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Implementation of Recommended Screening and Counseling Interventions to Prevent Mental Health Disorders in Children and Adolescents: A Systematic Review

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This report is based on research conducted by the <EPC> Evidence-based Practice Center (EPC) under contract to the Agency for Healthcare Research and Quality (AHRQ), Rockville, MD (Contract No. <#>). The findings and conclusions in this document are those of the authors, who are responsible for its contents; the findings and conclusions do not necessarily represent the views of AHRQ. Therefore, no statement in this report should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

A representative from AHRQ served as a Contracting Officer's Representative and reviewed the contract deliverables for adherence to contract requirements and quality. AHRQ did not directly participate in the literature search, determination of study eligibility criteria, data analysis, interpretation of data, or preparation or drafting of this report.

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of systematic reviews to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new healthcare technologies and strategies.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews can help clarify whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about AHRQ EPC systematic reviews, see https://effectivehealthcare.ahrq.gov/about/epc/evidence-synthesis

AHRQ expects that these systematic reviews will be helpful to health plans, providers, purchasers, government programs, and the healthcare system as a whole. Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the website (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input.

If you have comments on this systematic review, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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Key Informants

In designing the study questions, the EPC consulted several Key Informants who represent the end users of research. The EPC sought the Key Informant input on the priority areas for research and synthesis. Key Informants are not involved in the analysis of the evidence or the writing of the report. Therefore, in the end, study questions, design, methodological approaches, and/or conclusions do not necessarily represent the views of individual Key Informants.

Key Informants must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their role as end users, individuals with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any conflicts of interest.

The list of Key Informants who provided input to this report follows:

[To be included in the final report.]

Technical Expert Panel

In designing the study questions and methodology at the outset of this report, the EPC consulted several technical and content experts. Broad expertise and perspectives were sought. Divergent and conflicted opinions are common and perceived as healthy scientific discourse that results in a thoughtful, relevant systematic review. Therefore, in the end, study questions, design, methodologic approaches, and/or conclusions do not necessarily represent the views of individual technical and content experts.

Technical Experts must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content expertise, individuals with potential conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential conflicts of interest identified.

The list of Technical Experts who provided input to this report follows:

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Peer Reviewers

Prior to publication of the final evidence report, EPCs sought input from independent Peer Reviewers without financial conflicts of interest. However, the conclusions and synthesis of the scientific literature presented in this report do not necessarily represent the views of individual reviewers. AHRQ may also seek comments from other Federal agencies when appropriate.

Peer Reviewers must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content

expertise, individuals with potential nonfinancial conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

The list of Peer Reviewers follows:

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Implementation of Recommended Screening and Counseling Interventions to Prevent Mental Health Disorders in Children and Adolescents: A Systematic Review

Abstract

Objectives. To assess the impact of implementation strategies for mental health and substance use screening and counseling for children and adolescents in primary care as recommended by the United States Preventive Services Task Force and Bright Futures Periodicity Schedule.

Data Sources. PubMed, PsycInfo, Cochrane Library, and the Cumulative Index to Nursing and Allied Health Literature, as well as gray literature sources, reference lists, and technical experts.

Review Methods. We followed the Agency for Healthcare Research and Quality Methods Guide for Effectiveness and Comparative Effectiveness Reviews, adapting it with classifications from the Expert Recommendations for Implementing Change (ERIC) and the Effective Practice and Organisation of Care (EPOC) taxonomies. We searched for studies published from January 1, 2010, through October 6, 2023, and selected studies that compared strategies for implementing mental health and substance use screening and counseling interventions for children and adolescents in primary care with another implementation strategy or no strategy. We evaluated randomized and nonrandomized controlled trials and interrupted time series studies. Studies conducted outside the United States were evaluated separately.

Results. We included 11 studies from the United States and 2 from other countries. Studies focused on screening and counseling for depression and suicide risk, eating disorders, substance use disorders, and general behavioral health risk factors. Implementation approaches were multifaceted and consisted of learning collaboratives, providing support to clinicians, adding new team members to incorporate behavioral health into primary care, and using technology. Overall, our confidence in the available evidence was limited, with numerous outcomes receiving an insufficient strength of evidence rating. When compared to clinical interventions where only minimal or no strategies were employed, implementation strategies consistently resulted in higher screening rates and increased initiation of treatments. Few studies assessed patient outcomes, and clinician support neither reduced risk behaviors nor increased referrals for specialty substance use treatment. Different types of implementation approaches appeared to have comparable effectiveness. The evidence on the impact of implementation strategies on inequities in the delivery of recommended interventions for populations at risk for disparities was limited to a single study focused on clinician support for screening for depression and suicide risk and yielded insuffcient strength of evidence. We did not identify any studies on implementation of screening for anxiety or maternal depression among teenage mothers. Furthermore, none of the included studies assessed the acceptability or feasibility of the implementation approaches utilized nor were patients' quality of life or adverse events assessed.

Conclusions. The identified implementation approaches may increase screening and brief interventions. The evidence, however, is uncertain. Different types of implementation strategies appear to have comparable effectiveness.

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Executive Summary

Main Points

- Few studies (n=11) evaluated strategies to implement clinical interventions recommended by the Bright Futures Periodicity Schedule and the U.S. Preventive Services Task Force for preventing mental health and substance use disorders among children and adolescents.

- The implementation approaches identified in this report are complex, multifaceted approaches. We categorized studies as evaluating one of four overarching implementation approaches: incorporating behavioral health into primary care, engaging in learning collaboratives, providing support to clinicians, and using technology to facilitate screening or brief intervention. Studies were classified based on the primary implementation strategy employed, and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology.

- Implementation approaches consistently led to increased screening (reach) and a greater number of brief interventions and counseling for moderate-risk and high-risk behaviors (addressing a positive screen), and appropriate prescribing for mental health conditions (initiating treatment) compared with when no or minimal strategies were employed. Evidence assessing the impact of implementation approaches on patient outcomes was limited to clinian support, which did not improve risk behavior compared with educational material. Much of this evidence remains highly uncertain, with higher certainty for counseling than screening in some settings.

- Studies comparing different implementation approaches generally reported comparable effectiveness, though individual outcomes occasionally showed differences. The evidence on the impact of implementation strategies on inequities in the delivery of recommended interventions for populations at risk for disparities was limited to a single study focused on clinician support for screening for depression and suicide risk and yielded insuffcient strength of evidence.

- No studies were identified that focused on the implementation of screening for anxiety or maternal depression among teenage mothers. Additionally, the 11 included studies failed to assess the acceptability or feasibility of the clinical intervention being implemented. Assessments of patients' quality of life or adverse events were also absent. Furthermore, evidence was lacking on whether characteristics of the population, settings, care delivery, or the implementation strategy itself influences the effectiveness of implementation strategies.

- Despite the increase in screening and counseling that resulted from implementation approaches, the combination of limited evidence and lack of certainty about the available evidence highlights the need for more research on the impact of strategies to implement

recommended screening and counseling interventions to prevent mental health disorders in primary care settings for children and adolescents.

Background and Purpose

In the United States, nearly 20 percent of children are affected by mental health disorders.[1] This prevalence is disproportionally greater among historically marginalized groups, such as children and adolescents of color; from low-income households; who identify as lesbian, gay, bisexual, transgender, queer or questioning, intersex, or asexual (LGBTQIA+); or who have disabilities.[2-5] Screening and counseling for mental health disorders among children and adolescents is recommended by the American Academy of Pediatrics Bright Futures Periodicity Schedule and the U.S. Preventive Services Task Force (USPSTF). However, there is a gap in successfully implementing evidence-based preventive mental health interventions into primary care due to myriad barriers such as limitations in providers' attitudes and knowledge of interventions, limited time and resources for the increased workload required to screen and counsel, mental health provider shortages, or limited or uncertain reimbursement for services. This review aims to assess the effectiveness and risk for harms of implementation strategies—techniques that enhance implementation, service, and health outcomes[6]—for mental health and substance use screening and counseling for children and adolescents in primary care as recommended by the USPSTF and Bright Futures Periodicity Schedule.

Methods

This systematic review follows the Agency for Healthcare Research and Quality (AHRQ) Methods Guide for Effectiveness and Comparative Effectiveness Reviews, which is adapted with classifications from the Expert Recommendations for Implementing Change (ERIC)[7] and the Effective Practice and Organisation of Care (EPOC)[8, 9] taxonomies. The review process involved collaboration with Key Informants and a Technical Expert Panel to refine the scope and protocol and to prioritize outcomes most important for decision making. We searched multiple electronic databases and gray literature sources from January 1, 2010, through October 6, 2023. Two investigators independently screened each abstract and full text and rated the risk of bias of included studies. During abstract screening, we used DistillerSR's artificial intelligence (AI) capabilities to continually prioritize abstracts with a high likelihood of meeting inclusion criteria. For the bottom 30 percent of prioritized abstracts, DistillerSR's AI function replaced one investigator for screening. We abstracted data on characteristics of study populations, settings, clinical interventions, potential barriers and facilitators to implementation, implementation strategies, comparators, study designs, methods, and results from included studies. We rated the strength of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group approach.[10]

Results

We included 11 studies (3 randomized controlled trials [RCTs],[11-13] 2 cluster RCTs,[14, 15] 1 stepped-wedge trial,[16] 4 nonrandomized controlled trials,[17-20] and 1 interrupted time series [ITS]).[21] Studies allocated a range of 163 to 8,108 participants, 22 to 354 providers, and 4 to 59 practices. Clinical interventions of included studies focused on screening and brief intervention for depression and suicide risk,[19-21] eating disorders,[18] substance use,[13-15] and general behavioral health risk factors.[11, 12, 16, 17] Four studies implemented screening only,[17-20] three studies utilized

screening and brief intervention (SBI), and four employed screening, brief intervention, and referral to treatment (SBIRT)[14-16, 21] as clinical interventions.[11-13]

The overarching implementation approaches that studies evaluated consisted of learning collaboratives,[18, 19, 21] providing clinician support,[11-13, 15, 20] adding new team members to incorporate behavioral health into primary care,[14-16] and using technology to facilitate screening or brief intervention.[17] These approaches were multifaceted with studies often using multiple implementation strategies. These complex approaches to implementation were compared with no strategy,[15-17, 19-21] a minimal implementation strategy (distributing information/educational material),[11, 12, 18] or some other set of implementation strategies.[13-15]

More than half of the included studies (6 of 11) were rated as having high risk of bias, mostly because of uncontrolled potential confounding.[16-21] **Table ES-1** summarizes the effects of implementation approaches on implementation, service, and patient outcomes[6] for different clinical interventions.

