

UCSF

UC San Francisco Previously Published Works

Title

Addressing adolescent substance use in an urban pediatric federally qualified health center

Permalink

<https://escholarship.org/uc/item/8q8512gd>

Authors

Yonek, Juliet C

Velez, Sarah

Satre, Derek D

et al.

Publication Date

2022-04-01

DOI

10.1016/j.jsat.2021.108653

Peer reviewed



Published in final edited form as:

J Subst Abuse Treat. 2022 April ; 135: 108653. doi:10.1016/j.jsat.2021.108653.

Addressing adolescent substance use in an urban pediatric federally qualified health center

Juliet C. Yonek^{a,c,*}, Sarah Velez^{a,c}, Derek D. Satre^{a,d}, Kathryn Margolis^{b,c}, Amy Whittle^{b,c}, Shonul Jain^{b,c}, Marina Tolou-Shams^{a,c}

^aDepartment of Psychiatry and Behavioral Sciences, Weill Institute for Neurosciences, University of California San Francisco, 401 Parnassus Avenue, San Francisco, CA 94143, United States

^bDepartment of Pediatrics at Zuckerberg San Francisco General Hospital, 1001 Potrero Avenue, Building 5, Suite 6B, San Francisco, CA 94110, United States

^cDepartment of Psychiatry and Behavioral Sciences at Zuckerberg San Francisco General Hospital, 1001 Potrero Avenue, Building 5, Suite 7M, San Francisco, CA 94110, United States

^dDivision of Research, Kaiser Permanente Northern California Region, 2000 Broadway, Oakland, CA 94612, United States

Abstract

Objective: Screening, brief intervention, and referral to treatment (SBIRT) is a systematic approach to identification and intervention for individuals at risk for substance use disorders. Prior research indicates that SBIRT is underutilized in pediatric primary care. Yet few studies have examined procedures for identifying and addressing substance use in clinics that serve publicly insured adolescents (i.e., federally qualified health centers [FQHC]). This descriptive, multi-method study assessed adolescent substance use frequency and provider perspectives to inform SBIRT implementation in an urban pediatric FQHC in California.

Methods: A medical record review assessed substance use frequency and correlates among publicly insured adolescents aged 12–17 years who completed a well-child visit in pediatric primary care between 2014 and 2017 (N = 2252). Data on substance use (i.e., alcohol, illicit drugs, and tobacco) were from a health assessment tool mandated by Medicaid. Semi-structured interviews with 12 providers (i.e., pediatricians, nurse practitioners, behavioral health clinicians)

*Corresponding author at: Zuckerberg San Francisco General Hospital and Trauma Center, 1001 Potrero Avenue, Building 5, 7M15, San Francisco, CA 94110, United States. juliet.yonek@ucsf.edu (J.C. Yonek).

CRediT authorship contribution statement

Yonek, Juliet: Conceptualization, Methodology, Data collection, Formal analysis, Writing-Original draft and Revised draft.

Velez, Sarah: Data collection, Formal analysis, Writing-Original draft.

Satre, Derek: Writing-Review & editing.

Margolis, Kathryn: Conceptualization, Writing-Review & editing.

Whittle, Amy: Conceptualization, Data curation, Writing-Review & editing.

Shonul, Jain: Writing-Review & editing.

Tolou-Shams: Conceptualization, Methodology, Writing-Review & editing, Funding acquisition.

All authors have approved the final manuscript.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsat.2021.108653>.

elicited information about the current clinic workflow for adolescent substance use and barriers and facilitators to SBIRT implementation.

Results: Of 1588 adolescents who completed the assessment (70.5%), 6.8% reported current substance use. Self-reported use was highest among non-Hispanic Black (15.2%) adolescents and those with co-occurring depressive symptoms (14.4%). Provider-reported challenges to implementing SBIRT included a lack of space for confidential screening and a lack of referral options. Providers favored implementing technology-based tools such as tablets for adolescent pre-visit screening and electronic medical record–based decision support to facilitate brief intervention and treatment referrals.

Conclusions: This study fills a substantial research gap by examining factors that impede and support SBIRT implementation in pediatric FQHC settings. Successful SBIRT implementation in these settings could significantly reduce the unmet need for substance use treatment among uninsured and publicly insured adolescents. Pediatric primary care and urgent care providers perceived SBIRT to be feasible, and health information and digital technologies may facilitate the integration of SBIRT into clinic workflows. Ensuring confidentiality for screening and expanding referral options for adolescents in need of community-based addiction treatment are also critical to increasing SBIRT uptake.

Keywords

Adolescent; Substance use; Depression; SBIRT; Federally qualified health center

1. Introduction

Adolescent substance use occurs when the developing brain is maturing, making it more susceptible to the adverse impact of intoxicating substances (Squeglia & Gray, 2016). Alcohol, tobacco, and cannabis are the most commonly used substances in this population. In 2019, an estimated 9.4% of adolescents aged 12–17 in the United States reported past-month alcohol use, 3.8% reported tobacco use, and 7.4% reported cannabis use based on a national survey (SAMHSA, 2020). These rates varied by race and ethnicity. For example, past-month cannabis use was 11.0% among Native American, 8.6% among Hispanic, 7.1% among Black, 7.3% among White, and 2.0% among Asian adolescents.

Approximately 4.5% of adolescents had a substance use disorder (SUD) in 2019 (SAMHSA, 2020). SUDs often co-occur with mental health disorders such as depression, anxiety, and attention deficit hyperactivity disorder (ADHD) (Chan et al., 2008; Grella et al., 2004; Hawke et al., 2018). Although effective treatments for adolescent SUDs are available, less than 10% of adolescents in need of substance use treatment receive it (SAMHSA, 2020). Untreated SUDs during adolescence are associated with poor mental health (Brook et al., 2016), poor academic performance (Meier et al., 2015), increased risk of death by suicide (Fontanella et al., 2020), and increased risk of having an SUD in adulthood (D'Amico et al., 2005). Frequently cited barriers to treatment include stigma toward substance use treatment services, low perceived need for treatment, not feeling ready for treatment, and confidentiality concerns (Berridge et al., 2018; Mensinger et al., 2006). Minoritized youth and families may be disproportionately less likely to initiate and complete treatment (Alegria

et al., 2011; Saloner et al., 2014). Compared to White youth, Black and Hispanic youth are less likely to have health insurance, be identified with an SUD and referred for treatment, and live close to addiction treatment facilities (Alegria et al., 2011). They are also more likely to live in areas where Medicaid acceptance rates are lower (Cummings et al., 2011). The absence of cultural sensitivity, stigma, and perceived discrimination creates additional barriers to treatment engagement and completion for minoritized youth (Acevedo et al., 2020; Mays et al., 2017).

To prevent these adverse outcomes and improve access to substance use treatment, professional medical and government organizations recommend Screening, Brief Intervention, and Referral to Treatment (SBIRT) in pediatric primary care settings (American Academy of Pediatrics Committee on Substance Use and Prevention, 2016; NIDA, 2014; SAMHSA, 2015). SBIRT is an evidence-based approach used to identify, reduce, and prevent problematic substance use and SUD development. SBIRT includes screening for substance use risk using a validated tool, offering positive reinforcement for nonuse, brief intervention (BI) (e.g., counseling) for mild or moderate substance use, and referral to treatment for those with severe substance use (Levy & Williams, 2016). Pediatric primary care represents an ideal setting for SBIRT, given that 48% of adolescents see a primary care provider at least annually (Adams et al., 2018). Federally qualified health centers (FQHCs), i.e., community-based organizations that offer comprehensive health services to patients regardless of health insurance status (HRSA, 2018), provide primary care and preventive services to publicly insured or underinsured adolescents. Thus, conducting SBIRT in pediatric FQHCs holds promise for improving substance use treatment access and health outcomes for minoritized adolescents who are disproportionately lacking access to care (Alegria et al., 2011; Saloner et al., 2014).

