted that legal age categories of young populations are often misaligned with their psychosocial development. Adolescence can be seen as starting between the ages of 9 and 12 years at the onset of puberty and continuing with cognitive developments that start to occur around age 14 or 15 years, with the maturation of higher executive function concluding around age 25 or 26 years. However, legally, the definition of an adult is usually age 18 years, which doesn't necessarily align with cognitive development and an individual's ability to make medical decisions independently. Adding to this complexity, all 50 states and the District of Columbia allow adolescents to consent to STI screening and treatment when they are younger than the age of majority, as early as age 12 years in some states. These different developmental stages and gradual accumulation of legal rights point to a need for different levels of support when adolescents are making medical decisions, including those related to CPS, at different points in the life span. CPS may require additional attention because of their orientation toward prevention, which may be less salient to young people. Key informants noted that the resources available to adolescents also vary depending on their educational status (i.e., attending high school, college, or another educational setting) or whether they are in the workforce. The resources available across these settings vary and access to them is punctuated based on school calendars and graduation dates, although there is a consistent need for services across this age range.

> "There's a hyper focus on the undergraduate experience, especially at some of these universities because a lot of crazy things have happened, but it's like, graduate school students need care, too. People throughout their lifetime need attention as well, and especially our youth and adolescents."
>
> —Key Informant

Supporting age-appropriate risk-taking and decision making. In addition, adolescence is often a time of risk-taking. Experts noted that supporting adolescents who are accessing CPS is at least partially dependent on the specific risk factors for an individual and how those risk factors are perceived and approached. Experts noted that there are challenges to delivering necessary preventive services when patients and providers have different understandings of the level of risk and therefore different priorities for their care needs. At the same time, experts noted that risk and resilience often go hand in hand and that supporting adolescents in taking appropriate risks is also critical. The gradual development of higher-order thinking and the ability to appreciate

> "As for vaping and cigarettes [as an aesthetic choice], I think people are a lot more likely to be like, 'Oh, yeah, Hello! Well, this is a problem, I know! But you know, what can I do about it?'"
>
> —Key Informant

longer-term consequences of actions point to a need for more nuanced discussions about CPS with adolescents compared with adults.

Considering CPS as a part of overall healthcare. In terms of seeking care, the key informants viewed CPS as part of overall healthcare and did not consider them separately from other types of healthcare. They used several primary sources of health information: Google, their parents, their friends, and healthcare providers. They also reported using social media (including Instagram and Reddit) to find additional information. The decision of whether or not to see a healthcare provider was often informed by what trusted family or friends had to say. They reported that their trust in a person or a source of information was driven by a variety of factors including familiarity, reliability, a willingness to provide an empathetic and nonjudgmental approach, and shared identities (e.g., gender, age, race, ethnicity, gender identity, sexual orientation). For these key informants, trust was about the overall relationship, not just about the specific health condition. In addition, there were some cases where they did not want a medical answer to a specific concern but were instead seeking empathy and shared understanding. Finally, both experts and KIs noted that historical mistrust of the medical system among individuals and community of color can play a role in how adolescents access and receive CPS.

> "My health provider may provide that medicalized answer where I'm just looking for that humanistic, regular answer. So, I feel like that's why I may go to my friend just for the simplified version, the version where it's not all these terms I may not understand."
>
> —Key Informant

Colleges and universities are common locations for the delivery of health services. Key informants reported on a variety of approaches their colleges have used to address student health, including alcohol use, sexual health, and mental health. This included sexual health fairs, marketing of student health and wellness services, connections to care, and supportive living environments for students in recovery. Among the respondents, approaches that were viewed as accessible, inclusive, and nonjudgmental were seen as the most successful.

> "I just appreciate [health information from] Reddit more because I'm able to understand it."
>
> —Key Informant

Appropriately bundling or separating CPS. Although clustering some CPS may be valuable in reaching more individuals, the key informants noted that alcohol, tobacco, and drug use are viewed distinctly and that separating strategies to improve CPS around these health issues may be more fruitful. The respondents noted that alcohol use is normalized among young people, especially in college. Respondents noted that colleges focused on risk prevention and support for students with alcohol use disorder, rather than primary prevention. Despite the known health risks associated with tobacco, one respondent noted that smoking or vaping is often seen as an aesthetic choice. In contrast, drugs were seen as more stigmatized, with one respondent noting that seeking help for addiction would be very "hush-hush." The variability of the factors influencing alcohol, tobacco, and drug use point to a need for different approaches to address them.

Conversely, experts also described the interrelatedness of risk factors for mental health, substance use, and sexual risk-taking, which frequently overlap, and noted that considering any one of these issues in isolation is likely a missed opportunity to help a person with multiple health needs. One strategy for appropriately bundling or separating CPS may be to include all indicated CPS at a wellness visit, offering some (e.g., tobacco screening) at all visits, and then others on an as-needed basis. However, these approaches need to be considered in the context of healthcare financing with appropriate reimbursement for prevention services outside of a regular preventive visit.

> "All of these things are intertwined—substance use, mental health, STDs—they all exist together. Very rarely do they exist by themselves."
>
> —TEP member

3.2 Improving Delivery of CPS in Traditional Primary Care

Experts agreed that there were opportunities to improve delivery of CPS in traditional primary care settings (e.g., pediatrician or family physician office visits). Experts noted that it was sometimes unclear how CPS delivered within primary care visits were being counted or conceptualized, with different estimates for CPS receipt in the Youth Risk Behavior Survey, National Ambulatory Medical Care Survey, and National Health Interview Survey. However, they noted that there is room for improvement, both in delivering well-child visits and improving the quality of existing well-child visits to encompass more CPS.

> "Young people actually get a lot of visits. The visits have substantial time. They just don't always have the content that we're asking for here."
>
> —TEP member

Better integration of health data from other settings. Experts noted that young people may seek care from multiple sources and that certain CPS, such as STI screenings, may not be included in their primary care medical record. This was affirmed by the key informants who described seeking care through school-based clinics (both high school and college based) and free-standing health centers, especially those that are supportive of LGBTQIA+ identifying people. Experts noted that having a comprehensive care record can help them provide more efficient care by enabling them to connect an individual to follow-up care, if needed, or avoid providing duplicative services.