Overall, our confidence in the available evidence was limited, with numerous outcomes receiving an insufficient strength of evidence rating because of methodological study limitations or the small number of patients who screened positive. Most evidence of moderate to high strength pertains to studies that evaluated strategies for improving screening and counseling for substance use.

Findings of low or insufficient evidence suggest that compared with minimal or no implementation, various approaches led to improved rates of screening, responses to positive screens, and initiation of treatment. Specifically, engaging in learning collaboratives increased screening rates for depression and eating disorders.[18, 19, 21] Clinician support resulted in higher depression screening rates and more frequent brief interventions for depression.[20] Support for clinicians to implement general behavioral health screening also led to higher rates of counseling for moderate- and high-risk behaviors (e.g., for alcohol and drug use, depression).[11, 12] Incorporating behavioral health into primary care settings enhanced screening for general behavioral health risks and facilitated treatment initiation.[16] Leveraging technology to screen patients electronically and aggregate responses into an online report to guide providers during patient encounters increased screening for risky behavior and mental health concerns.[17] Only one study assessing clinician support, however, reported on patient outcomes. Based on evidence of high and moderate strength, clinician support did not reduce risk behaviors despite an increase in counseling compared with the distribution of educational materials.[11, 12]

Studies comparing different types of implementation approaches reported comparable effectiveness with occasional exceptions in individual outcomes. Evidence of high or moderate strength demonstrated that clinician support and behavioral health incorporation had comparable effectiveness in enhancing screening and brief advice.[14] Brief interventions for substance use, however, were utilized more frequently with clinician support than behavioral health incorporation.[14] Evidence of moderate strength found comparable time to first post-visit use of alcohol and cannabis when employing clinician support with computer-based reminders as an implementation strategy versus technology without reminders for low-risk youth.[13] There was low strength of evidence that providers in the clinician support with reminders arm delivered brief advice and provided information on health risks of alcohol and cannabis use more often than providers in the technology support without reminders arm. Strength of evidence was moderate for increased time to alcohol or cannabis use among youth at increased risk of alcohol and substance use when delivered with clinician support and reminders compared to technology without reminders.[13]

Although the addition of behavioral health incorporation to clinician support did not result in increased screening, it increased the frequency of brief interventions while it simultaneously reduced referrals to specialty treatment.[15] These findings are based on high strength of evidence for screening, moderate strength of evidence for brief intervention, and low strength of evidence for referral to specialty treatment.

Only one study examined the impact of an implementation strategy on equity, finding that clinician support increased screening without exacerbating inequity among historically marginalized patients based on race and ethnicity.[20]

We did not identify any studies on implementation of screening for anxiety or maternal depression among teenage mothers. Furthermore, none of the included studies assessed the acceptability or feasibility of the implementation approaches used nor were patients' quality of life or adverse events assessed.

Table ES-1. Summary of effects of implementation strategies

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Screening and Brief Intervention for Depression and Suicide Risk			
Learning collaborative (screening or SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=2[19, 21] • A learning collaborative may increase screening, but the evidence is very uncertain (insufficient SOE). **Sustainability**: k=2[19, 21] • A learning collaborative may lead to a sustainable increase of screening, but the evidence is very uncertain (insufficient SOE).	**Equity:** No evidence **Address positive screen:** k=1[19] • A learning collaborative may have little to no effect on the provision of an initial plan of care for patients screening positive, but the evidence is very uncertain (insufficient SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Support clinicians (screening) vs. no strategy	**Acceptability:** No evidence **Feasibility**: No evidence **Reach**: k=1[20] • Providing support to clinicians may increase screening, but the evidence is very uncertain (insufficient SOE). **Sustainability:** No evidence	**Equity:** k=1[20] • Providing support to clinicians may have little to no effect on inequity, but the evidence is very uncertain (insufficient SOE). **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Screening for Eating Disorders			

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Learning collaborative (screening) vs. distribute educational materials only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[18] • A learning collaborative may increase screening, but the evidence is very uncertain (insufficient SOE). • A learning collaborative may increase screening in high-risk patients, but the evidence is very uncertain (insufficient SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Screening and Counseling for Alcohol, Tobacco, and Other Substance Use			

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Behavioral health Incorporation vs. clinician support	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[14] <u>Screening</u> • Behavioral health incorporation and clinician support have comparable effectiveness in increasing screening (high SOE). **Sustainability:** k=1[14] <u>Screening</u> • Behavioral health incorporation and clinician support have comparable effectiveness in sustaining screening (high SOE). <u>Brief advice</u> • Behavioral health incorporation and clinician support may have comparable effectiveness in sustaining provision of brief advice (low SOE). <u>Brief intervention</u> • Behavioral incorporation may result in less sustained provision of brief interventions than clinician support (low SOE).	**Equity:** No evidence **Address positive screen:** k=1[14] <u>Brief advice</u> • Behavioral health incorporation and clinician support may have comparable effectiveness in increasing the provision of brief advice (low SOE). <u>Brief intervention</u> • Behavioral incorporation may be less effective in increasing the provision of brief interventions than clinician support (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Incorporation via an embedded BHCP plus clinician support (SBIRT) vs. clinician support only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[15] <u>Screening</u> • Behavioral health incorporation when added to clinician support does not improve screening (high SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[15] <u>Brief intervention</u> • Behavioral health incorporation when added to clinician support probably increases the provision of brief interventions (moderate SOE). <u>Referral to specialty treatment</u> • Behavioral health incorporation via an embedded BHCP probably reduces referrals to specialty treatment (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Clinician support (SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[15] <u>Brief intervention</u> • Clinician support likely increases the provision of brief interventions (moderate SOE). <u>Referral to specialty treatment</u> • Clinician support may have little to no impact on referrals to specialty treatment (low SOE). **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Clinician support including computer-based reminders (SBI) vs. technology without reminders	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[13] Brief advice: k=1[13] • Support for clinicians with computer-based reminders likely improves delivery of brief advice for alcohol use and cannabis use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders likely improves delivery of information about health risks of alcohol use and cannabis use among high-risk adolescents (moderate SOE). **Initiation of treatment:** No evidence	**Mental health**: k=1[13] Alcohol use • Support for clinicians with computer-based reminders likely increases the time to first post-visit alcohol use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders probably has little to no effect on time to post-visit alcohol use among low-risk adolescents (moderate SOE). Heavy episodic drinking • Support for clinicians with computer-based reminders probably has little to no effect on the time to first post-visit heavy episodic drinking among high-risk adolescents (moderate SOE). Cannabis use • Support for clinicians with computer-based reminders is likely to increase the time to first cannabis use among high-risk adolescents (moderate SOE). • Support for clinicians with computer-based reminders probably has little to no effect on time to first cannabis use among low-risk adolescents (moderate SOE). **Quality of life:** No evidence **Adverse events:** No evidence
General Behavioral Health Risk Factors			

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Technology-based implementation approach (SBI) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[17] • A technology-based implementation approach may increase screening and brief intervention for risky behaviors, but the evidence is very uncertain. (insufficient SOE). • A technology-based implementation approach may increase screening and brief intervention for mental health concerns, but the evidence is very uncertain (insufficient SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** No evidence **Initiation of treatment:** No evidence	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence
Clinician support-based implementation approach (SBI) vs. distribute educational materials only	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** No evidence **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=2[11, 12] • A clinician support-based implementation approach is likely to increase counseling for moderate-risk behaviors (high SOE) • A clinician support-based implementation approach is likely to increase counseling for high-risk behaviors (high SOE) **Initiation of treatment:** No evidence	**Mental health:** k=2[11, 12] • A clinician support-based implementation approach has little to no effect on risk behaviors at 3-month followup (high SOE). • A clinician support-based implementation approach probably has little to no effect on risk behaviors at 6-month followup (moderate SOE). **Quality of life:** No evidence **Adverse events:** No evidence

Implementation Strategy (clinical intervention) vs. Comparator	Implementation Outcomes	Service Outcomes	Patient Outcomes
Incorporation-based implementation approach, with learning collaborative (SBIRT) vs. no strategy	**Acceptability:** No evidence **Feasibility:** No evidence **Reach:** k=1[16] • A combined incorporation and learning collaborative implementation approach may increase screening rates, but the evidence is very uncertain (insufficient SOE). **Sustainability:** No evidence	**Equity:** No evidence **Address positive screen:** k=1[16] • A combined incorporation and learning collaborative implementation approach may increase followup via primary care behavioral health visits, but the evidence is very uncertain (insufficient SOE). **Initiation of treatment:** k=1[16]) • A combined incorporation and learning collaborative implementation approach may increase psychotherapy visits with a specialist, but the evidence is uncertain (low SOE). • A combined incorporation and learning collaborative implementation may have little to no effect on increase in guideline-congruent ADHD prescribing, but the evidence is very uncertain (insufficient SOE). • A combined incorporation and learning collaborative implementation approach may increase guideline-congruent SSRI prescribing, but the evidence is very uncertain (insufficient SOE).	**Mental health:** No evidence **Quality of life:** No evidence **Adverse events:** No evidence

ADHD = attention deficit hyperactivity disorder; BHCP = behavioral health care practitioner; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI = selective serotonin reuptake inhibitors.