Available evidence supports the effectiveness of SBIRT in pediatric primary care for improving screening with a validated screening tool, delivering BIs, and initiating specialty treatment among adolescents referred for treatment (Beaton et al., 2016; Monico et al., 2019; Sterling et al., 2017). However, evidence for the effectiveness of BIs in preventing or reducing adolescent substance use is inconclusive (Curry et al., 2018; O'Connor et al., 2020). For example, a randomized trial comparing computer-facilitated screening and BI to usual care for adolescents with unhealthy substance use reported significant reductions in cannabis use and heavy episodic drinking at 12 months for those who received the intervention (Knight et al., 2019). However, Sterling et al. found no change in substance use rates over time in a cluster-randomized trial comparing two different SBIRT delivery approaches (pediatrician-delivered and embedded behavioral health clinician [BHC]-delivered SBIRT) (Sterling et al., 2018).

Despite inconsistent empirical support, the American Academy of Pediatrics recommends that pediatricians provide substance use screening and counseling to all adolescents as part of routine care during annual well-child visits (WCV) (American Academy of Pediatrics Committee on Substance Use and Prevention, 2016). Yet prior research suggests that routine screening for substance use in primary care is uncommon (Harris, Herr-Zaya, et al., 2012; Palmer et al., 2019), and a significant number of adolescents who screen positive (i.e., identified as being at risk of an SUD) do not receive a BI or referral to

treatment (Mitchell et al., 2020). Noted barriers to SBIRT implementation in pediatric primary care include provider time constraints, unfamiliarity with validated screening tools, lack of training on treating adolescents who screen positive, and limited referral options (Palmer et al., 2019). Strategies that may help to overcome barriers to SBIRT adoption include training pediatricians on how to efficiently screen and deliver BIs (Whittle et al., 2014), computerized screening (Harris et al., 2016), and use of embedded BHCs to provide brief interventions and referral to treatment (Sterling et al., 2015). Embedded BHCs are typically licensed clinical social workers or clinical psychologists who work in primary care practices to provide brief therapy for mild to moderate behavioral health concerns, including substance use (Njoroge et al., 2017).

A limitation of prior research on SBIRT implementation in pediatric primary care is that few studies have examined the full SBIRT model (i. e., all three components) (Mitchell et al., 2016; Sterling et al., 2015). Only one study has evaluated the implementation of the full SBIRT model in an FQHC (Mitchell et al., 2020). However, generalizability may be limited given that the study took place in a single FQHC. Understanding procedures for adolescent substance use in pediatric FQHCs can help to identify potential barriers and facilitators to SBIRT implementation. Understanding patterns of adolescent substance use by race and ethnicity and other demographic factors is also needed to ensure that SBIRT components are delivered equitably, identify subgroups in need of targeted intervention (Wu et al., 2011), and address long-standing disparities in treatment access.

To address this knowledge gap, we conducted a descriptive, multi-method study in an urban pediatric FQHC that consisted of (1) a retrospective medical record review of quantitative data from an annual health assessment in pediatric primary care and (2) qualitative interviews with providers in pediatric primary care and urgent care. The quantitative portion of the study aimed to (a) assess substance use frequency among adolescents attending a WCV in pediatric primary care and (b) assess differences according to demographic characteristics and depressive symptoms. The qualitative portion aimed to (a) describe existing procedures for identifying and addressing adolescent's substance use, (b) understand perceptions and attitudes toward adolescent substance use, (c) identify barriers to SBIRT implementation, and (d) obtain provider-recommended strategies for overcoming barriers to SBIRT implementation, particularly technology-based approaches. The qualitative aim included urgent care given that it is a potentially important setting for early detection and intervention for substance use problems. Although this setting typically provides acute assessment and management rather than preventive care, research suggests that 25% of publicly insured adolescents primarily rely on urgent care for most of their health needs (Goyal et al., 2020). Study findings can inform SBIRT implementation strategies within urban pediatric FQHC clinics and potentially reduce disparities in SUD treatment access among minoritized adolescents.

2. Materials and methods

2.1. Study setting

The study took place in two separate pediatric clinics (primary care and urgent care) within a county hospital that is part of an integrated delivery system in San Francisco,

California. Both clinics combined serve approximately 10,000 individual adolescent patients per year, and of those, 58.1% identify as Hispanic, 19.1% as Black, 11% as Asian/Pacific Islander, and 6.5% as Caucasian. Most (91.4%) patients are Medicaid-insured, and 7.9% are uninsured.

2.2. Study procedures and data collection

The University of California, San Francisco Institutional Review Board approved all recruitment, data collection, and analytic procedures.

2.2.1. Quantitative study procedures and data collection—The study team selected for review electronic medical records (EMR) of pediatric primary care patients aged 12–17 years who had an annual WCV between January 1, 2014, and January 1, 2017. The study excluded primary care visits other than WCVs and urgent care visits because screening for substance use does not typically occur during these visits. The research team abstracted data using a standardized data capture form and entered them directly into a REDCap database (Wright, 2016).

The study team extracted demographics (i.e., patient age, Hispanic ethnicity, race, and gender) from a standard template in the EMR. The study obtained adolescent-reported substance use and depressive symptoms from the Staying Healthy Assessment (SHA). The 36-item SHA assesses substance use, tobacco use, mental health, nutrition, physical activity, safety, dental health, sexual health, and independent living status. Items for each domain are based on recommendations from professional sources, including the U.S. Preventive Services Task Force Recommendations and the American Academy of Pediatrics; however, the SHA has not been psychometrically validated. While a validated measure would have been preferable, the SHA was the only source of quantitative data on substance use and depressive symptoms at the time of the study. Additionally, the SHA reflects real-world practice in a clinical setting; providers are required by Medi-Cal (i.e., California's Medicaid program) to give the SHA annually to adolescents aged 12–17 years during their WCV.

The substance use domain includes four items: (1) Do you use or sniff any substance to get high, such as marijuana, cocaine, crack, methamphetamine (meth), ecstasy, etc.?; (2) Do you use medicines not prescribed for you?; (3) Do you drink alcohol once a week or more?; and (4) If you drink alcohol, do you drink enough to get drunk or pass out? The study assessed tobacco use with the question, Do you smoke cigarettes or chew tobacco? This study considered an adolescent positive for substance use if he/she reported any substance use or tobacco use. We considered data missing if respondents left each substance use item and the tobacco use item blank. The study assessed depressive symptoms with a single item: Do you often feel sad, down, or hopeless? This is similar to an item from the Patient Health Questionnaire 2 (PHQ-2), a psychometrically validated, self-reported depression screener (Kroenke et al., 2003). We considered the data to be missing if this item was blank.

2.2.2. Qualitative study procedures and data collection—The study recruited a convenience sample of pediatric providers (i.e., pediatricians, nurse practitioners) and behavioral health clinicians (BHCs) to participate in semi-structured interviews via email and we advertisement in a departmental newsletter. The study targeted between 12 and 18

providers for recruitment in anticipation that this number would be sufficient to reach data saturation (Glasser & Strauss, 1967; Nelson, 2017).

Research staff sent email invitations to all pediatric providers (n = 30) and behavioral health clinicians (n = 3). Providers and BHCs were eligible to participate if they provided patient care to adolescents within pediatric primary or urgent care at the study site for at least two years. Eleven providers (36.7%) and one behavioral health clinician (33.3%) agreed to participate and were eligible. The remaining 2 BHCs did not respond to the email invitation. Of the 19 pediatric providers who did not participate, five declined due to time constraints, six were ineligible because they rarely saw adolescents. Eight did not respond to the email invitation. Study staff sent up to 3 follow-up emails to providers who did not respond to the initial email invitation.

The semi-structured interview guide (see Supplementary Appendix S1) included questions about clinical priorities, current policies and procedures specific to adolescent substance use screening and treatment, challenges to implementing systematic SBIRT, and perspectives on how health technologies (e.g., electronic screeners and EMR-based clinical decision support tools) could facilitate SBIRT implementation. The interview guide was developed by study authors (a child/adolescent psychologist [MTS] and a mixed-methods health services researcher [JY]) and reviewed by a pediatrician (AW) and a pediatric psychologist (KM). Interview guides were informed by prior SBIRT studies that used implementation science frameworks to guide data collection and analysis, such as the Knowledge to Action (KTA) (McNeely et al., 2018) and the Consolidated Framework for Implementation Research (Stanhope et al., 2018).