> "It really is making sure that the team knows how to engage with youth. And we think that that is so simple. But we're always surprised at how people *think* but don't really *know* the things that they need to do when they're engaging with youth."
>
> —TEP member

Improving youth friendliness of primary care settings. A lack of *youth friendliness* in traditional primary care settings was also noted as a reason for underuse of such settings by adolescents, especially for stigmatized services. One expert summarized *youth friendliness* as "meeting young people where they are." The experts provided examples of youth-friendly behaviors, including using correct names and pronouns, demonstrating LGBTQIA+ inclusivity, and allowing young people to lead conversations. They also mentioned examples of youth-friendly organizational attributes, including ADA (Americans with Disabilities Act of 1990) compliance, language translation services, youth-adjusted hours, and physical media (e.g., posters) that represent the youth population being served. There were differing opinions among the experts about the role of youth friendliness in care quality. One expert suggested that robust

parent involvement is the key to providing quality preventive care and should be incorporated before youth-friendly approaches are considered. Other experts disagreed, stating that youth friendliness and quality are synonymous and not mutually exclusive, and that there is evidence to support that youth friendliness (including a youth-friendly waiting area, evening clinic hours, and providers with adolescent health training) leads to higher-quality care.

3.3 Parental Engagement and Inclusion

Positive parental engagement was seen as critical to healthy adolescent development and the receipt of CPS. The experts and key informants offered a range of opinions regarding how much parental engagement was appropriate and at what age, but there was a general consensus that building and supporting trusting relationships between providers, parents/caregivers, and adolescents was foundational to providing better care (including CPS) for adolescents. Building these relationships early supports adolescents as they transition to adult care and age out of well-child visits, usually at age 18.

Integrating confidentiality into adolescent well-child visits. One strategy experts cited was to normalize confidential conversations between a provider and an adolescent over time. Providers should begin having confidential time to speak with adolescents starting early in adolescence, with the amount of confidential time increasing as the adolescent ages. Building in this expectation of privacy supports the parents in understanding their child's development and helps the adolescent take responsibility for certain aspects of their own health.

One expert described how she had seen that operationalized for her own family: *"[Our son's pediatrician] started training us as parents from his birth until he aged out about what to expect with her as the clinician and worked to establish the relationship so when he entered adolescence we were prepared and trusted her to give us information and help guide us along the way for his health. This transferred onto our son, who felt confident and reassured to make his own appointments and established his own relationship with the pediatrician."*

> "The earlier we can inform parents and have those conversations about confidentiality, the different ages when these services should start happening, or what parents need to do to provide support for them the better, because otherwise the parents become reactionary at 16, when the young person may start engaging in sex, and they weren't aware that now maybe they can get birth control pills without their [the parent's] consent."
>
> —TEP member

Importance of parental involvement in seeking CPS for stigmatized conditions. The key informants cited examples of both positive and negative parental involvement. In trusting relationships, they felt comfortable seeking help and support from their parents for health issues. Parents built and sustained that support by being open, helpful, and nonjudgmental. The key informants noted that parents can unintentionally create barriers to trusting relationships by intentionally or unintentionally closing off topics of conversation. If topics like mental health or sexual well-being aren't addressed at all, young people may assume that those topics are taboo or not otherwise something they can bring up with their parents. In addition, the young people interviewed noted that technology, such as location tracking, can have a negative impact on parent-child trust relationships and can lead to adolescents taking steps to conceal their location from their parents (e.g., if they are seeking care at a sexual health clinic).

> "And then when you don't talk to kids about sex, I think it creates an environment like, 'Well, I can't talk to my parents about sex,' even if they would be open to talking about it, so you'll look other places for that information."
>
> —Key Informant

3.4 Reaching Adolescents Beyond Primary Care

Although primary care remains an important venue for delivering CPS to adolescents, experts agreed that there are opportunities to expand where and how these services are delivered. Offering preventive services in settings other than primary care may help to close gaps in care and provide more opportunities for young people to access youth-friendly care. The Community Preventive Services Task Force makes several recommendations that address preventive health strategies among adolescents within school and community-based organizations or virtually through interventions provided via the internet or mobile devices.[34-39] An added advantage of offering preventive services in alternate settings is that it provides the opportunity to leverage assets inherent to different settings, such as staff experience, more convenient access, a higher degree of confidentiality, or the use of incentives or peers.

Examples of alternative delivery settings include schools, community settings, emergency department visits, and urgent care. The use of social media, mobile health, and virtual services are increasingly accessible and convenient, especially for young people. Ideally, provision of screening and counseling services from diverse settings can help to meet the unique needs of young people and ensure that CPS are accessible, equitable, acceptable, appropriate, comprehensive, effective, and efficient.[40]

3.4.1 School-based Delivery of Preventive Services

Overwhelmingly, experts shared that preventive services are most effectively delivered through a holistic approach that considers all settings that adolescents encounter. Schools and school-based health clinics were discussed as critical, nonclinical settings for this population by the nature of the broad access that schools have to young people.

> "Access to youth happens at schools more than any other site."
>
> —TEP member

School-based health clinics and student referral programs implemented through school-community partnerships are two common approaches to reach adolescents. However, these types of programs are limited and, when available, the services offered to students may not address some of the recommended CPS. Experts shared that this is often due to the broad variability in the level of readiness among schools to provide health services resulting from competing educational priorities.

> "Health is not always supported or put in a place of need in schools. We even have health education in a place of scarcity, and also in jeopardy of not even being taught."
>
> —TEP member

Variability in school context and exemplars. Experts noted that the availability of school-based healthcare delivery is often a reflection of a wide variety of contextual conditions, including political constraints, financial and human resources, and parental involvement. Experts agreed that there are political and policy factors that can inhibit effective delivery of CPS in schools and that providing preventive services related to sexual health is particularly challenging in the current political environment. Experts also noted that states have been returning funds given to them to conduct the Youth Risk Behavior Survey at the state level and, as a result, data are not available to measure the impact of these policies on young people. Families and, in some instances, schools themselves may not always serve as a trusted organization for some populations.