Limitations

The evidence assessing the effectiveness of implementation strategies is limited in quality and quantity. More than half of the included studies exhibited high risk of bias and many outcomes were rated as insufficient strength of evidence, indicating that clear conclusions cannot be drawn. The evidence on patient outcomes and inequity in the delivery of recommended interventions for populations at risk for disparities was particularly limited.

By its nature, implementation science work poses great challenges because it involves multifaceted strategies and wide arrays of outcomes that require significant application of judgment when being synthesized. None of the studies evaluated the burden imposed on clinicians, which could vary significantly among different implementation strategies and could be the determining factor of whether the effectiveness of implementation strategies is sustainable over time.

Implications and Conclusions

The identified implementation approaches may improve some aspects of addressing mental health and substance use disorders in primary care, particularly in increasing screening and brief interventions. The evidence, however, is uncertain. Different types of implementation strategies appear to have comparable effectiveness with occasional exceptions in individual outcomes.

However, it is not currently possible to draw definitive conclusions. This is due to lack of data for certain conditions addressed in the USPSTF and Bright Futures guidelines, missing data for certain outcomes (particularly equity), and many areas of low or insufficient strength of evidence. Decision makers initiating implementation strategies to enhance mental health and substance use screening and counseling in children and adolescents should prioritize strategies backed by available evidence, even in cases where certainty is limited. Future studies need to address a broader array of outcomes, including sustainability and clinician burden. These trials would assess the comparative effectiveness of various strategies as well as their general effectiveness when compared to no specific implementation strategy.

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1. Introduction

1.1 Background

Mental health and substance use disorders are common among children and adolescents in the United States, with nearly 20 percent experiencing a mental health disorder in a given year.[1] The prevalence of some mental health disorders among children and adolescents is increasing;[2-4] for example, the number of children and adolescents diagnosed with anxiety and depression grew by nearly 30 percent each between 2016 and 2020.[5] This trend was further exacerbated during the COVID-19 public health emergency.[5-8] For example, mental health–related emergency department visits increased 24 percent for children ages 5 to 11 years and 31 percent for those ages 12 to 17 years from March 2020 to October 2020 compared with 2019 emergency department visits.[7] Moreover, the burden of mental health disorders is not equitably distributed. Children and adolescents of color; from low-income households; who identify as lesbian, gay, bisexual, transgender, queer or questioning, intersex, or asexual (LGBTQIA+); who have disabilities; or who have a combination of these factors[9-11] face a disproportionately higher burden of these disorders.[12]

Untreated or poorly managed mental health disorders among children and adolescents have significant consequences, including reduced long-term quality of life[13] and higher mortality.[14] However, despite the high prevalence and the negative impacts of these disorders, fewer than half of children and adolescents with mental health disorders receive any treatment, and nearly half perceived an unmet need for mental health services in 2022.[15-18]

Primary care settings, traditionally focused on prevention and family-centered care, offer an opportunity to intervene by using preventive mental health interventions ranging in scope from brief risk assessments or symptom screenings to more in-depth counseling to avoid the progression of the condition. There has been a growing emphasis to increase investment in prevention of mental health disorders in these settings, including the Patient Protection and Affordable Care Act and the Mental Health Parity and Addiction Equity Act, which have expanded access to preventive and other mental health services.[19, 20] Furthermore, although mental health services have often been isolated from primary care, leading to fragmented and uncoordinated care in the past, there is now a shift toward incorporating physical and behavioral mental healthcare in the primary care setting.[21]

1.1.1. Current Guidance for Implementing Preventive Mental Health Interventions for Children and Adolescents

The American Academy of Pediatrics, through its Bright Futures initiative, and the U.S. Preventive Services Task Force (USPSTF) are two groups that make recommendations about which preventive services should be offered in primary care settings. The Bright Futures Periodicity Schedule and the USPSTF recommend screening and counseling for mental health disorders, including substance use disorders, among children and adolescents. Identification through screening and early management may increase access to appropriate services, increase positive behaviors, minimize the severity and progression of illness, and ultimately improve health and quality of life outcomes for children and adolescents.[22, 23] For instance, screening for a particular mental health disorder among children and (e.g., depression) can serve as a preventive measure for a second condition (e.g., substance use disorder) and decrease the potential long-term outcomes associated with untreated mental illness (e.g., risk of school dropout and juvenile

justice system involvement).[24, 25] Unfortunately, there has been limited implementation of evidence-based preventive mental health interventions in primary care[26] due to myriad barriers such as limitations in primary care providers' attitudes and knowledge of interventions and ability to address mental health during the primary care visit, limited time and resources to compensate for the increased workload, poorly defined incorporated staff roles, inadequate coordination between physical and mental health providers, lack of mental health providers, and limited or uncertain reimbursement for services.[27]

1.1.2. Implementation Strategies as a Way to Increase Evidence-Based Screening and Counseling for Mental Health Disorders

Implementation science, defined as the study of methods to promote the systematic adoption of research findings and other evidence-based practices into routine practice,[28] is well-positioned to address this significant research-to-practice gap. Implementation strategies, which are methods or techniques used to enhance implementation outcomes such as adoption, reach, and sustainability, offer a pathway to improve the implementation of preventive mental health interventions into practice.[29] Moreover, implementation strategies also have the potential to address the inequitable burden of mental health disorders across different historically marginalized groups of children and adolescents. By centering health equity within the design, selection, and application of implementation strategies, they can be harnessed and adapted to improve the equitable uptake of recommended preventive mental health interventions. However, deciphering which strategies are appropriate for a given implementation goal and the ways in which they need to be tailored for primary care settings is not easily determined based on the range of possible strategies and the settings in which they have been tested. Consequently, it is still necessary to identify and understand which implementation strategies are effective in implementing recommended preventive mental health interventions into primary care.

Implementation strategies should ideally be selected and tailored to specific populations, settings, or determinants (i.e., barriers and facilitators[30]) to increase the likelihood of successful implementation. For example, implementing screenings in school-based mental health settings may require adapted or entirely different strategies[31] than when implementing them in traditional primary care settings, as each setting has its own unique challenges and contextual considerations.[32] Some implementation strategies can be classified as discrete implementation strategies, which are single techniques such as distributing educational materials, implementing reminders to prompt screening or counseling, or creating a new clinical team.[33] However, given that implementation is inherently multilevel (e.g., occurring across patients, caregivers, providers, or practices), implementation strategies are more often multifaceted, which combines multiple discrete strategies to improve implementation outcomes across levels (e.g., feasibility at the practice level and fidelity at the provider level) to ultimately improve health outcomes for children and adolescents.[33]

1.2 Purpose and Scope of the Systematic Review

This systematic review was commissioned in response to a renewed focus and investment from the Federal Government to address the youth mental health crisis. Although there is some evidence on the effectiveness of different preventive mental health interventions,[34] there is limited guidance for implementing preventive mental health interventions in primary care settings to reproduce successful implementation in practice. This systematic review will identify

implementation strategies that are effective for implementing recommended preventive interventions for mental health disorders, including substance use disorders, for children and adolescents into primary care.

2. Methods

2.1 Review Approach

Our methods followed the Agency for Healthcare Research and Quality (AHRQ) Methods Guide for Effectiveness and Comparative Effectiveness Reviews. Because no specific guidance for reviews on implementation strategies is available, we adapted the guidance by employing classifications for interventions and comparators as outlined by the Expert Recommendations for Implementing Change (ERIC)[35] and the Effective Practice and Organisation of Care (EPOC) taxonomy.[36, 37] Our reporting adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guideline[38] and the extensions for reporting complex interventions[39] and equity.[40] To determine study designs of nonrandomized studies, we used criteria proposed by AHRQ for the classification of study designs.[41]

To refine the scope of the review and the protocol, we worked with Key Informants (KIs) and a Technical Expert Panel (TEP). The seven KIs consisted of mental health clinicians and researchers, patient and family advocates, and payers and policymakers. An important task of the KIs was to select outcomes that are relevant to assess the effectiveness of implementation strategies, as well as other outcomes that are important for children, adolescents, and their families. A search in the Core Outcome Measures in Effectiveness Trials (COMET) database did not find relevant core outcome sets for this topic. The TEP consisted of a distinguished group of seven implementation scientists and clinicians with experience in preventive mental healthcare for children and adolescents. Some TEP members also had expertise in equity and evidence synthesis. TEP members participated in a conference call and discussions through email to review the logic model, Key Questions (KQs), and PICOTS (population, interventions, comparators, outcomes, timing, and setting).

The final protocol was posted on AHRQ's Effective Health Care website from December 8, 2023, to January 5, 2024. We posted a Supplemental Evidence and Data for Systematic Reviews (SEADS) notice on the Effective Health Care Program website for 4 weeks to receive supplemental evidence and data from the public. The protocol was registered with Prospero (CRD42024499342). Additional details on methods are reported in Appendix A.

2.1.1. Key Questions

This review included one KQ:

KQ 1. What is the impact of strategies to implement recommended screening and counseling interventions to prevent mental health and substance use disorders in primary care settings for children and adolescents?

a. Do the characteristics of the population, settings, care delivery, or implementation strategy lead to varying impacts in different population subgroups?

b. Can implementation strategies improve equity in the delivery of recommended interventions to prevent mental health disorders for populations at risk for disparities (e.g., those of minority race, ethnicity, gender identity, and sexual orientation, and those with physical disabilities and low socioeconomic status)?