One study author (JY) conducted the interviews between March and May 2018 either over the phone or in person in private locations at the hospital. Interviews lasted between 45 and 60 min and were audio-recorded. The study compensated participants with a \$20 gift card. Provider interviews were professionally transcribed verbatim, leaving out any names.

2.3. Analysis

2.3.1. Quantitative data analysis—For adolescents with multiple data points (i.e., SHA data for each year), the study treated each data point as an independent observation. We summarized data using standard descriptive statistics (i.e., means and standard deviations for continuous variables and frequencies and proportions for categorical variables). Research staff conducted bivariate analyses to assess variation in substance use frequency by demographic characteristics and mental health status using Pearson's χ^2 tests. An alpha value of $p < .05$ indicated statistical significance. The study team conducted analyses using SPSS 23 (IBM).

2.3.2. Qualitative data analysis—Study staff entered provider interview transcripts into ATLAS.ti 8.0 (Scientific Software Development GmbH) software for data management and analysis. We used inductive and deductive methods to analyze the qualitative data (Hsieh & Shannon, 2005). Before reviewing the transcripts, the team developed an initial set of codes based on the interview guide. Two researchers (JY, SV) independently read and coded four transcripts using these codes while simultaneously developing new codes to

capture emerging themes. Afterward, the study team compared coded transcripts to identify differences in coding, which were resolved through consensus. The study team repeated this process with additional transcripts until the study achieved inter-coder agreement for all codes, and no additional themes emerged. One researcher (SV) used the finalized codebook to code the remaining transcripts and re-code prior transcripts. The study collated codes into themes pertaining to SBIRT procedures and implementation factors (JY), and the team selected illustrative quotes for each theme. The study reached data saturation during data coding and analysis. Two researchers (SV and JY) concluded that saturation was reached when no new themes emerged related to the qualitative study aims and when a sufficient understanding of emergent themes had been achieved (Glasser & Strauss, 1967; Nelson, 2017).

3. Results

3.1. Quantitative findings

3.1.1. Participant characteristics—Of 2252 adolescents who had an annual WCV in pediatric primary care, 70.5% (n = 1588) completed a SHA (Table 1). A SHA may not have been completed for the following reasons: (1) the SHA form was mistakenly not given to the adolescent; (2) the provider did not note in the patient's record that a SHA was required, and (3) the SHA form was completed but not scanned into the EMR. SHA completion varied by gender: a significantly higher proportion of females completed an SHA than males (72.6% vs. 68.5%, $p = .02$). Completion did not vary by race, Hispanic ethnicity, or age. Of 1588 adolescents who completed the SHA (70.5%), 66.6% identified as Hispanic, 9.9% as non-Hispanic (NH) Black, 20.5% as NH Other, and 3.0% as NH White. Approximately 50% were female, and the average age was 14.4 years (S.D. = 1.71). Sixteen percent reported depressive symptoms, which differed by race and ethnicity, i.e., 22.5% among NH White and 18.6% among NH Black adolescents.

3.1.2. Adolescent substance use frequency—Approximately 7.0% of adolescents reported current substance use. Significant variation occurred by race and ethnicity, and age ($p < .001$ for each). The highest percentages were among NH Black (15.2%), NH White (10.1%), and adolescents aged 16–17 years (13.1%). More adolescents with depressive symptoms reported using drugs or alcohol than adolescents without depressive symptoms (N = 1330; 14.4% vs. 5.3%, $p < .001$).

3.2. Qualitative findings

The study team completed twelve semi-structured interviews with participants. Participants were 11 medical providers (7 in pediatric primary care and 4 in urgent care; 8 physicians and three nurse practitioners) and one BHC who was a licensed clinical social worker. Participants were in their current roles between 4 and 11 years. The majority were female (83.0%), which reflects the gender distribution in the sampling frame.

3.2.1. Existing procedures for identifying and managing adolescent substance use

3.2.1.1. Identification.: In pediatric primary care, providers reported that the SHA is the primary method for identifying problematic substance use and depression in adolescents. Adolescents complete a paper- and-pencil version of the SHA in the waiting room before their visit and without parent/guardian assistance. The medical assistant gives completed assessments to the pediatric provider to review and discuss with the patient during the visit and subsequently scans them into the EMR. The CRAFFT (Car, Relax, Alone, Forget, Friends, Trouble) (Knight et al., 2002), a validated adolescent substance use screening tool, was available in the EMR. However, providers reported that they rarely used the CRAFFT because it is difficult to access in the EMR. As one provider stated, “[Screeners probably] exist in some form in the EMR, but they are not obvious enough to me. I ask about substance use in the context of our conversation, but I don't document the information using a screening tool in the EMR.” Another provider mentioned, “I have to click through like sixteen things to just answer each question. So, I honestly don't use them [screeners]”.

In urgent care, providers explained that the HEADDS (Home, Education & Employment, Activities, Drugs, Sexuality, and Suicidality/Depression) is used to obtain substance use information. The HEADDS is a clinician-administered, interview-based psychosocial assessment and does not include validated substance use or mental health screening measures. Providers reported that they might not complete the HEADDS when they are short-staffed or need to prioritize stabilizing acute patients. As one provider described,

When we have adequate staffing for the volume of patients at hand, I think we routinely ask residents to do this [HEADDS assessment] for all of our adolescent patients, routinely...but in full disclosure, during the winter months when we are getting just buried in very acutely sick kids, we may not do quite as many of them.

3.2.1.2. Management.: Providers stated that BHCs were available at both clinics. Providers referred adolescents who were using substances to cope with emotional distress or adolescents perceived as chronic or “heavy” users to a BHC for further evaluation and treatment (i.e., brief intervention or referral to an outside addiction treatment provider, as appropriate). One urgent care provider described,

For many patients who are smoking or drinking, there is often an emotional component. I'll ask, ‘Why do you drink so much?’ They'll tell me, ‘I just drink to forget’ or ‘I'm just so stressed all the time -I just don't even want to be here.’ I try to identify the core emotion that's leading to the risky [substance use] behavior, and then I involve BHC.

Some providers mentioned using strategies such as motivational interviewing or harm reduction for adolescents who report occasional substance use. A pediatric provider reported,

I tend to do some form of motivational interviewing, of reflection on their use, and I tend to spin it as “How does it help you?” “What are the positive attributes of using that is helpful to you?” And I think this opens up a lot more conversation.

3.2.2. Provider perceptions and attitudes toward adolescent substance use—

Six themes emerged from the interviews regarding provider perceptions and attitudes toward adolescent substance use. First, pediatric primary and urgent care providers reported that cannabis use was widespread among adolescents, but other illicit drug use (e.g., prescription opioid misuse) was rare. As one primary care provider noted, “I would say the majority of kids that I see that use substances, marijuana or cannabis products make up 90%. Next in line might be alcohol. It's a very small percentage who use other things.”

Second, providers described most substance use as mild to moderate rather than severe. According to one primary care provider, “With adolescents, it is rare to see kids with full-on addiction. And they are not coming to primary care if they do.” An urgent care provider added, “Probably twice a year, I will have a toxicologic chief complaint come into pediatric urgent care. So, it is not something that we commonly see.”

Third, providers reported that substance use frequently co-occurred with mental health problems such as depression and was often used as a coping mechanism. For example, one primary care provider expressed, “I have found that many kids tend to rely on things like alcohol, marijuana and sometimes harder drugs to cope with social and emotional issues whether that be family problems or the role of separation, and reunification for immigrant families.” Fourth, providers perceived every visit as an opportunity to identify and address substance use and other psychosocial concerns that may otherwise go unaddressed. One urgent care provider noted,

If you don't ask these questions [about substance use] in Urgent Care, then you're missing a huge opportunity to intervene. A lot of them may have missed their Well-Child check and may not have been in to see anybody for a year or two.