> "For many people of color, the school system is not a trusted place."
>
> —TEP member

Experts shared several examples of school-based initiatives in California, Washington, New Jersey, and Colorado that include CPS delivery, and that may be worth further examination and replication, including:

- **Project Connect**—The Project Connect Health Systems Intervention, facilitated by the Family Planning, Access, Care, and Treatment program within the California Department of Health Care Services, was an 8-year research study in the Los Angeles Unified School District that sought to provide sexual and reproductive healthcare to

students by teaching them about and how to navigate the health system to access healthcare.

- **Project AWARE Newark**—Newark Public Schools worked to address "inequities in student access to health, mental health, economic, and social resources" using funding from the Substance Abuse and Mental Health Services Administration.[41]
- **Seattle King County School-Based Health Centers**—Seattle King County School System in Washington operates school-based health centers at over 30 elementary, middle, and high schools through partnerships with public and private organizations.
- **Denver Health Pediatrics at Denver Public Schools**—Denver Public Schools in Colorado house 19 student health centers that offer free mental health, behavioral health, family planning, and other services to more than 13,000 students.

In addition to specific state level efforts, the Centers for Disease Control and Prevention's *What Works in Schools Program*[42] supports school districts to provide education, create safe and supportive environments, and support young people through improving access to health services. These services can be offered either on-site or through referral mechanisms to care providers in the community. Finally, one expert shared the importance of formal (vs. informal) partnerships between schools and healthcare delivery sites, noting that formal relationships make it more likely that adolescents can access needed care.

3.4.2 Delivery of Preventive Services in Other Settings

Although schools are often discussed as the primary nonclinical delivery setting for adolescents, experts discussed additional opportunities to reach adolescents through places where youth gather or seek services. Examples included:

- Alternative healthcare settings such as health departments, mobile health units, Federally Qualified Health Centers, and dental offices/clinics because many children and teens visit a dentist regularly for cleanings.
- Community organizations including churches, libraries, youth and community centers, and after-school programs.
- Home school or alternative school settings and groups to reach children and adolescents who are not in traditional school settings.

Experts agreed that openness to engage adolescents in a variety of settings may help to increase access to CPS.

3.4.3 Use of Technology to Deliver Preventive Services

The use of technology to deliver healthcare services is widely accepted, including by adolescents. Experts and key informants discussed that many young people are open to the use of technology to access both health information and health services. Experts discussed three primary issues surrounding technology: the integration of technology into healthcare workflows, utilization of virtual care delivery, and dissemination of health-related information.

Technology has also become more prevalent in primary care settings and experts noted that tools such as tablet-based screenings and integration of screening recommendations into

electronic health records have become more common. Experts mentioned that changes in processes to conduct screenings, such as the use of tablets, may not be well-described in the literature because the switch to a tablet is seen as a facilitator of clinic workflow update rather than a technology intervention, even though several studies have reported that electronic screening tools may be preferred in some instances. Experts also noted some existing challenges with paper-based screening tools, such as ensuring appropriate linkages to follow-up care, remain.

After the COVID-19 pandemic, the use of virtual care has become mainstream. Experts mentioned that telehealth or virtual care offers young people opportunities to remain engaged with their care, when they are unable to get to a care site. This was echoed by key informants who shared that virtual appointments are often preferred if they lack transportation or want to be discreet. Key informants also discussed the value of telehealth in allowing them to be in their "own space" and "be their authentic selves," and in providing the ability to "take their therapy with them" when living away from home.

Although generally widely accepted, the use of virtual care also presents some challenges. Experts noted how state and district confidentiality requirements can limit young people's access to virtual care, even if it is preferred by the individual. And some individuals who want in-person therapeutic services struggle to find providers willing to meet them in person.

> "Telehealth is the only option that therapists are offering, so it's like, either we take this, or we're left to grapple with our mental health on our own."
>
> —Key Informant

Experts also raised several challenges regarding the scalability of technology. They shared that it is often difficult to scale interventions developed in a research context in a healthcare setting, and that HIV prevention models may be one successful model to consider replicating. Experts shared that it is often difficult to find information about programs and services being implemented in the field when much of it is not reported in the literature. Providers are challenged to identify evidence-based interventions, especially in a field that is evolving rapidly.

Finally, technology was discussed as a valuable tool for disseminating information to adolescents and young people. This included the use of social media campaigns emphasizing the importance of preventive services and the use of QR codes in public places to share the location of youth-friendly mental health services. One key informant shared the need to be cautious with sharing information on social media as it can also quickly result in the dissemination of misinformation that can do more harm than good, especially when young people share misinformation because they are looking for a reaction or think it is funny and don't consider that other people may think the information is serious.

Although there are many efforts working to address delivery of care to adolescents, experts agreed that there are significant challenges regarding the evaluation, scalability, and

sustainability of these efforts. They called for more clarity about the types of interventions that have been successful, particularly in schools, and when comparing “one-to-one” interventions that resemble individual clinical interactions with “one-to-many” interventions that follow a population-based approach. Finally, experts noted a need to move from research to practice, especially at scale, to identify and disseminate sustainable solutions.

Section 4: Discussion

4. Discussion

4.1 Reflections on Findings

Our findings point toward a need for an adolescent-focused model of CPS delivery that meets individuals where they are both physically and developmentally. The current political and policy context makes having a universal model for CPS delivery to adolescents challenging, and many organizations that serve young people are looking for guidance on how to improve services for this population. Although we identified a small number of programs and interventions that serve as exemplars for successful CPS delivery, experts emphasized the need to move beyond demonstrating proof of concept and focus on how to disseminate successful strategies and scale them to a larger population. Although many healthcare interventions are naturally focused on a specific setting (e.g., clinics, schools, community centers), it is important for any future approaches to consider the range of locations where adolescents can be reached and how they intersect.

The prevalence of mental health disorders, alcohol, tobacco, and other drug use, and STIs among adolescents demonstrate the pressing need to address these issues. The risk factors for mental health, substance use, and STIs are often intertwined and holistic strategies that help individuals manage multiple risks at once may be more fruitful and efficient. At the same time, although alcohol, tobacco, and other drugs are often grouped together, the normalization of alcohol consumption among young adults, aesthetic choices associated with smoking and vaping, and the greater stigma attached to drug use point to the need for tailored strategies that meet adolescents where they are in coping with these issues.