To assess the potential applicability of studies conducted outside the United States, we summarized non-U.S. studies captured by our literature search that meet other inclusion criteria using a Contextual Question (CQ):

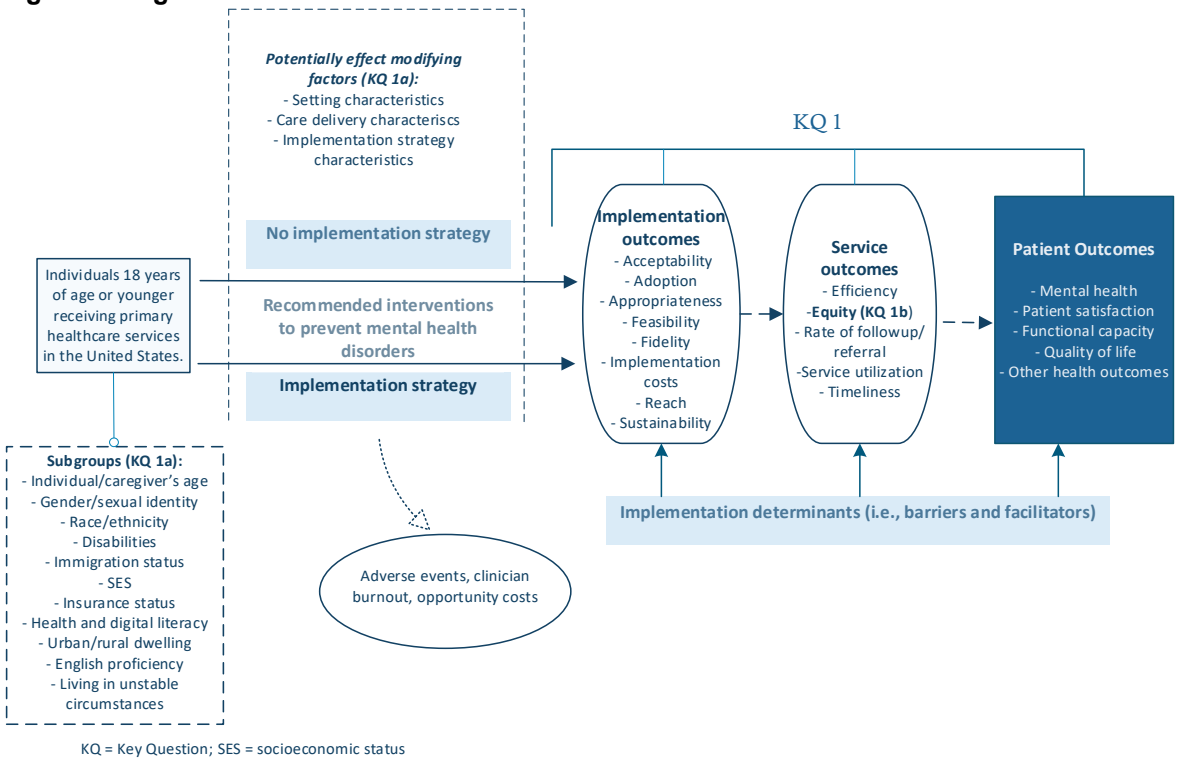
CQ 1. What strategies for implementing interventions to prevent mental health disorders (including substance use disorders) in primary care settings for children and adolescents were examined in seminal studies conducted outside the United States?

a. What are the findings of these seminal studies?

2.1.2. Logic Model

We developed a logic model to guide the systematic review process (**Figure 1**). As shown in Figure 1, we categorized our outcomes of interest as implementation, service, and patient outcomes.[42] Implementation outcomes were defined as the effects of implementing interventions to prevent mental health disorders (including substance use disorders), measured by acceptability, adoption, appropriateness, feasibility, fidelity, implementation costs, reach, and sustainability. Service outcomes were defined as the extent to which services are efficient, equitable, effective, or timely.[42] Patient outcomes were defined as the impact on the patient and measured by patient mental health, patient satisfaction, functional capacity, quality of life, or any other reported health outcomes.

Figure 1. Logic model



KQ = Key Question; SES = socioeconomic status

2.2 Study Selection

2.2.1. Inclusion and Exclusion Criteria

We developed inclusion and exclusion criteria with respect to PICOTS for the KQ. They are listed in detail in **Table A-5**. Briefly, our population of interest was individuals 18 years of age or younger receiving primary healthcare services (we also included studies with a mix of patients both younger than and older than 18 years of age if at least 80 percent of the population was younger than 21 years of age). We focused on clinical interventions that are recommended in the Bright Futures Periodicity Schedule, developed by the American Academy of Pediatrics, and by the U.S. Preventive Services Task Force (USPSTF) to prevent mental health disorders (including interventions with insufficient evidence). We used the Bright Futures Periodicity Schedule and the USPSTF recommendations because, together, they provide a comprehensive, evidence-based framework for mental health preventive interventions in children and adolescents in the United States.

The eligible interventions encompassed all strategies aimed at implementing clinical interventions designed to prevent mental health disorders. We classified implementation strategies using the ERIC[35] and the EPOC taxonomy.[36, 37] Comparators were other implementation strategies or no implementation strategies.

We categorized our other outcomes of interest as implementation, service, and patient outcomes.[42]

2.2.2. Search Strategy

To identify articles relevant to the KQ and Contextual Question, we conducted a focused PubMed/ MEDLINE search for studies published from January 1, 2010, through October 6, 2023, by using a variety of terms, including Medical Subject Headings (MeSH) and related keywords and phrases, and by limiting the search to English-language studies, studies involving children and adolescents (18 years of age or younger), and human-only studies. We selected 2010 as the starting date for the literature searches because implementation strategies for preventive behavioral and mental health services have evolved significantly since the passage of the Patient Protection and Affordable Care Act.[19, 20] We also searched the American Psychiatric Association (APA) PsycInfo, the Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature, and Embase (for primary studies only) using analogous search terms. The PubMed search strategy was peer reviewed by another Evidence-based Practice Center librarian. For the PubMed search, we removed studies conducted in low- and middle-income countries with the validated National Institute for Health and Care Excellence Organisation for Economic Co-operation and Development countries geographic search filter.[43] We focused the search on high-income countries because of their greater applicability to the U.S. healthcare system.

Additionally, we searched the gray literature for unpublished studies relevant to this review. Gray literature sources included ClinicalTrials.gov, Greynet.org, the Trip Medical Database, Google Advanced Search, and the literature collection on AHRQ's Academy for Integrating Behavioral Health and Primary Care website.

To avoid retrieval bias, we conducted supplementary searches in reference lists of landmark studies and relevant reviews, editorials, and commentaries on this topic to look for any relevant citations that might have been missed by electronic searches.

Appendix A provides a detailed explanation of the search strategy, including the search strings for all databases.

2.2.3. Literature Screening

We used DistillerSR for literature screening, leveraging its artificial intelligence (AI) capabilities to continually prioritize abstracts with a high likelihood of meeting our inclusion criteria. Two investigators independently screened the top 70 percent of these prioritized abstracts against predefined inclusion and exclusion criteria. For the remaining 30 percent of abstracts, we substituted one investigator with DistillerSR's AI function that had been trained based on the investigator's selections of the dual-screening abstracts. Any discrepancies between human investigators and DistillerSR were resolved through review by an additional investigator. We also employed DistillerSR's AI function to check for screening errors to vet dual exclusions of abstracts. Studies marked for possible inclusion underwent a full-text review. For studies without adequate information to determine inclusion or exclusion, we retrieved the full text. All results were tracked in DistillerSR.

Two trained team members independently reviewed each full-text article for inclusion or exclusion based on the eligibility criteria. If both reviewers agreed that a study did not meet the eligibility criteria, the study was excluded. Conflicts in decisions were resolved by discussion and consensus or by consulting a third member of the review team. We recorded the reasons for exclusions of full-text publications.

2.3 Data Extraction

We extracted data using DistillerSR and organized relevant information, including characteristics of study populations, settings, clinical interventions, potential barriers and facilitators to their implementation, implementation strategies, comparators, study designs, methods, and results, into evidence tables.

To provide users of our review with the necessary information to determine the applicability of findings, we extracted detailed data on contexts,[44] settings, interventions,[44] and implementation strategies. We used Proctor et al.'s recommendations for specifying implementation strategies[29] to guide our data abstraction and reporting so that end users of the review can operationalize the strategies in practice and replicate their effectiveness.

Further details on the data extraction process are available in **Appendix A**.

2.4 Risk of Bias Assessment

To assess risk of bias, we used the Cochrane Risk of Bias 2 (RoB 2.0) tool for individually randomized parallel-group trials,[45] the RoB 2 extension for cluster-randomized parallel-group trials (RoB 2 CRT),[45] the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool[46] for nonrandomized studies of interventions with concurrent controls, and the Effective Public Health Practice Project tool[47] for interrupted time series analysis. Two reviewers independently assessed the risk of bias at the study and outcomes level. They resolved discrepancies by consensus or by involvement of a third, senior investigator.

At the outset of rating the risk of bias, we specified the effect of adherence as our primary perspective of interest, focusing on the impact of adhering to an implementation strategy, rather than solely considering the effect of assignment to such a strategy. We adopted this perspective because we recognize that failures in implementing an implementation strategy and

nonadherence can significantly influence the outcomes of clinical preventive interventions that have already demonstrated their effectiveness.

Because the risk of bias tools that we employed used different terminologies for different risk of bias categories, we harmonized the terminologies for our report. Specifically, we collapsed ROBINS-I ratings of *serious* and *critical* risk of bias into one category and refer to it as *high risk of bias* to be consistent with the RoB 2 tool. In addition, we changed ROBINS-I ratings of *moderate* risk of bias and EPOC ratings of *unclear* risk of bias to *some risk of bias concerns.* We use the RoB 2 classification of risk of bias ratings*: low risk of bias, some risk of bias concerns,* and *high risk of bias.* **Appendix A** presents the definitions of the risk of bias categories.