A primary care provider stated,

I think it's critical because when patients come specifically for preventive care, sometimes this is the only chance that they're going to talk to somebody and maybe get a little bit of education regarding substance use and its relationship to their physical and mental health.

Fifth, providers in both settings noted that asking about substance use is how they identify underlying mental health or emotional problems. One primary care provider stated,

When talking to adolescents, they're very upfront about what the benefits of using drugs are for them and what has come forward is: ‘it helps me sleep, it calms my anger, I don't have to think about certain things as much.’ It has become very clear to me that substance use is a coping mechanism for them.

Sixth, providers described how professional guidelines had shaped their perceptions regarding the importance of asking their adolescent patients about substance use. One urgent care provider stated, “Our professional association recommends screening all teenage patients at all encounters, including urgent care visits. We know that they are prone to behaviors that put them at higher risk than other age groups.”

3.2.3. Barriers to SBIRT implementation—The research team identified five themes regarding barriers to identifying and addressing adolescent substance use. One theme was a lack of time to screen and counsel youth with problematic substance use. As one pediatric provider described, “We’re being asked to screen for everything, and they’ve just shortened appointments 20 minutes. It’s just not enough time.”

Providers identified knowledge deficits as a barrier to providing screening and interventions to address substance use. According to one pediatric provider, “I think we are a little bit better with knowing what to say and what to give out for things specifically related to mood or, to some extent, like, trauma, or a violence history. For substance abuse, I’m less well versed.”

An unclear or nonexistent care pathway for adolescents who report substance use emerged as a critical barrier to addressing substance use in primary and urgent care. An urgent care provider expressed,

We don’t have an algorithm, ‘screen positive, do this or do that.’ So, there is a fair amount of scratching our heads for a kid who flags positive for, say, alcohol abuse on the HEADDs. I don’t think we have great protocols in urgent care for this.

A primary care provider noted,

With sexual activity, it’s really easy because you can do some brief counseling, put them on birth control, test them for STDs, and you feel like you’ve accomplished something. It becomes so complicated for substance abuse and a lot of these social needs where providers just feel like completely at a loss of what to do if they screen positive, especially if nobody else [i.e., a BHC] is available to help them.

Primary care providers mentioned a lack of privacy as a barrier to confidential screening and patient-provider discussion about substance use. For example, one provider said:

The teen could be filling the SHA out with their parent sitting right there. So, there are times that I suspect they circle all ‘no.’ After the parent steps out of the room, they may give a different answer. So, I kind of take everything on the SHA with a grain of salt.

Finally, a lack of local youth addiction treatment providers emerged as a critical barrier to referral. As one provider described, “s like they have to fall into a big crack in order to get help... Other than going to jail, there are few resources available for youth with substance use disorders.”

3.2.4. Provider-recommended strategies for overcoming barriers to SBIRT—Six themes emerged regarding recommendations for overcoming current challenges to SBIRT implementation. First, providers suggested training on how to counsel patients and deliver BIs. For example, one primary care provider stated, “We need more education, like conferences or grand rounds. And something interactive on how to do motivational interviewing and harm reduction.”

Second, primary care providers suggested using non-physician staff (e.g., medical assistants, nurses) to administer screeners to adolescents before the clinical encounter. One provider mentioned, “You need to have the screening done by someone other than the provider, so the screening is not a part of the 15-minute visit.”

Third, providers in both settings described how using mobile phones or tablets may increase adolescents' engagement in screening. One urgent care provider expressed, “I love the idea of using an iPad to screen patients for risky behavior. I think that teenage patients are completely comfortable disclosing to the Internet all of their activities. It also gives patients something to do while they are waiting to see their provider.” Fourth, providers reported that integrating results from the electronic screener into the EMR could help to guide provider discussion about substance use and inform treatment decisions. For example, one pediatric provider noted,

I think doing the screener on a tablet can be very helpful if there is some way to get the results directly to the provider to look at, or some easy way to actually look at the questions that flagged positive, to guide our discussion about it. I sometimes think what happens with those tablet screeners is that it spits out a score, but there's no interpretation of that score other than it is positive.

Fifth, providers suggested using the EMR to alert BHCs when adolescents screen positive. A primary care provider explained, “I think it would be helpful if a behavioral health clinician received a notification when there is a positive screening result, so that they could come and discuss those results with us a little more.” Sixth, to overcome barriers to referral, providers suggested creating an online resource with contact information for local youth addiction treatment providers and their current capacity. As one urgent care provider stated, “It would be helpful to have an online resource specifically for substance use treatment so we could make a phone call to get people into treatment.”

4. Discussion

This multi-method study assessed substance use frequency, described existing procedures for detecting and addressing adolescent substance use, and identified factors that can inhibit and promote SBIRT implementation in an urban pediatric FQHC. Quantitative data indicated that the frequency of adolescent substance use among WCVs in pediatric primary care was 6.8%, which is low relative to state-level estimates; 8.5% of adolescents aged 12–17 years in California reported past-month illicit drug use in 2017–2018 (SAMSHA, 2019). It is also lower than previously reported rates of past-year substance use among adolescent primary care patients, ranging from 11% to 24.3% (Knight et al., 2019; Sterling et al., 2018). The frequency among older adolescents (i.e., 16–17 years old) in this study (13.1%) is also notably lower than expected given rates of cannabis and alcohol use among high school seniors nationally; in 2019, 22.3% of 12th graders reported past-month cannabis and 29.3% reported past-month alcohol use (NIDA, 2019). Differences may reflect different time frames for reporting substance use across studies (i.e., past-month, past-year, lifetime). The SHA does not specify a time frame; however, the wording of the question on substance use suggests current use (i.e., “do you use”).

Substance use may be underreported in the study population because the study used a single question to assess the use of multiple illicit drugs. Consequently, adolescents may have misinterpreted this question as using all drugs listed rather than using any of the drugs. Findings indicate the need to implement a validated substance use screening tool or establish the psychometric performance of the SHA relative to a validated tool such as the CRAFFT (Knight et al., 2002). Qualitative findings suggest additional explanations for underreported substance use, such as a lack of private space for screening. Primary care providers also speculated that adolescents with risky substance use might be accessing care in acute care settings rather than pediatric primary care. Urgent care providers acknowledged this as a reason to implement standardized screening for adolescent substance use in this setting. Adolescents in the study population with more problematic substance use may also be more likely to present for care in the emergency department (ED). An estimated 1.5 million adolescents in the United States use EDs as their main source of health care (Weiss et al., 2014). Adolescents who rely on EDs for care are more likely to come from vulnerable and at-risk populations, and have disproportionately higher rates of drug and alcohol use than adolescents who access primary care (Langerman et al., 2019).

Substance use frequency was significantly higher among adolescents with depressive symptoms than those without depressive symptoms, which aligns with qualitative findings. Co-occurring depressive symptoms may complicate the course of substance use treatment and recovery, leading to slower recoveries and increasing the likelihood of relapse following interventions (Grella et al., 2004). This finding underscores the importance of concurrent screening for SUDs and depression in adolescents and integrated treatment that targets both issues simultaneously (i.e., dual diagnosis treatment) (Hinckley & Riggs, 2019).

A significantly higher percentage of NH Black adolescents (15.2%) reported substance use relative to NH White (10.0%) and Hispanic adolescents (6.3%). These percentages are higher than anticipated, particularly among Black adolescents. In 2019, an estimated 8.5% of Black adolescents aged 12–17 years reported past-month illicit drug use, compared to 8.5% of White and 10.1% of Hispanic adolescents (SAMHSA, 2020). Higher rates among Black adolescents served by FQHCs may be attributable to sequelae of chronic psychological distress resulting from racial discrimination, historical trauma, and structural racism that is associated with living in neighborhoods with high levels of poverty and violence, greater alcohol and drug availability, and fewer positive social activities that are protective against adolescent substance use (Copeland-Linder et al., 2011; Criss et al., 2016; Davis & Grier, 2015; Reboussin et al., 2019).