Across settings and services, the need for trusting relationships—between adolescents, parents, providers, healthcare systems, and schools, among others, was a recurring theme. Without strategies that address underlying issues, such as mistrust of the healthcare system or the mindset that doctor's visits are for addressing illness and not prevention, interventions designed to increase and improve delivery of CPS may have limited reach. Strategies, messaging, and interventions that drive health and well-being, including connected care; supportive environments; and positive, collaborative relationships between adolescents, parents, providers, schools, and other youth-serving organizations, may support the delivery of CPS and improve the health of young people. Actively engaging young people in the design and implementation of future efforts may help to facilitate the development and maintenance of more trusting relationships and programs and services that better meet the needs of adolescents across the developmental spectrum.

Finally, many of the issues raised by the experts and KIIs are related to systemic issues in both healthcare and society more broadly. For example, addressing the negative experiences that many individuals and communities of color have had in interacting with the healthcare system is a key component of building trusted relationships and is widely applicable to all healthcare, not just the delivery of CPS to adolescents. Similarly, healthcare financing issues, such as making sure that preventive services are covered by health insurance and that a provider's time spent counseling and guiding families is reimbursable, apply more broadly as well.

4.2 Future Opportunities

Engaging youth directly as experts in intervention design and program development was a recommendation that emerged from both the experts and the KIs. Youth boards, particularly paid ones, help to center the voices of adolescents. Experts cited an example of Patient-Centered Outcomes Research Institute–funded work where youth are engaged as experts, and a key informant noted that paid engagement can be protective for at-risk youth.

Experts suggested improved training and education for providers regarding how to establish an expectation of confidentiality for certain portions of an adolescent's well-child visits and how to communicate with parents about what they can expect, so that concerns are minimized. In addition, there may be opportunities to improve the dissemination and use of resources that support practices in becoming youth friendly.

In addition to improving delivery of CPS to youth in traditional primary care settings, there is a need for services that reach youth who do not have regular encounters to primary care for a range of reasons. For many young people, schools and the healthcare system are not trusted places or sources of information and there is work to be done to improve trust. TEP members suggested additional research collaborations between primary care systems and alternative and innovative service delivery models that reach out-of-school youth and those otherwise at risk of not receiving CPS. In addition, they called for research about what improvements can be made within primary care and what tasks can be most successfully accomplished by community organizations or primary care extenders.

Experts called for strategies and funding to help scale interventions. For example, increased funding to support projects like the CDC's What Works in Schools program to provide funding for districts so they can deliver sexual health services and mental health support in partnership with primary care physicians, youth-based community organizations, health departments, and other relevant community partners.

Another key area for future research is to expand the perspective on health outcomes for youth when evaluating the risks and benefits of preventive services. In the context of evaluating CPS, there is often a distinction between impact on intermediate outcomes (e.g., lower blood pressure when taking a medication) and impact on health outcomes (e.g., reduced prevalence of stroke). However, for young people, the list of health outcomes is fairly short because young people are generally healthy. Experts shared that there is a need to think more expansively about what is a positive indicator of health in young peoples' lives. For example, high school graduation could be seen as a health outcome because of the impact it has on future health. Similarly, lack of smoking initiation at age 18 years could be an important health "outcome" because of its implications for that individual's health as an adult. Having agreement on outcomes for adolescents, even if they are not traditionally seen as "health outcomes," would be beneficial for evaluating the benefits and risks of various CPS for young people.

4.3 Limitations

The intent of this work was to focus on CPS that are stigmatized, but there are other CPS that apply to adolescents (e.g., vaccinations) that we have not addressed in this work. In addition, because our focus was on CPS recommended by the USPSTF, some important health services with high relevance to adolescents, such as contraception, were out of scope. Further, some topics and risk factors overlap and there is not always clear delineation between how topics should be considered in the context of CPS. For example, most depression screening tools assess suicide risk, but the USPSTF considers suicide risk screening separately from depression screening.

Another limitation is that all of our KIIs were college or graduate students. Because they were recruited through youth advocacy organizations, all of them are actively engaged in advocacy on policy topics. Additional perspectives from young people who transitioned directly from high school to the workforce or who did not complete high school would expand the viewpoints included here.

The environmental scan served as a starting point for conversations with the TEP and KIs and was not intended to be a comprehensive systematic review. There were some issues raised by the TEP and KIs, most notably parental engagement, which were not included in the scan.

4.4 Conclusions

Adolescence is a critical time for establishing health behaviors and CPS are essential to helping adolescents remain healthy. Our findings point toward a need for an adolescent-focused model of CPS delivery that meets individuals where they are both physically and developmentally and takes into account multiple, often overlapping, risk factors. This approach is challenging given the current health care delivery and policy context where adolescents have varying access to health care services based on a range of factors, including educational status, geography, and insurance coverage and where preventive services are often reimbursed at a lower rate. Holistic, scalable approaches that take a more expansive view of health and health outcomes should be considered to reach more adolescents with needed CPS.

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Appendix

Methods Appendix

In this appendix, we provide additional details regarding the methods we used to develop the environmental scan and conduct the technical expert panel (TEP) and key informant interviews (KIIs).

M.1 Environmental Scan

The search for this scan, developed in collaboration with an information specialist and completed on August 23, 2023, was based on a combination of controlled vocabulary and keywords related to preventive services for adolescents in the following bibliographic databases: PubMed (National Library of Medicine), Education Resources Information Center (ERIC via EBSCOhost), and the Cochrane Library (Wiley). The searches covered the period from 2012 to August 2023. To identify grey literature, we searched ClinicalTrials.gov and PROSPERO, and the websites of government (e.g., Centers for Disease Control and Prevention, Agency for Healthcare Research and Quality [AHRQ]) and professional organizations in September and October 2023. All bibliographic citations were managed and deduplicated using EndNote X9 (Clarivate Analytics).