2.5 Data Synthesis and Analysis

We summarized data narratively, structuring the synthesis of the evidence by clinical interventions and following the Cochrane EPOC[36, 37] and the ERIC[35] frameworks. An implementation scientist merged the ERIC[35] and EPOC[36, 37] frameworks into a single comprehensive framework, combining similar strategies across the two frameworks where appropriate (**Table A-7**). Two implementation scientists independently coded implementation strategies and overarching implementation approaches reported in each included study according to the adapted framework and resolved disagreements through adjudication. As the overarching implementation approaches were multifaceted with studies often utilizing multiple implementation strategies, studies were classified based on the primary implementation strategy employed.

If we found three or more similar randomized controlled trials (RCTs) addressing an outcome of interest, we considered meta-analysis of the data from those studies. When only two similar RCTs were identified for meta-analysis, we considered fixed effects models to estimate pooled effects.[48] To determine whether quantitative analyses were appropriate, we assessed the contextual, clinical, and methodological heterogeneity of the studies under consideration following established guidance.[49] We assessed statistical heterogeneity in effects between studies by calculating the chi-squared statistic and the I^2 statistic (the proportion of variation in study estimates attributable to heterogeneity).[50, 51] We initially planned to assess publication bias through funnel plots and Egger's test. However, due to the limited number of studies, a formal assessment of publication bias was not feasible.

To leverage the expected heterogeneity, we intended to use Qualitative Comparative Analysis (QCA)[52] to identify potential relationships between implementation strategies and the desired outcomes. Because of few studies, we were not able to conduct QCA.

2.6 Grading the Strength of the Body of Evidence

We rated the strength of evidence (SOE) based on the guidance established by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group.[53] We asked the Technical Expert Panel to rate the relative importance of outcomes using a modified Delphi approach. Panel members rated the importance of outcomes on a Likert scale from 1 to 9, where 1 is the least important and 9 the most important for decision making. **Table A-8** presents results of the ratings for each of the three categories. We rated the SOE for the three outcomes with the highest mean rating from each outcome type, which included equity, address a positive screen (other than through initiation of treatment), mental health, acceptability, quality of life,

adverse events, feasibility, sustainability, and initiation of treatment. We also rated the SOE for reach, which was identified by our implementation scientists as another important outcome for decision making. **Table 1** presents definitions and examples for the 10 prioritized outcomes, and **Table A-9** presents the definitions of SOE ratings.

Table 1. Prioritized outcomes

Prioritized Outcome	Definition	Examples
Implementation outcomes		
Acceptability	Satisfaction with the clinical intervention being implemented	Provider satisfaction with screening, SBI, or SBIRT process
Feasibility	Fit or suitability of the clinical intervention for everyday use in the setting in which it was implemented	Provider perception of intervention feasibility
Reach	Access to the clinical intervention being implemented	Proportion of patients appropriately screened
Sustainability	Maintenance of the clinical intervention in the setting in which it was implemented	Impacts on other implementation outcomes (e.g., increase in screening rates) sustained overtime
Service outcomes		
Address a positive screen[a]	Immediate, intermediate step taken by provider in response to screening results that meet an established threshold	Proportion of patients who screened positive who were provided brief intervention, an initial plan of care, or a referral to specialist
Initiation of treatment	Subsequent steps initiated for patients requiring treatment	Started psychotherapy; received guideline-congruent prescription
Equity	Delivery (including reach, fidelity) of the clinical intervention does not vary by patient characteristics	Differences in any relevant outcomes by subgroup (e.g., race/ethnicity, gender)
Patient outcomes		
Mental health	Severity of a patient's risk factors or symptoms regarding their psychological and emotional well-being	Risk behaviors at followup (not at initial screening)
Quality of life	Extent to which a patient is healthy, comfortable, and able to enjoy life	Physical, social, emotional, or functional well-being
Adverse events	Unfavorable outcome experienced by a patient receiving the clinical intervention	Suicide attempt

[a] To facilitate synthesis, delivering brief advice or intervention based on screening results and providing a referral were categorized as addressing a positive screen regardless of whether studies were implementing screening only, SBI, or SBIRT (rather than as fidelity for interventions that included a clear process for when to deliver brief advice or intervention or when to refer patients).
SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

2.7 Peer Review and Public Commentary

Experts in clinical prevention for children and adolescents and implementation, and individuals representing stakeholder and user communities will be invited to provide an external peer review of this systematic review. AHRQ and an associate editor will also provide comments. The draft report will be posted on the AHRQ website for 4 weeks to elicit public comment. We will address all reviewer comments and revise the text as appropriate. A disposition of comments table of peer and public comments will be posted on the Effective Health Care website after AHRQ posts the final systematic review.

2.8 Use of Artificial Intelligence and/or Machine Learning

During abstract screening, we used DistillerSR's AI capabilities to continually prioritize abstracts with a high likelihood of meeting our inclusion criteria. For the bottom 30 percent of

prioritized abstracts (i.e., abstracts with the least likelihood for inclusion), one investigator was substituted with DistillerSR's AI function for screening. Any discrepancies between human investigators and DistillerSR were resolved through review by an additional investigator. We also used DistillerSR's AI function to check for screening errors to reduce the risk of falsely excluded abstracts.

3. Results

We included 11 studies reported in 15 publications for Key Question (KQ) 1.[54-68] We report detailed study and population characteristics of the studies included for KQ 1 in **Appendix B**. Clinical interventions of included studies focused on screening and brief intervention for depression and suicide risk,[54, 56, 63] eating disorders,[66] substance use,[61, 65, 68] and general behavioral health risk factors.[55, 59, 64, 67] Four studies implemented screening only,[54, 63, 66, 67] four employed screening, brief intervention, and referral to treatment (SBIRT),[55, 56, 61, 68] and three studies utilized screening and brief intervention (SBI) as clinical interventions.[59, 64, 65] We included two studies for Contextual Question (CQ) 1,[69, 70] which were synthesized separately and described in **Section 3.2**.

There are five randomized controlled trials (RCTs) and six studies with other study designs. Among the RCTs, three studies were randomized at the individual level[59, 64, 65] and two were cluster RCTs.[61, 68] Among the other study designs, there were four were nonrandomized controlled trials,[54, 63, 66, 67] one stepped-wedge trial,[55] and one interrupted time series (ITS).[56] Studies allocated a range of 163 to 8,108 participants, 22 to 354 providers, and 4 to 59 practices.

Study participants ranged from 10 to 21 years of age and five studies reported a mean patient age between 14 and 15 years.[54, 61, 64, 65, 68] Eight studies reported roughly equal proportions of male and female participants,[54, 59, 61, 63-65, 67, 68] and three studies did not report on sex.[55, 56, 66] Seven studies reported the race/ethnicity breakdown of participants,[54, 55, 59, 64, 65, 67, 68] four of which were relatively similar to the general U.S. population.[54, 55, 59, 64] Compared to U.S. demographics, one study reported a relatively higher proportion of Black participants (56%),[67] one reported a relatively higher proportion of Hispanic participants (26%),[65] and one study reported a relatively higher proportion of Black, Asian, and Hispanic participants (71%).[68] Four studies were conducted in Massachusetts,[54, 55, 65, 66] two in Washington,[59, 64] one in California,[68] one in rural Ohio,[56] one in urban Maryland,[61] one in a mix of rural and urban practices in Vermont,[63] and one in a mix of rural and urban practices in Florida.[67]

All included studies were categorized into one of four overarching implementation approaches: behavioral health incorporation,[55, 61, 68] learning collaboratives,[55, 56, 63, 66] clinician support,[54, 59, 64, 68] or technology to facilitate screening or brief intervention.[65, 67] Studies were classified based on the primary implementation strategy employed (**Table 2**), and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology. For instance, an overarching implementation approach that adds new team members to incorporate behavioral health into a primary care approach defaults to behavioral health incorporation over other approaches such as learning collaboratives or the use of technology.

Table 2. Definitions of overarching implementation approaches

Implementation Approach	Primary Strategies Involved	Definition of Primary Strategies[35-37]
Behavioral health incorporation	Create new clinical team	Change who serves on the clinical team, adding different disciplines and different skills to make it more likely that the intervention is delivered or is more successfully delivered

Implementation Approach	Primary Strategies Involved	Definition of Primary Strategies[35-37]
Learning collaborative	Engage in learning collaborative and provide facilitation/consultation or conduct cyclical tests of change	Facilitate formation of groups of providers or provider organizations and foster a collaborative learning environment to improve implementation of the intervention
		Provide interactive problem-solving or ongoing consultation with experts to support intervention implementation through a supportive interpersonal relationship
		Implement changes in a cyclical fashion using small tests of change before implementing changes system-wide
Clinician support	Facilitate relay of clinical data to providers or provide reminders	Provide as close to real-time data as possible about key measures of process/outcomes in a way that promotes use of the targeted innovation
		Develop reminder systems designed to help clinicians recall information or prompt them to use the intervention
Technology	Use technology or change infrastructure	Technology-based methods to transfer healthcare information and support the delivery of care

Studies compared the implementation approaches to no approach,[54-56, 63, 67, 68] a minimal implementation approach (distributing information material),[59, 64, 66]or other implementation approaches.[61, 65, 68]

Seven studies were supported by public funding,[59, 61, 63-65, 67, 68] one each by a private foundation[54] and private hospital,[55] and one by a professional society.[66] One study did not report a funding source.[56]

Risk of bias assessments of included studies and relevant justifications are reported in **Appendix C**. We rated one study with low risk of bias,[61] four studies with some concerns of bias,[59, 64, 65, 68] six studies with high risk of bias.[54-56, 63, 66, 67] Risk of bias concerns were mostly because of uncontrolled potential confounding in nonrandomized studies.