Implementing SBIRT in pediatric FQHCs could be an essential step in mitigating disparities in SUD identification and treatment utilization among minoritized youth. However, SBIRT provision in these settings must be tailored to address key socio-cultural and structural factors that impede minoritized youth's initiation and engagement in substance use treatment, such as perceived racial discrimination, stigma, and lack of cultural sensitivity (Acevedo et al., 2020). For example, screening and brief interventions should be culturally informed (Green, 2018), account for the systemically oppressive sources of stress tied to substance use among racial and ethnic minority youth (Criss et al., 2016), and be tailored for youth with exposure to trauma and adverse childhood experiences (Spencer et al., 2021).

Providers need to be aware of racial and ethnic disparities in referral rates for substance use treatment and trained to recognize how their own biases and stereotypes (explicit or implicit) may contribute to these disparities (Fong et al., 2018).

Pediatric provider interviews revealed well-documented barriers, including a lack of time for screening, a lack of skills to conduct brief interventions, and a lack of referral options (Palmer et al., 2019). Barriers that may be particularly important in FQHC settings given their relative lack of resources included a lack of private space for screening and the absence of a well-defined care pathway for adolescents who report substance use. To overcome screening barriers, providers recommended administering electronic screeners to adolescents before the visit and having non-physician staff (e.g., medical assistants) present the screener. Previous research has reported provider support for electronic substance use screening in primary care (McNeely et al., 2018; Palmer et al., 2019). Research has shown that the use of patient-reported electronic screening tools, such as tablets, increase honest disclosure of problematic substance use among adolescents (Harris, Csémy, et al., 2012) and save time (D'Souza-Li & Harris, 2016). Electronic screening and integration into the EMR may also promote routine use of validated screening tools (Harris et al., 2016). Feasibility in FQHC settings may depend on training non-physician staff to present the screener and offer additional support when needed, redesigning workflows to allow for successful implementation, and EMR functionality (e.g., the ability to directly integrate screening results from tablets into the patient's EMR).

To improve the use of screening results to inform treatment decisions at the point of care, providers recommended using EMR technology to interpret electronic screening results and provide clinical decision support (CDS) based on adolescents' SUD risk level. Adult primary care providers have reported the need for EMR-based CDS to help integrate SBIRT into their workflows (Muench et al., 2015). Computerized CDS tools for adolescent substance use are available; examples include NIDA's Brief Screener for Tobacco, Alcohol, and Other Drugs and Screening to Brief Intervention (NIDA, 2017). In addition to asking about the frequency of past year substance use, both tools calculate a risk score and assign SUD risk level (Kelly et al., 2014; Levy et al., 2014). Clinicians also receive information about the score's implications, suggested actions, and additional resources.

Prior studies have also shown that these tools can improve provider counseling rates related to adolescent substance use (Knight et al., 2019; McCarty et al., 2019; Richardson et al., 2019). The use of a computerized tool to deliver adolescents' substance use screening results, SUD risk levels, and talking points to pediatricians increased rates of advice to adolescents about cannabis and alcohol (Knight et al., 2019). EMR-based CDS tools could help to triage patients with the greatest need for intervention or referral to optimize the use of limited treatment resources within pediatric FQHCs if they are (1) aligned with the clinic workflow; (2) tailored to the patient based on demographics, clinical characteristics (e.g., psychiatric comorbidities), or other factors; and (3) providers are trained on how to use the tools (Burdick & Kessler, 2017).

Providers also suggested offering training on conducting brief interventions and harm reduction as a strategy to overcome barriers to SBIRT implementation. Harm reduction

approaches are compatible with the SBIRT model, which aims to prevent and reduce risky substance use and potential harms associated with substance use. For adolescents already using substances, risk-reduction strategies may promote safer attitudes toward substance use and reduce incidents of harms related to alcohol and drug use (Baltzer et al., 2008). Harm reduction may also facilitate opportunities for future engagement in treatment (Kimmel et al., 2021).

Providers reported that limited community-based addiction treatment options for publicly insured adolescents with severe substance use and long waitlists were significant barriers to referral. Indeed, community-based substance use treatment options for publicly insured youth in the study area are extremely limited. One outpatient substance use treatment provider exists for publicly insured youth in the San Francisco Bay Area, and no partial hospitalization or residential addiction treatment services exist. Additional treatment options for publicly insured youth are clearly needed; however, the exact number needed is difficult to estimate given a lack of systematically collected and uniform data on California's child substance use treatment workforce.

Strategies to address the unmet need for treatment include (1) increasing recruitment, retention, and training of youth addiction treatment specialists and (2) adopting team-based models of care in which psychiatrists and addiction treatment specialists provide consultation and education to primary care physicians, physician assistants, and nurse practitioners (Coffman et al., 2018). For example, the Massachusetts Child Psychiatry Access Program gives primary care providers direct access to pediatric substance use disorder consultation and education (Massachusetts Child Psychiatry Access Program, 2014). Other strategies include building the capacity of substance use treatment programs to deliver evidence-based practices (Squires et al., 2008) and technology infrastructure development to support telehealth-based SUD treatment (ATTC, 2020; Hogue et al., 2018).

4.1. Limitations

This study was conducted in a single urban pediatric FQHC and may not be generalizable to rural FQHCs, FQHCs that do not have on-site BHCs, and FQHCs that serve populations that are not predominantly Latinx or Hispanic. The perspective of BHCs was limited to a single individual. Data on additional provider characteristics such as race, ethnicity, and age were unavailable to further characterize the qualitative study sample. The study did not use a specific implementation science framework to guide qualitative data collection and interpretation; however, both components were informed from prior SBIRT studies that used implementation science frameworks (McNeely et al., 2018; Stanhope et al., 2018). Selection bias may have influenced the frequency of substance use and depressive symptoms among adolescent primary care patients, given that the SHA was missing for 30% of patients. The frequency of substance use and depressive symptoms among adolescent primary care patients may not generalize to urgent care patients. The SHA has not been validated and relies on a single item to assess multiple types of drug use; thus, substance use may be under-reported. Similarly, the study assessed depressive symptoms using a single, unvalidated measure. Despite these limitations, the SHA reflects real-world practice, and findings provide a rationale for either adopting empirically supported adolescent substance

use screening tools such as the CRAFFT and the PHQ-2 or validating the SHA. Introducing specific examples of digital health tools to providers during the interview may have biased their endorsement of these tools. However, providers explained why these tools would help to increase SBIRT uptake.

The research team did not design the study to use qualitative data to inform quantitative results or test hypotheses generated from the qualitative data. However, study findings suggest important next steps for research—specifically to assess whether the provider-recommended strategies to facilitate confidential, standardized screening and linkage to an appropriate level of care can be successfully implemented and ultimately improve access to substance use treatment for minoritized youth in FQHC settings.

5. Conclusion

Early identification and treatment of substance use problems in urban pediatric FQHCs is critical to improving access to SUD treatment and health outcomes among publicly insured adolescents. In this sample, NH Black adolescents and those with depressive symptoms self-reported the highest rates of substance use. Key SBIRT barriers included a lack of time to screen and counsel youth with problematic substance use, an unclear care pathway for adolescents who report substance use, and a lack of treatment referral options. Providers' recommendations for overcoming barriers to SBIRT adoption in this setting included using EMR and digital health technologies to facilitate the integration of SBIRT into the clinic workflow, consistent with prior research. Although these technologies hold promise for overcoming barriers to SBIRT delivery, they do not replace the need to expand the behavioral health workforce and establish SBIRT protocols and workflows tailored to the population served. Attention to contextual factors contributing to substance use (e.g., systemic racism) and response to treatment (e.g., co-occurring depressive symptoms) among adolescents served by urban FQHCs is paramount to successful SBIRT implementation in these settings. Additional research on SBIRT implementation in acute care settings is needed given that adolescents with more severe substance use may be more likely to seek care in these settings.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

We thank the staff from the Children's Health Center at Zuckerberg San Francisco General Hospital for their participation in the qualitative interviews. We also thank Mr. Zachary Bonzell for his assistance with the medical record review and Dr. Emily Dauria for lending her expertise on qualitative research methods.