M.1.1 Search Strategy

PubMed

Search No.	Query	Results
#1	Search: "Preventive Health Services"[Majr] OR "clinical preventive services"[tiab] OR "clinical preventive service"[tiab] OR "clinical preventive"[tiab:~3] OR Preventive[title] OR Prevention[title] OR Mass Screening[Majr] OR screening[title] OR screen*[title] OR screens[title] OR screened[title] OR Counseling[Majr] OR counsel*[title] OR counseling[title] OR "Primary Prevention"[Majr] OR "primary prevention"[tiab] OR "community-based"[tw]	844,994
#2	Search: "Adolescent"[Mesh] OR "Adolescent Health Services"[Mesh] OR "Young Adult"[mesh] OR "young adult"[tiab] OR "young people"[tiab] OR adolescen*[tiab] OR teen[tiab] OR teens[tiab] OR teenage[tiab] OR teenaged[tiab] OR teenager*[tiab] OR "middle school"[tiab] OR "high school"[tiab] OR "sixth grade*"[tiab] OR "6th grade*"[tiab] OR "seventh grade*"[tiab] OR "7th grade*"[tiab] OR "eighth grade*"[tiab] OR "8th grade*"[tiab] OR "ninth grade*"[tiab] OR "9th grade*"[tiab] OR "tenth grade*"[tiab] OR "10th grade*"[tiab] OR "eleventh grade*"[tiab] OR "11th grade*"[tiab] OR "twelfth grade*"[tiab] OR "12th grade*"[tiab] OR "school health*"[tiab] OR "school-based"[tiab:~1] OR ((college OR university) AND student*)	3,094,964

(continued)

PubMed (continued)

Search No.	Query	Results
#3	Search: #1 AND #2	142,633
#4	Search: "Mental Health"[Majr] OR "Mental Health Services"[Mesh] OR "Mental Health Associations"[Mesh] OR "Community Mental Health Services"[Mesh] OR Anxiety OR anxi*[tiab] OR Depression OR depress* OR dysthym* OR parasuicide* OR parasuicidal OR suicide OR suicidal OR "Mental health"[tiab] OR "Behavioral Medicine"[Majr] OR "behavioral health"[tw] OR "Sexual Health"[Mesh] OR "sexual health"[tiab] OR "Substance-Related Disorders"[Mesh] OR "Substance Abuse Detection"[Mesh] OR "Substance Abuse, Oral"[Mesh] OR "substance abuse"[tiab:~1] OR "substance disorder"[tiab:~1] OR "substance disorders"[tiab:~1] OR "substance abuse"[tiab:~1] OR "substance use"[tiab:~1] OR "drug abuse"[tiab:~1] OR "Amphetamine Disorders"[tiab:~1] OR "Amphetamine Disorder"[tiab:~1] OR "Cocaine Disorders"[tiab:~1] OR "Cocaine Disorder"[tiab:~1] OR Inhalant*[tiab] OR Marijuana[tiab] OR "Narcotic-Related Disorders"[tiab:~1] OR "Narcotic-Related Disorder"[tiab:~1] OR "Substance Withdrawal Syndrome"[tiab:~1] OR addiction*[tiab] OR "addictive behavior*"[tiab] OR "addictive behaviour*"[tiab] OR "addictive disorder*"[tiab] OR "Tobacco Use"[Mesh] OR "Tobacco, Smokeless"[Mesh] OR "Tobacco Use Disorder"[Mesh] OR "Tobacco Smoking"[Mesh] OR "Tobacco Use Cessation"[Mesh] OR "Tobacco Use Cessation Devices"[Mesh] OR "Tobacco Use"[tiab:~1] OR tobacco[tiab] OR cigarette*[tiab] OR smoking[tiab] OR smoker*[tiab] OR vaping[tiab] OR vape*[tiab] OR "Alcohol-Related Disorders"[Mesh] OR Alcoholics[Mesh] OR "Alcoholism"[Mesh] OR "Alcohol Drinking" [MeSH] OR "alcohol abuse"[tiab:~1] OR "alcohol addiction*"[tiab] OR "alcohol consumption"[tiab:~1] OR "alcohol depend*"[tiab] OR "alcohol misuse"[tiab:~1] OR "alcohol problem*"[tiab] OR alcoholism[tiab] OR "alcohol use disorder*"[tiab] OR ((drinking[tiab] OR drinker[tiab] OR drinkers[tiab]) AND alcohol*[tiab]) OR "harmful alcohol*"[tiab] OR "harmful drink*"[tiab] OR "problem drink*"[tiab] OR "HIV"[Mesh] OR HIV[tiab] OR "Pre-Exposure Prophylaxis"[Majr] OR "pre-exposure prophylaxis"[ti] OR "preexposure prophylaxis"[ti] OR PrEP[tiab] OR "Sexually Transmitted Diseases"[Mesh] OR "sexually transmitted"[tiab] OR STI[tiab] OR STIs[tiab] OR STD[tiab] OR STDs[tiab] OR chlamydia OR gonorrhea OR "Hepatitis B" OR Syphilis OR "Contraception"[Mesh] OR "Youth Risk Behavior Surveillance System"[tiab] OR YRBSS OR ("School Health Profiles" AND CDC) OR "school based survey*"[tiab]	2,493,028
#5	Search: #3 AND #4	53,138

(continued)

PubMed (continued)