3.1 Key Question 1. Strategies to Implement Recommended Screening and Counseling Interventions for Mental Health and Substance Use Disorders

We organized findings for the KQ by clinical interventions, summarizing the effectiveness of specific implementation strategies on screening for depression, screening for eating disorders, screening and counseling for substance use, and screening for general behavioral health risk factors. Within each section for a clinical intervention, we begin by detailing the characteristics of the included studies. This includes a brief table summarizing the specific implementation strategies used (**Appendix B** provides a detailed presentation of the implementation approaches). We then present an overview of potential barriers and facilitators. Finally, we summarize the results concerning implementation, service delivery, and patient outcomes.

Due to the limited evidence directly addressing the two subquestions of KQ 1, we have opted not to present these findings separately. Instead, we integrate this evidence into the summary for the main KQ. **Appendix D** presents strength of evidence ratings for outcomes rated as critical or important for decision making.

Table 3 summarizes characteristics of included studies and effects of the implementation strategies. Detailed tables presenting abstracted outcome data from each included study and forest plots of meta-analyses are reported in **Appendix E**.

Table 3. Summary of study characteristics and intervention effects of included studies

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach (N practices, N providers, N patients)	Comparator Strategy (N practices, N providers, N patients)	Intervention Effects (implementation vs. control) Strength of Evidence
Depression				
Dalal 2023[54] NRSI with high risk of bias	2-stage screening (for depression and suicide risk)	Support clinicians (9 practices, 18 providers, 891 patients)	No strategy (9 practices, 14 providers, 1,721 patients)	Patients screened 93.8% vs. 89.1% (p<0.001) Insufficient SOE for greater effectiveness of implementation strategy Equity Comparable screening rates between racial minorities and White children (94.5% vs. 94.7%; 89.7% vs. 90.7%) Insufficient SOE for comparable effectiveness
Harder 2019[63] NRSI with high risk of bias	Screening (for depression and suicide risk)	Learning collaborative (17 practices, providers NR, 792 patients)	No strategy (21 practices, providers NR, 772 patients)	Patients screened 90% vs. 75% (p<0.001) Insufficient SOE for greater effectiveness of implementation strategy Screened with a validated tool 77% vs 32% (p<0.001) SOE not rated[a] Initial plan of care 81% vs. 91% (p=0.05) Insufficient SOE for greater effectiveness of comparator strategy
Baum 2020[56] ITS with high risk of bias	SBIRT management bundle	Learning collaborative (4 practices, 22 providers, 1,768 patients)	N/A	Patients screened 0% pre-intervention vs. 81% post-intervention (p=NR) Insufficient SOE for greater effectiveness of implementation strategy Sustainability Over 6 months post-intervention, screening rates remained around 80% Insufficient SOE for greater effectiveness of implementation strategy
Eating Disorders				
Gooding 2017[66] NRSI with high risk of bias	Screening	Learning collaborative (practices NR, 23 providers, 509 patients)	Educational materials (practices NR, 280 providers, 7,592 patients)	Patients screened 22.0% vs. 5.7% (p<0.0001) Insufficient SOE for greater effectiveness of implementation strategy

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach (N practices, N providers, N patients)	Comparator Strategy (N practices, N providers, N patients)	Intervention Effects (implementation vs. control) Strength of Evidence
Gooding 2017[66] NRSI with high risk of bias (continued)				High-risk patients screened 30.0% vs. 8.7% (p=0.9) Insufficient SOE for greater effectiveness of implementation strategy[b]
Substance Use				
Knight, 2019[60, 65] RCT with some bias concerns	SBI (for alcohol, marijuana, and other drugs)	Support clinicians (reminders) (54 allocated [49 analyzed], 628 patients allocated [626 analyzed])	Technology without reminders 243 patients allocated [243 analyzed])	Time to first post-visit alcohol use High-risk patients: adj HR: 0.69 (0.47 to 1.02) Moderate SOE for greater effectiveness of implementation strategy[b] Low-risk patients: adj HR: 0.87 (0.57 to 1.31) Moderate SOE for comparable effectiveness Time to first post-visit heavy episodic drinking High-risk patients: adj HR: 0.66 (0.40 to 1.10) Moderate SOE for comparable effectiveness Time to first post-visit cannabis use High-risk patients: adj HR: 0.62 (0.41 to 0.94) Moderate SOE for greater effectiveness of implementation strategy Low-risk patients: adj HR: 0.76 (0.44 to 1.32) Moderate SOE for comparable effectiveness Brief advice for high-risk patients Brief advice for avoiding alcohol use: 105/148 (70.9%) vs. 36/63 (57.1%); adj RR: 1.21 (0.95 to 1.52) Moderate SOE for greater Effectiveness of implementation strategy Brief advice for avoiding cannabis use: 122/148 (82.4%) vs. 37/63 (58.7%); adj RR: 1.36 (1.09 to 1.69) Moderate SOE for greater effectiveness of implementation strategy Information about health risks for high-risk patients

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach (N practices, N providers, N patients)	Comparator Strategy (N practices, N providers, N patients)	Intervention Effects (implementation vs. control) Strength of Evidence
Knight, 2019[60, 65] RCT with some bias concerns (continued)				Information about health risks of alcohol use: 132/148 (89.2%) vs. 47/63 (74.6%); adj RR: 1.22 (1.04 to 1.44) Moderate SOE for greater effectiveness of implementation strategy Information about health risks of cannabis use: 117/148 (79.1%) vs. 40/63 (63.5%) adj RR: 1.34 (1.09 to 1.65) Moderate SOE for greater effectiveness of implementation strategy
Mitchell 2020[57, 58, 61, 62] Cluster RCT with low risk of bias	SBIRT (for alcohol and other drugs)	Behavioral health incorporation (3 practices, 15 providers, 5,406 patient visits)	Clinician support only (4 practices, 12 providers, 4,233 patient visits)	<u>Screening provided</u> Implementation phase: 64.1% vs. 59.2% (p=0.52) High SOE for comparable effectiveness Sustainability phase: 73.9% vs. 65.6% (p=NR) High SOE for comparable effectiveness <u>Brief advice provided</u> Implementation phase: 30.4% vs. 28.3%, OR=0.84 (95% CI, 0.26 to 2.70) Low SOE for comparable effectiveness Sustainability phase: 32.9% vs. 35.3% (p=NR) Low SOE for comparable effectiveness <u>Brief intervention provided</u> Implementation phase: 8.1% vs. 38.0%, aOR=0.15 (95% CI, 0.04 to 0.56)[b] Low SOE for greater effectiveness of comparator Sustainability phase: 3.8% vs. 43.8% (p=NR) Low SOE for greater effectiveness of comparator

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach (N practices, N providers, N patients)	Comparator Strategy (N practices, N providers, N patients)	Intervention Effects (implementation vs. control) Strength of Evidence
Sterling 2015[68] Cluster RCT with some bias concerns	SBIRT (for substance use)	Behavioral health incorporation plus clinician support (17 providers allocated [16 analyzed], 1,558 patients allocated [671 analyzed])	Clinician support only (17 providers allocated [14 analyzed], 1,558 patients allocated [584 analyzed])	Screening 24.3% vs. 25.5% (p=0.44) High SOE for comparable effectiveness Brief intervention provided 25.5% vs. 16.4% (p=NR) Moderate SOE for greater effectiveness of implementation strategy Referral to specialty treatment aOR=0.58 (95% CI, 0.43 to 0.78) Low SOE for greater effectiveness of comparator
		Clinician support (17 providers allocated [14 analyzed], 1,558 patients allocated [584 analyzed])	No strategy (18 providers allocated [16 analyzed], 1,769 allocated [616 analyzed])	Brief intervention provided 16.4% vs. 1.8%; OR=10.37 (95% CI, 5.45 to 19.74) Moderate SOE for greater effectiveness of implementation strategy Referral to specialty treatment aOR=1.11 (95% CI, 0.83 to 1.49) Low SOE for comparable effectiveness
General Behavioral Health				
Thompson 2016[67] NRSI with high risk of bias	Screening (for general health risks)	Technology (computerized assessment) (20 practices, providers NR, 99 patients)	No strategy (2 practices, providers NR, 64 patients)	Screening for risky behaviors 0.36 vs. 0.05 (p=0.03) Insufficient SOE for greater effectiveness of implementation strategy Mental health screening 0.42 vs. 0.08 (p<0.01) Insufficient SOE for greater effectiveness of implementation strategy
Richardson 2019[64] RCT with some bias concerns	SBI (broad assessment including alcohol and other drugs and depression)	Support clinicians (relay data) (practices and providers NR, 147 patients allocated [141 analyzed])	Educational materials (practices and providers NR, 153 patients allocated [151 analyzed])	Counseling for moderate or high-risk behaviors aRR = 1.32, 95% CI 1.07 – 1.63 High SOE[c] for greater effectiveness of implementation Risky behaviors 3.25 vs. 2.89 at 3 months (p=0.08) High SOE[c] for comparable effectiveness