Funding

This work was supported by a philanthropic donation funds to the UCSF Department of Psychiatry and Behavioral Sciences (MTS) and from the National Institutes of Health grants (K24 AA025703 [DDS], K24 DA046569-01A1 [MTS], T32MH018261-33 [JCY] and T32DA007250 [JCY]).

References

- Acevedo A, Harvey N, Kamanu M, Tendulkar S, & Fleary S (2020). Barriers, facilitators, and disparities in retention for adolescents in treatment for substance use disorders: A qualitative study with treatment providers. *Substance Abuse: Treatment, Prevention, and Policy*, 15(1). 10.1186/s13011-020-00284-4
- Adams SH, Jane Park M, Twietmeyer L, Brindis CD, & Irwin CE (2018). Association between adolescent preventive care and the role of the affordable care act. *JAMA Pediatrics*, 172(1), 43–48. 10.1001/jamapediatrics.2017.3140 [PubMed: 29114725]
- Alegria M, Carson NJ, Goncalves M, & Keefe K (2011). Disparities in treatment for substance use disorders and co-occurring disorders for ethnic/racial minority youth. *Journal of the American Academy of Child and Adolescent Psychiatry*, 50(1), 22–31. 10.1016/j.jaac.2010.10.005 [PubMed: 21156267]
- American Academy of Pediatrics Committee on Substance Use and Prevention. (2016). Substance use screening, brief intervention, and referral to treatment. *Pediatrics*, 138 (1). 10.1542/peds.2016-1210
- ATTC. (2020). Addiction Technology Transfer Center (ATTC) Network. <https://attcnetwork.org/>.
- Baltzer F, Elliott A, Katzman D, Pinzon J, Sankaran K, Taddeo D, Findlay SM, & Leslie KM (2008). Harm reduction: An approach to reducing risky health behaviours in adolescents. *Paediatrics and Child Health*, 13(1), 53–56. 10.1093/pch/13.1.53 [PubMed: 19119355]
- Beaton A, Shubkin CD, & Chapman S (2016). Addressing substance misuse in adolescents: A review of the literature on the screening, brief intervention, and referral to treatment model. *Current Opinion in Pediatrics*, 28(2), 258–265. 10.1097/MOP.0000000000000333. Lippincott Williams and Wilkins. [PubMed: 26867164]
- Berridge BJ, McCann TV, Cheatham A, & Lubman DI (2018). Perceived barriers and enablers of help-seeking for substance use problems during adolescence. *Health Promotion Practice*, 19(1), 86–93. 10.1177/1524839917691944 [PubMed: 29161886]
- Brook JS, Zhang C, Rubenstone E, Primack BA, & Brook DW (2016). Comorbid trajectories of substance use as predictors of antisocial personality disorder, major depressive episode, and generalized anxiety disorder. *Addictive Behaviors*, 62, 114–121. 10.1016/j.addbeh.2016.06.003 [PubMed: 27344118]
- Burdick TE, & Kessler RS (2017). Development and use of a clinical decision support tool for behavioral health screening in primary care clinics. *Applied Clinical Informatics*, 8(2), 412–429. 10.4338/ACI-2016-04-RA-0068 [PubMed: 28447101]
- Chan YF, Dennis ML, & Funk RR (2008). Prevalence and comorbidity of major internalizing and externalizing problems among adolescents and adults presenting to substance abuse treatment. *Journal of Substance Abuse Treatment*, 34(1), 14–24. 10.1016/j.jsat.2006.12.031 [PubMed: 17574804]
- Coffman J, Bates T, Geyn I, & Spetz J (2018). California's Current and Future Behavioral Health Workforce.
- Copeland-Linder N, Lambert SF, Chen YF, & Jalongo NS (2011). Contextual stress and health risk behaviors among African American adolescents. *Journal of Youth and Adolescence*, 40(2), 158–173. 10.1007/s10964-010-9520-y [PubMed: 20213481]
- Criss S, Rodriguez D, & Goldman RE (2016). The social context of substance use and perceived risk among Rhode Island urban minority adolescents. *Journal of Health Care for the Poor and Underserved*, 27(1), 176–193. 10.1353/hpu.2016.0001 [PubMed: 27763464]
- Cummings JR, Wen H, & Druss BG (2011). Racial/ethnic differences in treatment for substance use disorders among U.S. adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 50(12), 1265–1274. 10.1016/j.jaac.2011.09.006 [PubMed: 22115147]
- Curry SJ, Krist AH, Owens DK, Barry MJ, Caughey AB, Davidson KW, Doubeni CA, Epling JW, Kemper AR, Kubik M, Landefeld CS, Mangione CM, Silverstein M, Simon MA, Tseng CW, & Wong JB (2018). Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: US preventive services task force recommendation statement. *JAMA - Journal of the American Medical Association*. 10.1001/jama.2018.16789

- D'Amico EJ, Ellickson PL, Collins RL, Martino S, & Klein DJ (2005). Processes linking adolescent problems to substance-use problems in late young adulthood. *Journal of Studies on Alcohol*, 66(6), 766–775. 10.15288/jsa.2005.66.766. [PubMed: 16459938]
- Davis B, & Grier S (2015). A tale of two urbanities: Adolescent alcohol and cigarette consumption in high and low-poverty urban neighborhoods. *Journal of Business Research*, 68(10), 2109–2116. 10.1016/j.jbusres.2015.03.009
- D'Souza-Li L, & Harris SK (2016). The future of screening, brief intervention and referral to treatment in adolescent primary care: research directions and dissemination challenges. *Current Opinion in Pediatrics*, 28(4), 434–440. 10.1097/MOP.0000000000000371 [PubMed: 27152620]
- Fong Fai H, Alegria M, Bair-Merritt MH, & Beardslee W (2018). Factors associated with mental health services referrals for children investigated by child welfare. *Child Abuse and Neglect*, 79, 401–412. 10.1016/j.chiabu.2018.01.020 [PubMed: 29529594]
- Fontanella CA, Warner LA, Steelesmith D, Bridge JA, Sweeney HA, & Campo JV (2020). Clinical profiles and health services patterns of medicaid-enrolled youths who died by suicide. *JAMA Pediatrics*. 10.1001/jamapediatrics.2020.0002
- Glasser B, & Strauss A (1967). *The discovery of grounded theory: Strategies for qualitative research*. Aldine.
- Goyal M, Richardson T, Masonbrink A, Reed JL, Alpern ER, Hall M, & Neuman MI (2020). Reliance on acute care settings for health care utilization: A comparison of adolescents with younger children. *Pediatric Emergency Care*, July 1. 10.1097/PEC.0000000000001924
- Green HD (2018). A community-based evaluation of screening, brief intervention, and referral to treatment (SBIRT) for the Black community. *Qualitative Health Research*, 28(3), 418–432. 10.1177/1049732317746962 [PubMed: 29254450]
- Grella CE, Joshi V, & Hser YI (2004). Effects of comorbidity on treatment processes and outcomes among adolescents in drug treatment programs. *Journal of Child and Adolescent Substance Abuse* (Vol. 13,(4), 13–31. 10.1300/J029v13n04_02. Taylor & Francis Group.
- Harris SK, Csémy L, Sherritt L, Starostova O, Van Hook S, Johnson J, Boulter S, Brooks T, Carey P, Kossack R, Kulig JW, Van Vranken N, & Knight JR (2012). Computer-facilitated substance use screening and brief advice for teens in primary care: An international trial. *Pediatrics*, 129(6), 1072–1082. 10.1542/peds.2011-1624 [PubMed: 22566420]
- Harris SK, Herr-Zaya K, Weinstein Z, Whelton K, Perfas F, Castro-Donlan C, Straus J, Schoneman K, Botticelli M, & Levy S (2012). Results of a statewide survey of adolescent substance use screening rates and practices in primary care. *Substance Abuse*, 33(4), 321–326. 10.1080/08897077.2011.645950 [PubMed: 22989275]
- Harris SK, Knight JR, Van Hook S, Sherritt L, Brooks T, Kulig JW, Nordt CA, & Saitz R (2016). Adolescent substance use screening in primary care: Validity of computer self-Administered versus clinician-Administered screening. *Substance Abuse*, 37(1), 197–203. 10.1080/08897077.2015.1014615 [PubMed: 25774878]
- Hawke LD, Koyama E, & Henderson J (2018). Cannabis use, other substance use, and co-occurring mental health concerns among youth presenting for substance use treatment services: Sex and age differences. *Journal of Substance Abuse Treatment*, 91, 12–19. 10.1016/j.jsat.2018.05.001 [PubMed: 29910010]
- Hinckley JD, & Riggs P (2019). Integrated treatment of adolescents with co-occurring depression and substance use disorder. In, Vol. 28. *Child and adolescent psychiatric clinics of North America* (pp. 461–472). Saunders WB. 10.1016/j.chc.2019.02.006. Issue 3. [PubMed: 31076120]
- HRSA. (2018). Health Resources and Services Administration. What are federally qualified health centers (FQHCs)? [Webpage]. US Dept. of Health and Human Services. <https://bphc.hrsa.gov/about/what-is-a-health-center/index.html>.
- Hsieh HF, & Shannon SE (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*. 10.1177/1049732305276687
- Hogue A, Henderson CE, Becker SJ, & Knight DK (2018). Evidence base on Outpatient behavioral treatments for adolescent substance use, 2014–2017: Outcomes, treatment delivery, and promising horizons HHS public access. *Journal of Clinical Child and Adolescent Psychology*, 47(4), 499–526. 10.1080/15374416.2018.1466307 [PubMed: 29893607]