Search No.	Query	Results
#6	Search: "School Mental Health Services"[Mesh] OR "School Health Services"[Mesh] OR "School Nursing"[Mesh] OR "school based"[tiab:~1] OR "school nurses"[tiab:~1] OR "school nursing"[tiab:~1] OR "campus health"[tiab:~1] OR "student health services"[tiab:~1] OR "campus health"[tiab:~1] OR "Pharmacies"[Mesh] OR "Pharmaceutical Services, Online"[Mesh] OR "Pharmacists"[Mesh] OR "Practice Patterns, Pharmacists'"[Mesh] OR "Pharmacy Technicians"[Mesh] OR pharmac*[tiab] OR "Hospitals"[Mesh] OR hospital*[tiab] OR "Emergency Medical Services"[Mesh] OR "Emergency Services, Psychiatric"[Mesh] OR "Emergency Service, Hospital"[Mesh] OR "emergency services"[tiab] OR "emergency department"[tiab] OR EMS[ti] OR "emergency medical"[tiab:~1] OR "Obstetrics and Gynecology Department, Hospital"[Mesh] OR "Gynecologists"[Mesh] OR gynecolog*[tiab] OR ((LGBT*[tw] OR "Sexual and Gender Minorities"[Mesh]) AND center*[tiab]) OR "juvenile justice"[tiab] OR "Group Homes"[Mesh] OR "group home"[tiab:~1] OR "group homes"[tiab:~1] OR "Child Welfare"[Mesh] OR "child welfare"[tiab:~1] OR "child protective services"[mesh] OR "child protective services"[tiab:~1] OR "Community Mental Health Centers"[Mesh]	2,982,452
#7	Search: "Internet-Based Intervention"[Mesh] OR "digital"[tiab] OR "Social Media"[Mesh] OR "social media"[tiab] OR Amino OR Discord OR Instagram OR Kik OR "Live me"[Tiab:~1] OR MeetMe OR Monkey OR snapchat OR Tumblr OR twitter OR twitch OR "tik tok" OR WhatsApp OR Whisper OR Yubo OR "Peer Influence"[Mesh] OR "peer interaction*"[tiab] OR "Peer influence*"[tiab] OR "Emergency Service, Hospital"[Mesh] OR "emergency department" OR "Ambulatory Care"[Mesh] OR "Ambulatory Care Facilities"[Mesh] OR "urgent care"[tiab] OR telehealth OR telemedicine OR telenursing OR telepsychiatry OR virtual visit* OR app[title] OR apps[title] OR Asynchronous[Title] OR Blackberry OR "Cell Phone"[Mesh] OR "cell phone"[All Fields] OR "cellular phone"[All Fields] OR "cell phones"[All Fields] OR "cellular phones"[All Fields] OR chat[Title] OR chatbot*[title] OR "Computers, Handheld"[Mesh] OR Computers OR electronic[Title] OR "Electronic Mail"[Mesh] OR "electronic mail"[All Fields] OR email[Title] OR "e-mail"[title] OR gaming OR "Hand held computer"[All Fields] OR "Handheld computer"[All Fields] OR "Handheld devices"[All Fields] OR "Interactive software"[All Fields] OR IPad OR Ipod[tiab] OR Iphone OR I-Phone OR mHealth OR MMS[tiab] OR "mobile-based interventions"[All Fields] OR "Mobile Applications"[Mesh] OR "mobile application*"[title] OR "mobile health"[tiab] OR "mobile phone"[All Fields] OR "mobile phones"[All Fields] OR "MP3-Player"[Mesh] OR "MP3 player"[All Fields] OR "MP4 player"[All Fields] OR "Multimedia messages"[All Fields] OR "online consultation"[Title] OR PDA[tiab] OR "Personal Digital Assistant"[All Fields] OR "Pocket computer"[All Fields] OR "Pocket PC"[All Fields] OR "Short messaging system"[All Fields] OR "Smartphone"[Mesh] OR Smartphone OR "Smart phone"[All Fields] OR "Social Media"[Mesh] OR "social media"[tiab:~1] OR "smartphone application*"[title] OR SMS[Tiab] OR "store-and-forward"[title] OR Tablets OR text[title] OR "texting"[Title] OR "text message*"[Title] OR "Text Messaging"[Mesh] OR "Ultra mobile"[All Fields] OR Web-based[tiab]	23,161,888
#8	Search: #6 OR #7	23,848,497

(continued)

PubMed (continued)

Search No.	Query	Results
#9	Search: #5 AND #8	51,772
#10	Search: "Organizational Innovation"[Majr] OR "Models, Organizational"[Majr] OR "care model*"[tiab] OR "service"[tiab] OR ("Delivery of Health Care"[Majr] AND model*[tw]) OR program[tiab] OR programmatic[tiab] OR redesign[tiab] OR transformation[tiab] OR innovation[tiab] OR innovative[tiab] OR "new model"[tiab] OR reform[title] OR "quality"[title] OR "healthcare improvement"[tiab] OR "system improvement"[tiab] OR strategy[title] OR strategies[title] OR "improve care"[title] OR "Health Systems Agencies"[Majr] OR "Social Determinants of Health"[Mesh] OR "Quality Improvement"[Mesh] OR "Quality Measure*"[tiab] OR "Healthy People Programs"[Majr] OR "Health Plan Implementation"[Mesh] OR "Social Planning"[Mesh] OR implementation[tw] OR implement*[tiab] OR model*[tiab] OR "quality improvement"[tiab]	5,690,552
#11	Search: #9 AND #10	22,437
#12	#11 limited to English, from 2012 - 2023	13,271
#13	#12 excluding LMICs	10,595
#14	Search: "systematic review"[sb] OR review[pt] OR "narrative review"[tiab] OR "qualitative review"[tiab] OR "qualitative meta-synthesis"[tiab] OR "realist synthesis"[tiab] OR "qualitative evidence synthesis"[tiab] OR "qualitative evidence syntheses"[tiab] OR "narrative synthesis"[tiab] OR "scoping review"[tiab:~1] OR "environmental scan"[tiab:~1] OR "realist review"[tiab:~1] OR "rapid review"[tiab:~1] OR comment[pt] OR editorial[pt] OR letter[pt]	5,484,196
#15	Search: #13 AND #14	907

ERIC (EBSCOhost)

Search No.	Query	Results
S1	(ZU "adolescent attitudes") or (ZU "adolescent behavior") or (ZU "adolescent development") or (ZU "adolescent literature") or (ZU "adolescents")	60,492
S2	(DE "Young Adults") OR (DE "College Students")	110,562
S3	(DE "Preventive Medicine") OR prevent* OR screen* OR counsel* OR community-based	158,762
S4	S1 OR S2	166,147
S5	S3 AND S4	23,353
S6	((((((((((DE "Mental Health") OR (DE "Alcohol Abuse")) OR (DE "Alcoholism")) OR (DE "Drinking")) AND (DE "Drug Abuse" OR DE "Drug Addiction")) OR (DE "Depression (Psychology)")) OR (DE "Anxiety")) OR (DE "Suicide")) OR (DE "Smoking")) OR (DE "Acquired Immunodeficiency Syndrome (AIDS)") OR PREP) OR (DE "Sexually Transmitted Diseases")	38,064
S7	S5 AND S6	3,882
S8	(DE "School Health Services") OR (DE "School Nurses") OR (LGBT* AND Center*)	4,014
S9	S7 AND S8	83
S10	S9 limited to Date Published: 20120101-20230831	43