Author, Year Study Design and Risk of Bias	Clinical Intervention	Overarching Implementation Approach (N practices, N providers, N patients)	Comparator Strategy (N practices, N providers, N patients)	Intervention Effects (implementation vs. control) Strength of Evidence
Richardson 2021[59] RCT with some bias concerns	SBI (broad assessment including alcohol and other drugs and depression)	Support clinicians (relay data) (practices and providers NR, 145 patients)	Educational materials (practices and providers NR, 155 patients)	Counseling for moderate or high-risk behaviors aRR = 1.36, 95% CI 1.04 – 1.78 High SOE[c] for greater effectiveness of implementation Risky behaviors 2.74 vs. 2.68 at 3 months(p=0.81) High SOE[c] for comparable effectiveness 2.76 vs. 2.58 at 6 months (p=0.45) Moderate SOE for comparable effectiveness
Walter 2021[55] Stepped-wedge trial with high risk of bias	Stepped care via SBIRT (for behavioral, social, and emotional screening)	Behavioral health incorporation (with learning collaborative) (59 practices, 354 providers allocated [125 analyzed], 464 to 28,369 patients per practice)	N/A	Screening for risky behaviors 73.9% vs. 55.6%; aOR=1.25, 95% CI, 1.21 to 1.29 Insufficient SOE for greater effectiveness of implementation strategy Address positive screen 177 vs. 107 primary care behavioral health visits per 1,000 patient years; aRR=1.2, 95% CI, 1.1 to 1.3 Insufficient SOE for greater effectiveness of implementation strategy Initiation of treatment 176 vs. 15 psychotherapy visits per 1,000 patient years; aRR=6.7, 95% CI 5.8 to 7.7 Low SOE for greater effectiveness of implementation strategy 362 vs. 362 guideline-congruent ADHD prescriptions per 1,000 patient years; aRR=1.01, 95% CI, 0.96 to 1.07 Insufficient SOE for comparable effectiveness 190 vs. 57 guideline-congruent SSRI prescriptions per 1,000 patient years; aRR 1.3, 95% CI, 1.2 to 1.4 Insufficient SOE for greater effectiveness of implementation strategy

[a] SOE for screening in this study was assessed only for overall screening.
[b] Difference is not statistically significant.
[c] Data for this outcome were pooled across studies, resulting in a high certainty of evidence.
ADHD = attention deficit hyperactivity disorder; aRR = adjusted risk ratio; aOR = adjusted odds ratio; CI = confidence interval; HR = hazard ratio; ITS = interrupted time series; N = number; NR, not reported; NRSI = non-randomized study of interventions; OR = odds ratio; RCT = randomized controlled trial; RR = risk ratio; SBI = screening and brief intervention; SBIRT = screening,

brief intervention, and referral to treatment; SOE = strength of evidence; SSRI = selective serotonin reuptake inhibitors; vs. = versus.

3.1.1. Key Points

3.1.1.1 Implementation approaches compared with no or minimal implementation strategies

- Learning collaboratives or supporting clinicians may increase screening for depression, potentially leading to a sustainable increase in screening. However, the evidence is very uncertain based on two nonrandomized controlled trials (47 practices, N providers NR) and an ITS study (4 practices, 22 providers) (insufficient strength of evidence [SOE]).

- A learning collaborative may increase screening for eating disorders compared with print-only information. However, the evidence is very uncertain based on a single nonrandomized controlled trial (85 practices, 303 providers) (insufficient SOE).

- A multifaceted approach to clinician support probably improves the provision of brief intervention for substance use or mental health risks (moderate SOE) but not referrals to specialty treatment (low SOE) based on one RCT (30 providers, 1,200 patients).

- Clinician support did not reduce moderate- and high-risk behaviors despite an increase in counseling compared with the distribution of educational materials (600 patients) (high SOE).

- Multifaceted implementation strategies that take an overarching approach like leveraging technology or incorporating behavioral health into primary care may increase screening rates for general behavioral health risk factors, but the evidence is very uncertain from two nonrandomized controlled studies (engaging a total of 81 practices; insufficient SOE leveraging technology and insufficient SOE for incorporating behavioral health).

3.1.1.2 Implementation approaches compared with one another

- Behavioral health incorporation-based approaches and clinician support lead to comparable improvements of screening for alcohol, tobacco, and other drug use (high SOE) based on two RCTs (19 providers, 9,639 visits; 30 providers, 1,255 patients). Likewise, the provision of brief advice may be comparable between behavioral health incorporation and clinician support (low SOE) based on one RCT (19 providers, 9,639 visits).

- The evidence is inconsistent for the effectiveness of adding behavioral health incorporation approaches to clinician support, compared to clinician support alone, in delivering brief interventions for adolescents screening positive for alcohol, tobacco, or other drug use. One RCT (19 providers, 9,639 visits) showed that adding incorporated behavioral health via specialist sites led to fewer brief interventions than clinician support alone (low SOE). Another RCT (30 providers, 1,255 patients) found that adding behavioral health with an embedded provider resulted in more brief interventions

(moderate SOE) and fewer referrals to specialty treatment of tobacco, alcohol, or drug use (low SOE) compared to clinician support only.

- Clinician support with computer-based reminders (NR providers, 869 patients) probably improves delivery of brief advice and provision of information on health risks of alcohol and cannabis use and probably prolongs time to alcohol or cannabis use among high-risk adolescents compared with technology use (computerized screening without reminders) (moderate SOE) based on one RCT. Clinician support with computer-based reminders and technology use without reminders (NR providers, 869 patients) probably lead to comparable time to alcohol or cannabis use among low-risk adolescents, or time to heavy episodic alcohol use among high-risk adolescents (moderate SOE).

- Although supporting clinicians to implement SBI for general behavioral health risks had little to no effect on mental health risk behaviors at followup (based on 2 RCTs conducted at 5 practices; high SOE at 3-month followup and moderate SOE at 6-month followup), approaches that embed behavioral health providers to implement SBIRT models may increase subsequent rates of addressing a positive screen (insufficient SOE) and initiation of certain types of treatment (low SOE for psychotherapy, insufficient SOE for guideline concordant prescribing; based on a nonrandomized stepped-wedge controlled study with 59 practices).

3.1.2. Summary of Findings

Table 4 provides a detailed evidence map, summarizing the SOE concerning the effectiveness of different implementation strategies compared with control strategies, across prioritized implementation, service, and patient outcomes. Cells with footnote "a" (green shading) indicate that the implementation strategy led to improved outcomes, while footnote "b" (green shading with pattern) also indicates that the implementation strategy led to improved outcomes but the effect does not reach statistical significance. Footnote "c" (blue shading) denotes only a minimal or no difference between the implementation strategy and the control strategy. Footnote "d" (pink shading) denotes that the comparator strategy or no strategy was more effective. For a large number of prioritized outcomes, we did not find any eligible evidence.

Table 4. Evidence map

	Behavioral Health Incorporation (BHI)			**Learning Collaborative (LC)**		**Clinician Support (CS)**				**Technology**
Implementation strategy[a]	BHI	BHI with learning collaborative	BHI with clinician support	LC	LC	CS	CS	CS	CS	Technology
Comparator strategy	Clinician support	No strategy	Clinician support only	No strategy	Distribute educational material only	No strategy	Technology without reminders	No strategy	Distribute educational material only	No strategy
Clinical intervention/ condition	SBIRT for substance use[61]	SBIRT for general behavioral health risks[55]	SBIRT for substance use[68]	Screening[63] or SBIRT[56] for depression and suicide risk	Screening for eating disorders[66]	Screening for depression[54]	SBI for substance use[65]	SBIRT for substance use[68]	SBI for general behavioral health risks[59, 64]	Screening for general behavioral health risks[67]
Priority implementation outcomes										
Acceptability	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Feasibility	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Reach	Screening[d] ●●●●	Screening[b] ●○○○	Screening[d] ●●●●	Screening[b] ●○○○	Screening[b] ●○○○ Screening in high-risk patients[c] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	Screening for risky behaviors[b] ●○○○ Screening for mental health concerns[b] ●○○○
Sustainability	Screening[d] ●●●● Brief advice[d] ●●○○ Brief intervention[e] ●●○○	No evidence	No evidence	Screening[b] ●○○○	Screening[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence

	Behavioral Health Incorporation (BHI)			**Learning Collaborative (LC)**		**Clinician Support (CS)**				**Technology**
Priority service outcomes										
Equity	No evidence	No evidence	No evidence	No evidence	No evidence	Screening of historically marginalized groups[d] ●○○○	No evidence	No evidence	No evidence	No evidence
Address positive screen	Brief advice[d] ●●○○ Brief intervention[e] ●●○○	Primary care behavioral health visits[b] ●○○○	Brief intervention[b] ●●●○ Referral to specialty treatment[e] ●●○○	Initial plan of care[e] ●○○○	No evidence	No evidence	Brief advice[b] ●●○○	Brief intervention[b] ●●●○ Referral to specialty treatment[d] ●●○○	Counseling for moderate and high-risk behaviors[b] ●●●●	No evidence
Initiation of treatment	No evidence	Psychotherapy visits[b] ●●○○ Guideline-concordant ADHD prescribing[d] ●○○○ Guideline concordant SSRI prescribing[b] ●○○○	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Priority patient outcomes										
Mental health	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	Alcohol use among high-risk[c] ●●●○	No evidence	Risk behavior score at 3 months[d] ●●●●	No evidence
	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	Alcohol use among low risk[d] ●●●○	No evidence	Risk behavior score at 6 months[d] ●●●○	No evidence

	Behavioral Health Incorporation (BHI)			Learning Collaborative (LC)		Clinician Support (CS)				Technology
Mental health (continued)							Heavy episodic drinking among high risk[d] ●●●○ Cannabis use among high-risk[b] ●●●○ Cannabis use among low-risk[d] ●●●○			
Quality of life	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Adverse events	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence	No evidence
Legend:	Favors implementation strategy[b]	Favors implementation strategy but effect does not reach statistical significance[c]	Comparable effectiveness[d]	Favors comparator or no strategy[e]	●○○○ Insufficient SOE	●●○○ Low SOE	●●●○ Moderate SOE	●●●● High SOE		

[a] All included studies were categorized into one of four overarching implementation approaches: incorporating behavioral health into primary care, engaging learning collaboratives, providing support to clinicians, and using technology to facilitate screening or brief intervention. Studies were classified based on the primary implementation strategy employed, and in instances where multiple implementation approaches occurred, studies were categorized according to the most intensive implementation approach. Behavioral health incorporation was considered the most intensive, followed by learning collaboratives, providing support to clinicians, and finally, the use of technology. For instance, an overarching implementation approach that adds new team members to incorporate behavioral health into primary care approach defaults to behavioral health incorporation over other approaches such as learning collaboratives or the use of technology.