- Kelly SM, Gryczynski J, Mitchell SG, Kirk A, O'Grady KE, & Schwartz RP (2014). Validity of brief screening instrument for adolescent tobacco, alcohol, and drug use. *Pediatrics*, 133(5), 819–826. 10.1542/peds.2013-2346 [PubMed: 24753528]
- Kimmel SD, Gaeta JM, Hadland SE, Hallett E, & Marshall BDL (2021). Principles of harm reduction for young people who use drugs. *Pediatrics*, 147(2), S240–S248. 10.1542/PEDS.2020-023523G [PubMed: 33386326]
- Knight JR, Sherritt L, Shrier LA, Harris SK, & Chang G (2002). Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. *Archives of Pediatrics and Adolescent Medicine*. 10.1001/archpedi.156.6.607
- Knight JR, Sherritt L, Gibson EB, Levinson JA, Grubb LK, Samuels RC, Silva T, Vernacchio L, Wornham W, & Harris SK (2019). Effect of computer-based substance use screening and brief behavioral counseling vs usual Care for Youths in pediatric primary care: A pilot randomized clinical trial. *JAMA Network Open*, 2(6). 10.1001/jamanetworkopen.2019.6258
- Kroenke K, Spitzer RL, & Williams JBW (2003). The patient health questionnaire-2: Validity of a two-item depression screener. *Medical Care*. 10.1097/01.MLR.0000093487.78664.3C
- Langerman SD, Badolato GM, Rucker A, Jarvis L, Patel SJ, & Goyal MK (2019). Acceptability of adolescent social and behavioral health screening in the emergency department. *Journal of Adolescent Health*, 65(4), 543–548. 10.1016/j.jadohealth.2019.05.019
- Levy S, Weiss R, Sherritt L, Ziemnik R, Spalding A, Van Hook S, & Shrier L (2014). An electronic screen for triaging adolescent substance use by risk levels. *JAMA Pediatrics*, 168(9), 822–828. 10.1001/jamapediatrics.2014.774 [PubMed: 25070067]
- Levy S, & Williams J (2016). Substance use screening, brief intervention, and referral to treatment. *Pediatrics*, 138(1). 10.1542/peds.2016-1211
- Massachusetts Child Psychiatry Access Program. (2014). <https://www.mcpap.com/Provider/Substance%20Use.aspx>.
- Mays VM, Jones AL, Delany-Brumsey A, Coles C, & Cochran SD (2017). Perceived discrimination in health care and mental health/substance abuse treatment among Blacks, Latinos, and Whites. *Medical Care*, 55(2), 173–181. 10.1097/MLR.0000000000000638 [PubMed: 27753743]
- McCarty CA, Gersh E, Katzman K, Lee CM, Sucato GS, & Richardson LP (2019). Screening and brief intervention with adolescents with risky alcohol use in school-based health centers: A randomized clinical trial of the check yourself tool. *Substance Abuse*, 40(4), 510–518. 10.1080/08897077.2019.1576090 [PubMed: 30883284]
- McNeely J, Kumar PC, Rieckmann T, Sedlander E, Farkas S, Chollak C, Kannry JL, Vega A, Waite EA, Peccoraro LA, Rosenthal RN, McCarty D, & Rotrosen J (2018). Barriers and facilitators affecting the implementation of substance use screening in primary care clinics: A qualitative study of patients, providers, and staff. *Addiction Science & Clinical Practice*, 13(1), 8. 10.1186/S13722-018-0110-8 [PubMed: 29628018]
- Meier MH, Hill ML, Small PJ, & Luthar SS (2015). Associations of adolescent cannabis use with academic performance and mental health: A longitudinal study of upper middle class youth. *Drug and Alcohol Dependence*, 156, 207–212. 10.1016/j.drugalcdep.2015.09.010 [PubMed: 26409752]
- Mensingher JL, Diamond GS, Kaminer Y, & Wintersteen MB (2006). Adolescent and therapist perception of barriers to outpatient substance abuse treatment. *American Journal on Addictions*, 15(Suppl. 1), 16–25. 10.1080/10550490601003631 [PubMed: 17182416]
- Mitchell SG, Gryczynski J, Schwartz RP, Kirk AS, Dusek K, Oros M, Hosler C, O'Grady KE, & Brown BS (2020). Adolescent SBIRT implementation: Generalist vs. specialist models of service delivery in primary care. *Journal of Substance Abuse Treatment*, 111, 67–72. 10.1016/j.jsat.2020.01.007 [PubMed: 32087839]
- Mitchell SG, Schwartz RP, Kirk AS, Dusek K, Oros M, Hosler C, Gryczynski J, Barbosa C, Dunlap L, Lounsbury D, O'Grady KE, & Brown BS (2016). SBIRT implementation for adolescents in urban federally qualified health centers. *Journal of Substance Abuse Treatment*, 60, 81–90. 10.1016/j.jsat.2015.06.011 [PubMed: 26297321]
- Monico LB, Mitchell SG, Dusek K, Gryczynski J, Schwartz RP, Oros M, Hosler C, O'Grady KE, & Brown BS (2019). A comparison of screening practices for adolescents in primary care after