Cochrane Library (Wiley)

Search No.	Query	Retrieval
#1	[mh "Preventive Health Services"] OR "clinical preventive services":ti,ab OR "clinical preventive service":ti,ab,kw OR "clinical preventive":ti,ab OR Preventive:ti OR Prevention:ti OR [mh "Mass Screening"] OR screening:ti OR screen*:ti OR screens:ti OR screened:ti OR [mh Counseling] OR counsel*:ti OR counseling:ti OR [mh "Primary Prevention"] OR "primary prevention":ti,ab OR community-based:ti,ab,kw	114664
#2	[mh Adolescent] OR [mh "Adolescent Health Services"] OR [mh "Young Adult"] OR "young adult":ti,ab OR "young people":ti,ab OR adolescen*:ti,ab OR teen:ti,ab OR teens:ti,ab OR teenage:ti,ab OR teenaged:ti,ab OR teenager*:ti,ab OR "middle school":ti,ab OR "high school":ti,ab OR ("sixth" NEXT grade*):ti,ab OR ("6th" NEXT grade*):ti,ab OR ("seventh" NEXT grade*):ti,ab OR ("7th" NEXT grade*):ti,ab OR ("eighth" NEXT grade*):ti,ab OR ("8th" NEXT grade*):ti,ab OR ("ninth" NEXT grade*):ti,ab OR ("9th" NEXT grade*):ti,ab OR ("tenth" NEXT grade*):ti,ab OR ("10th" NEXT grade*):ti,ab OR ("eleventh" NEXT grade*):ti,ab OR ("11th" NEXT grade*):ti,ab OR ("twelfth" NEXT grade*):ti,ab OR ("12th" NEXT grade*):ti,ab OR ("school" NEXT health*):ti,ab OR “school-based”:ti,ab OR ((college OR university) AND student*)	215227
#3	#1 AND #2	20978

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Cochrane Library (Wiley) (continued)

Search No.	Query	Retrieval
#4	[mh "Mental Health"] OR [mh "Mental Health Services"] OR [mh "Mental Health Associations"] OR [mh "Community Mental Health Services"] OR Anxiety OR anxi*:ti,ab OR Depression OR depress* OR dysthym* OR parasuicide* OR parasuicidal OR suicide OR suicidal OR "Mental health":ti,ab OR [mh "Behavioral Medicine"] OR "behavioral health":ti,ab,kw OR [mh "Sexual Health"] OR "sexual health":ti,ab OR [mh "Substance-Related Disorders"] OR [mh "Substance Abuse Detection"] OR [mh "Substance Abuse, Oral"] OR (substance NEXT abuse):ti,ab OR (substance NEXT disorder):ti,ab OR (substance NEXT disorders):ti,ab OR (substance NEXT abuse):ti,ab OR (substance NEXT use):ti,ab OR (drug NEXT abuse):ti,ab OR (Amphetamine NEXT Disorders):ti,ab OR (Amphetamine NEXT Disorder):ti,ab OR (Cocaine NEXT Disorders):ti,ab OR (Cocaine NEXT Disorder):ti,ab OR Inhalant*:ti,ab OR Marijuana:ti,ab OR ("Narcotic-Related" NEXT Disorders):ti,ab OR ("Narcotic-Related" NEXT Disorder):ti,ab OR (Substance NEXT Withdrawal NEXT Syndrome):ti,ab OR addiction*:ti,ab OR (addictive NEXT behavior*):ti,ab OR (addictive NEXT behaviour*):ti,ab OR ("addictive" NEXT disorder*):ti,ab OR [mh "Tobacco Use"] OR [mh "Tobacco, Smokeless"] OR [mh "Tobacco Use Disorder"] OR [mh "Tobacco Smoking"] OR [mh "Tobacco Use Cessation"] OR [mh "Tobacco Use Cessation Devices"] OR (Tobacco NEXT Use):ti,ab OR tobacco:ti,ab OR cigarette*:ti,ab OR smoking:ti,ab OR smoker*:ti,ab OR vaping:ti,ab OR vape*:ti,ab OR [mh "Alcohol-Related Disorders"] OR [mh Alcoholics] OR [mh Alcoholism] OR [mh "Alcohol Drinking"] OR (alcohol NEXT abuse):ti,ab OR ("alcohol" NEXT addiction*):ti,ab OR (alcohol NEXT consumption):ti,ab OR ("alcohol" NEXT depend*):ti,ab OR (alcohol NEXT misuse):ti,ab OR (alcohol NEXT problem*):ti,ab OR alcoholism:ti,ab OR ("alcohol use" NEXT disorder*):ti,ab OR ((drinking:ti,ab OR drinker:ti,ab OR drinkers:ti,ab) AND alcohol*:ti,ab) OR ("harmful" NEXT alcohol*):ti,ab OR ("harmful" NEXT drink*):ti,ab OR ("problem" NEXT drink*):ti,ab OR [mh HIV] OR HIV:ti,ab OR [mh "Pre-Exposure Prophylaxis"] OR "pre-exposure prophylaxis":ti OR "preexposure prophylaxis":ti OR PrEP:ti,ab OR [mh "Sexually Transmitted Diseases"] OR "sexually transmitted":ti,ab OR STI:ti,ab OR STIs:ti,ab OR STD:ti,ab OR STDs:ti,ab OR chlamydia OR gonorrhea OR "Hepatitis B" OR Syphilis OR [mh Contraception] OR "Youth Risk Behavior Surveillance System":ti,ab OR YRBSS OR ("School Health Profiles" AND CDC) OR ("school based" NEXT survey*):ti,ab	284071
#5	#3 AND #4	10082
#6	[mh "Organizational Innovation"] OR [mh "Models, Organizational"] OR ("care" NEXT model*):ti,ab OR service:ti,ab OR ([mh "Delivery of Health Care"] AND model*:ti,ab,kw) OR program*:ti,ab OR programmatic:ti,ab OR redesign:ti,ab OR transformation:ti,ab OR innovation:ti,ab OR innovative:ti,ab OR "new model":ti,ab OR reform:ti OR quality:ti OR "healthcare improvement":ti,ab OR "system improvement":ti,ab OR strategy:ti OR strategies:ti OR "improve care":ti OR [mh "Health Systems Agencies"] OR [mh "Social Determinants of Health"] OR [mh "Quality Improvement"] OR ("Quality" NEXT Measure*):ti,ab OR [mh "Healthy People Programs"] OR [mh "Health Plan Implementation"] OR [mh "Social Planning"] OR implementation:ti,ab,kw OR implement*:ti,ab OR model*:ti,ab OR "quality improvement":ti,ab	365317
#7	#5 AND #6	5806
#11	Excluding LMICs	5149
#12	Limited to reviews and publication dates January 1, 2012 – August 23, 2023	**119**