- implementation of screening, brief intervention, and referral to treatment. *Journal of Adolescent Health*, 65(1), 46–50. 10.1016/j.jadohealth.2018.12.005
- Muench J, Jarvis K, Vandersloot D, Hayes M, Nash W, Hardman J, Grover P, & Winkle J (2015). Perceptions of clinical team members toward implementation of SBIRT processes. *Alcoholism Treatment Quarterly*, 33(2), 143–160. 10.1080/07347324.2015.1018775
- Nelson J (2017). Using conceptual depth criteria: Addressing the challenge of reaching saturation in qualitative research. *Qualitative Research*, 17(5), 554–570. 10.1177/1468794116679873
- NIDA. (2014). National Institute on Drug Abuse. Principles of adolescent substance use disorder treatment: A research-based guide. In *Publication No. 12–4180*. Bethesda, MD: NIH. https://www.drugabuse.gov/sites/default/files/podat_1.pdf.
- NIDA. (2017). National Institute on Drug Abuse. Screening tools for adolescent substance use. <https://www.drugabuse.gov/nidamed-medical-health-professionals/screening-tools-resources/screening-tools-for-adolescent-substance-use>.
- NIDA. (2019). National Institute on Drug Abuse. 2019, December 18. Monitoring the future survey: High school and youth trends drugFacts. <https://www.drugabuse.gov/publications/drugfacts/monitoring-future-survey-high-school-youth-trends>.
- Njoroge WFM, Williamson AA, Mautone JA, Robins PM, & Benton TD (2017). Competencies and training guidelines for behavioral health providers in pediatric primary care. *Child and Adolescent Psychiatric Clinics of North America*, 26 (4), 717–731. 10.1016/j.chc.2017.06.002. Saunders WB. [PubMed: 28916010]
- O'Connor E, Thomas R, Senger CA, Perdue L, Robalino S, & Patnode C (2020). Interventions to prevent illicit and nonmedical drug use in children, adolescents, and young adults: Updated evidence report and systematic review for the US preventive services task force. *JAMA - Journal of the American Medical Association*, 323(20), 2067–2079. 10.1001/jama.2020.1432 [PubMed: 32453373]
- Palmer A, Karakus M, & Mark T (2019). Barriers faced by physicians in screening for substance use disorders among adolescents. *Psychiatric Services*. 10.1176/appi.ps.201800427
- Reboussin BA, Furr-Holden DM, Green KM, Ialongo NS, Rabinowitz JA, Matson PA, Maher B, Nelson V, & Milam AJ (2019). Social influences on drinking trajectories from adolescence to young adulthood in an urban minority sample. *Journal of Studies on Alcohol and Drugs*, 80(2), 186–195. 10.15288/jsad.2019.80.186. [PubMed: 31014463]
- Richardson LP, Zhou C, Gersh E, Spielvogel H, Taylor JA, & McCarty CA (2019). Effect of electronic screening with personalized feedback on adolescent health risk behaviors in a primary care setting: A randomized clinical trial. *JAMA Network Open*, 2(5), Article e193581. 10.1001/jamanetworkopen.2019.3581 [PubMed: 31074815]
- Saloner B, Carson N, & Cook BL (2014). Explaining racial/ethnic differences in adolescent substance abuse treatment completion in the United States: A decomposition analysis. *Journal of Adolescent Health*, 54(6), 646–653. 10.1016/j.jadohealth.2014.01.002
- SAMHSA. (2015). Substance Abuse and Mental Health Services Administration. About screening, brief intervention, and referral to treatment (SBIRT). <http://www.samhsa.gov/sbirt/about>.
- SAMHSA. (2020). In Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health. *HHS Publication No. PEP20-07-01-001, NSDUH Series H-55* (p. 114). <https://www.samhsa.gov/data/sites/default/files/reports/rpt29393/2019NSDUHFRRPDFWHTML/2019NSDUHFRR1PDFW090120.pdf>.
- SAMSHA. (2019). 2017-2018 NSDUH state estimates of substance use and mental disorders. <https://www.samhsa.gov/data/report/2017-2018-nsduh-state-specific-tables>.
- Spencer AE, Valentine SE, Sikov J, Yule AM, Hsu H, ... Hallett E. Fortuna (2021). Principles of care for young adults with co-occurring psychiatric and substance use disorders. *Pediatrics*, 147(2), S229–S239. 10.1542/PEDS.2020-023523F
- Squeglia LM, & Gray KM (2016). Alcohol and drug use and the developing brain. *Current Psychiatry Reports*, 18(5), 1. 10.1007/s11920-016-0689-y. Current Medicine Group LLC. [PubMed: 26685903]

- Squires DD, Gumbley SJ, & Storti SA (2008). Training substance abuse treatment organizations to adopt evidence-based practices: The Addiction Technology Transfer Center of New England Science to Service Laboratory. *Journal of Substance Abuse Treatment*, 34(3), 293–301. 10.1016/j.jsat.2007.04.010 [PubMed: 17600652]
- Stanhope V, Manuel JI, Jessell L, & Halliday TM (2018). Implementing SBIRT for adolescents within community mental health organizations: A mixed methods study. *Journal of Substance Abuse Treatment*, 90, 38–46. 10.1016/j.jsat.2018.04.009 [PubMed: 29866382]
- Sterling S, Kline-Simon AH, Jones A, Satre DD, Parthasarathy S, & Weisner C (2017). Specialty addiction and psychiatry treatment initiation and engagement: Results from an SBIRT randomized trial in pediatrics. *Journal of Substance Abuse Treatment*, 82, 48–54. 10.1016/j.jsat.2017.09.005 [PubMed: 29021115]
- Sterling S, Kline-Simon AH, Satre DD, Jones A, Mertens J, Wong A, & Weisner C (2015). Implementation of screening, brief intervention, and referral to treatment for adolescents in pediatric primary care: A cluster randomized trial. *JAMA Pediatrics*, 169(11), Article e153145. 10.1001/jamapediatrics.2015.3145 [PubMed: 26523821]
- Sterling S, Kline-Simon AH, Weisner C, Jones A, & Satre DD (2018). Pediatrician and behavioral clinician-delivered screening, brief intervention and referral to treatment: Substance use and depression outcomes. *Journal of Adolescent Health*, 62 (4), 390–396. 10.1016/j.jadohealth.2017.10.016
- Weiss AL, D'Angelo LJ, & Rucker AC (2014). Adolescent use of the emergency department instead of the primary care provider: Who, why, and how urgent? *Journal of Adolescent Health*, 54(4), 416–420. 10.1016/j.jadohealth.2013.09.009
- Whittle AE, Buckelew SM, Satterfield JM, Lum PJ, & O'Sullivan P (2014). Addressing adolescent substance use: Teaching SBIRT and MI to residents. *Substance Abuse : Official Publication of the Association for Medical Education and Research in Substance Abuse*, 36(3), 0. 10.1080/08897077.2014.965292
- Wright A (2016). REDCap: A tool for the electronic capture of research data. *Journal of Electronic Resources in Medical Libraries*. 10.1080/15424065.2016.1259026
- Wu LT, Woody GE, Yang C, Pan JJ, & Blazer DG (2011). Racial/ethnic variations in substance-related disorders among adolescents in the United States. *Archives of General Psychiatry*, 68(11), 1176–1185. 10.1001/archgenpsychiatry.2011.120 [PubMed: 22065533]

Table 1

Substance use frequency among adolescents who completed the Staying Healthy Assessment (SHA), by demographic characteristics and depressive symptoms.

Characteristic	Adolescents who completed the SHA (N = 1588)	Adolescents who reported on substance use (N = 1436) ^{a,b}		
	% (n)	Substance use frequency ^d		
		% (n/ N ^c)	X ²	p- Value
Substance use ^{a,b}	6.8 (98/1436)	6.8 (98/1436)	–	–
Hispanic ethnicity/race				
Hispanic	66.6 (1057)	6.3 (60/959)	19.292	<.001
Non-Hispanic other (Asian American Indian/Alaskan Native other race Native Hawaiian or other Pacific Islander)	20.5 (326)	4.3 (13/299)		
Non-Hispanic Black	9.9 (157)	15.2 (21/138)		
Non-Hispanic White	3.0 (48)	10.0 (4/40)		
Sex				
Female	50.4 (801)	7.9 (58/737)	2.601	.065
Male	49.6 (787)	5.7 (40/699)		
Age				
12–13	35.4 (562)	2.2 (11/505)	43.96	<.001
14–15	34.8 (552)	6.2 (31/503)		
16–17	29.8 (474)	13.1 (56/428)		
Depressive symptoms ^e				
Yes	16.0 (229)	14.4 (30/208)	22.908	<.001
No	84.0 (1199)	5.3 (60/1122)		

^aIncludes adolescents who answered at least one of the following questions: (1) 'do you use or sniff any substance to get high, such as marijuana, cocaine, crack, methamphetamine (meth, ecstasy, etc.)?' (2) 'do you use medicines not prescribed for you?' (3) 'do you drink alcohol once a week or more?', (4) 'if you drink alcohol, do you drink enough to get drunk or pass out?', and (5) 'do you smoke cigarettes or chew tobacco?.'

^b1436 of 1588 (90.4%) adolescents reported on substance use.

^cThe number of adolescents within each category who reported on substance use.

^dThe percentage of adolescents who endorsed at least one substance use question.

^e1428 adolescents answered the question: 'do you often feel sad, down, or hopeless?' The number of adolescents who answered this question and one or more questions about substance use is 1330.