M.1.2 Screening of Potentially Relevant Information

We piloted screening of titles and abstracts and full-text articles retrieved using a sample of records to ensure that team members agreed on the topic scope. A senior team member reviewed the records from grey literature sources and selected representative publications for each setting and CPS topic area. Team members extracted relevant information from eligible publications into tables and then narratively summarized the information most relevant to the guiding questions.

Selection Criteria

We prioritized articles focused on at-risk youth, including those in the juvenile justice or child welfare systems and LGBTQ youth. We also prioritized articles that evaluated alternative settings to primary care such as schools, pharmacies, community sites, emergency departments, mobile clinics, or urgent care clinics (guiding question 1 [GQ1]) or mobile device or other technology-based platforms (GQ2).

Although the U.S. Preventive Services Task Force (USPSTF) considers the evidence for suicide screening insufficient to recommend for or against screening (I statement), we included information on this topic because it is often incorporated into current depression screening instruments. We focused on articles reporting on youth and young adults up to age 21 years or who were enrolled in college. We included systematic reviews that included primary studies with participants of all ages but focused only on the descriptions and results specific to primary studies of adolescents. Because USPSTF-recommended clinical preventive services be directed to individuals, we did not include articles evaluating population-directed mental health or sexual health promotion or education or mental health/substance use treatment for youth with established diagnoses. Comparators were not required and publications did not have to report outcomes; however, we extracted implementation or process outcomes (e.g., receipt, acceptability) and clinical outcomes if they were reported.

M.2 Technical Expert Panel (TEP)

M.2.1 Technical Expert Panel Recruitment

We recruited 13 experts for the TEP as shown in Table A-1. We developed an initial list of 40 potential TEP candidates based on recommendations from AHRQ, the Stakeholder Panel, information from the topic's environmental scan, and our own knowledge about experts in the topic area. We considered factors such as role, organization type, clinical or specialty area, gender, geography, and self-identified racial or ethnic minority when compiling the list of potential TEP candidates. After AHRQ approved the list of candidates, we recruited potential members via email over several weeks in waves. We offered eligible participants a $400 honorarium for their participation on the TEP.

Table M-1. Technical Expert Panel Members

Name	Organization	Role	Type of Organization
Christy Altidor, MPH, CPH	National Coalition of STD Directors and Florida Department of Health	Director of Adolescent Health Policy; STI Program Supervisor	State Policy/Public Health
Alison Evans Cuellar, PhD, MBA	George Mason University	Professor, Health Administration and Policy; Vice Chair, Community Preventive Services Task Force (CPSTF)	Research/Academia
Patricia Dittus, PhD	Centers for Disease Control and Prevention	Associate Director for Science, Division of Adolescent and School Health, Centers for Disease Control and Prevention	Federal Agency
Kevin D. Everett, PhD	University of Missouri	Associate Professor, Family & Community Medicine; Co-Director MU Rural Health Research Center	Research/Academia
Alexander G. Fiks, MD, MSCE	Perelman School of Medicine at the University of Pennsylvania and Children's Hospital of Philadelphia	Professor of Pediatrics; Director, the Possibilities Project, Innovation in Primary Care	Research/Academia
Vincent Guilamo-Ramos, PhD, MPH, LCSW, RN, ANP-BC, PMHNP-BC, FAAN	Johns Hopkins University	Director, Institute for Policy Solutions and Director, Center for Latino Adolescent and Family Health (CLAFH), Johns Hopkins University School of Nursing	Health System
Lisa Hightow-Weidman, MD, MPH	Florida State University	Distinguished Professor College of Nursing, Associate Dean for Research, and Director Institute on Digital Health and Innovation (IDHI), FSU	HIT
Jonathan Klein, MD, MPH	Stanford University and International Association for Adolescent Health	Professor of Pediatrics and Chief, Division of Adolescent Medicine, Stanford University President, International Association for Adolescent Health	Research/Academia
Audra Rankin, DNP, APRN, CPNP	University of North Carolina School of Nursing	Associate Professor	Health System
Mary Beth Szydlowski, MPH, CHES	Advocates for Youth and Chicago Public Schools	Associate Director, Healthy and Supportive Schools; Senior STI/HIV Prevention Specialist	Patient/Consumer Representative
Michael Silverstein, MD	Brown University	Director of Hassenfeld Child Health Innovation Institute; Vice-Chair, USPSTF	USPSTF (current/former)
Dana L. Thomas, MPH	Adolescent Health Initiative, Community Health Services, University of Michigan Health	Director	Health System
Leslie Walker-Harding, MD	University of Washington and Seattle Children's Hospital	Professor and Ford/Morgan Endowed Chair Department of Pediatrics and Associate Dean; Chief Academic Officer/Senior Vice President	Research/Academia

Key Informant Interviews

We recruited three key informants via several youth advocacy organizations, seeking individuals who had experience serving on advisory boards or who were engaged in school-based or community-based organizations. We received an initial list of 10 nominations and sought a mix of individuals with regard to location, gender, self-identified race/ethnicity, and area of interest in health or health policy. We recruited individuals via email over a period of 2 weeks in early 2024. We conducted 1-hour semi-structured interviews via Zoom in February 2024. Participants were offered a $100 honorarium for their time. The key informants and their university affiliations are listed in Table A-2.

Table M-2. Key Informants

Name	Organization
Makayla Dawkins	University of Connecticut
Gianna Jirak	New York University
Jorge Martinez	Northwestern University

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