[b] Findings favor the implementation strategy.

[c] Findings favor the implementation strategy but the effect does not reach statistical significance.

[d] Findings demonstrate comparable effectiveness of the implementation strategy and comparator strategy.

[e] Findings favor the comparator or no strategy, i.e., greater instances of the outcome in the comparator group. Whether this is desirable or not depends on a practice's intent when incorporating a behavioral health clinician into their practice.

ADHD = attention deficit hyperactivity disorder; BHI = behavioral health incorporation; CS = clinician support; LC = learning collaborative; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment; SOE = strength of evidence; SSRI, selective serotonin reuptake inhibitor.

3.1.3. Findings by Clinical Area: Screening for Depression

3.1.3.1 Characteristics of Included Studies

Three studies, two nonrandomized controlled trials[54, 63] and one ITS study,[56] evaluated implementation strategies to increase screening for depression and suicide risk among adolescents in pediatric primary care settings (**Table B-1**). We rated all three studies as having high risk of bias, primarily due to uncontrolled potential baseline confounding or inadequate statistical analysis. **Table 5** summarizes the implementation and comparison strategies for each included study; further details about implementation strategies used in these studies are reported in **Appendix B**.

One nonrandomized controlled trial conducted in Massachusetts[54] implemented a **clinician support-based implementation approach** to implement a two-stage screening for depression and suicide risk. Patients were first screened using the Pediatric Symptom Checklist (PSC-17). If the results indicated at risk, the Patient Health Questionnaire (PHQ-9) was then used for a more in-depth assessment.[54] The study involved nine pediatric primary care practices within a network.[54] Eighteen out of 32 physicians opted to voluntarily participate in the clinician support project, while the remaining 14 chose not to participate. Overall, 891 patients ages 12 to 18 years were seen by physicians participating in the clinician support project, while 1,756 were seen by physicians not participating in the project.[54] Patients seen by physicians participating in the clinician support-based QI project were largely non-Hispanic (84.6%), White (83.8%), and preferred the English language (94.0%). Physicians participating in the clinician support-based QI project received comprehensive implementation support over the 3-month implementation period, including training webinars, data reviews, and conference calls structured around two main intervention periods.

Two studies, one nonrandomized controlled trial[63] and one ITS study,[56] utilized a **learning collaborative implementation approach** to assess the outcomes of a two-stage screening process[63] or an SBIRT model[56] for depression and suicide risk. The nonrandomized controlled trial conducted in Vermont[63] focused on patients ages 12 to 18 years attending health supervision visits at 38 pediatric and family medicine practices that were part of a voluntary QI network of pediatric-serving practices.[63] The implementation period lasted 7 months, with 17 of the 38 practices and 792 of the 1,564 patients engaged in the learning collaborative implementation approach. Twenty-one practices (with 772 patients) from the same network did not receive implementation support and served as the study's control group. Participating practices engaged in a multifaceted learning collaborative implementation approach aimed at enhancing practitioners' knowledge and office systems regarding adolescent depression screening and had the autonomy to choose the depression screening tool that best suited their specific needs from those listed in the American Academy of Pediatrics Mental Health Toolkit.[63] Practices engaged in the learning collaborative implementation approach were composed of 33 percent of patients insured through Medicaid, compared with 40 percent of patients at control practices. Both groups had a similar proportion of female patients (53% and 51%, respectively).

The other study implementing a **learning collaborative implementation approach** conducted in rural Ohio focused on patients ages 11 to 18 years seen at any of the four participating pediatric primary care practices. Participating practices were part of a pediatric accountable care organization, Partners For Kids, and consisted of medical providers ranging from 2 to 10 providers per practice, with a patient population across practices of at least 40 percent insured by Medicaid.[56] Practices engaged in learning collaborative QI efforts over a 6-

month implementation period, including an interactive learning session and educational materials.[56] The primary objective was to improve depression management through a depression management bundle, which consisted of depression screening, safety assessments, brief intervention, and followup plans (i.e., an SBIRT model).

Table 5. Strategies used in studies on screening for depression

Author, Year Study design and risk of bias	Clinical Intervention	Implementation Strategy[a]									Comparison Strategy[a]
		Overarching Implementation Approach	Evaluate & Iterate	Interactive Assistance	Select, Adapt, Tailor	Develop Relationships	Train & Educate	Support Clinicians	Engage Patients	Change Infrastructure	
Dalal 2023[54] NRSI with high risk of bias	Screening (2-stage)	Support clinicians (reminders)	N/A	N/A	N/A	Organize clinician implementation team meetings	Conduct educational meetings	Provide reminders	N/A	N/A	No strategy
Harder 2019[63] NRSI with high risk of bias	Screening	Learning collaborative	Assess for readiness, conduct cyclical tests of change	Provide facilitation	Select based on practice and setting	Use workgroups	Engage in learning collaborative	N/A	N/A	N/A	No strategy
Baum 2020[56] ITS with high risk of bias	SBIRT (management bundle)	Learning collaborative	Develop implementation blueprint, conduct cyclical tests of change	Provide facilitation	N/A	N/A	Make training dynamic, engage in learning collaborative	N/A	N/A	N/A	N/A

[a] Implementation strategies are defined in Table A-7.
ITS = interrupted time series; N/A = not applicable; NRSI = non-randomized study of interventions; SBIRT = screening, brief intervention, and referral to treatment.

3.1.3.2 Overview of Potential Barriers and Facilitators

All three studies reported practice or provider characteristics that could influence implementation of screening[63 54] and SBIRT,[56] but did not report whether implementation strategies impacted them or subsequent outcomes. For the **clinician support-based approach** to implementing screening, practices engaged in the clinician support-based approach had a smaller presence in Federally qualified/certified rural areas (11% clinician support-based approach; 28% control; p<0.001) and a greater presence in the largest metropolitan area (47% clinician support-based approach; 31% control; p<0.001).[63] In the study evaluating a **learning collaborative implementation approach** to implementing screening,[54] adoption of a standardized template in the electronic health record to increase screening rates was inconsistent; only about half of the pediatricians utilized it, while others preferred free text notes over the structured templates. For the other study evaluating a **learning collaborative implementation approach** to implementing SBIRT[56] prior to the start of the project, practices reported that depression screening was not a standard practice and among a sample of 15 charts, 0 percent had documented screening at baseline.

3.1.3.3 Results for Implementation, Service, and Patient Outcomes

3.1.3.3.1 Clinician Support

Findings from one nonrandomized controlled trial[54] suggest that a **clinician support-based implementation approach** may increase screening rates, but the evidence is very uncertain (insufficient SOE). Reach was assessed using PSC-17 first-stage screening rates among children. The study reported that screening adolescents with the PSC-17 was standard of care across sites, yet patients under the care of providers receiving implementation support were significantly more likely to be screened than those in the control group after 3 months (93.8% vs. 89.1%, p<0.01).[54]. Historically marginalized racial or ethnic groups were screened at rates comparable to non-Hispanic White patients. This was observed in both patients seen by providers receiving implementation support and patients seen by providers in the control group (providers receiving implementation support: 94.5% vs. 94.7%; control: 89.7% vs. 90.7%). This indicates that a **clinician support-based implementation approach** may not introduce inequity, but the evidence is very uncertain (insufficient SOE).[54] Finally, provider fidelity to administering second stage screening using the PHQ-9 for adolescents who scored at risk on the PSC-17 was also higher in the practices implementing the clinician support-based approach than in the control group (54.8% vs. 16.1%, p<0.001).

3.1.3.3.2 Learning Collaborative

Findings of the second nonrandomized controlled trial[63] and the ITS study[56] consistently indicated that a **learning collaborative implementation approach** may increase the rate of screening, reflecting greater reach among patients, but the evidence is also very uncertain (insufficient SOE). In the nonrandomized controlled trial, the providers engaged in the learning collaborative showed an increase in depression screening rates among children compared with the control group (90% vs. 75%, p<0.001). In addition, children at practices participating in the learning collaborative had over three times greater odds of having any depression screening at followup than controls (aOR 3.53, 95% CI, 1.14 to 10.98).[63] In the ITS study, screening for depression increased from 0 percent among participating practices at baseline to 28 percent

within 3 months and to 81 percent within 6 months of engaging in the learning collaborative.[56]. This study also assessed sustainment of screening practices, finding that screening rates remained around 80 percent after practices standardized the screening process following the initial 6-month learning collaborative implementation period.[56] Only one of the two studies assessing learning collaboratives reported fidelity to the intervention being implemented.[63] Of those screened, more patients receiving care from practices engaged in the learning collaborative were screened with a validated tool than in the control group (77% vs. 32%, p<0.001; aOR 37.51, 95% CI, 7.67 to 183.48). Addressing a positive screen was also only reported by one of the studies evaluating the learning collaborative implementation approach.[63] Fewer patients in the learning collaborative implementation approach had an initial plan of care documented than in the control group (81% vs. 91%, p=0.05).[63]

3.1.4. Findings by Clinical Area: Screening for Eating Disorders

3.1.4.1 Characteristics of Included Studies

For eating disorders, we included one nonrandomized controlled trial with high risk of bias because of concerns about confounding, missing data, and deviations from the intended interventions (**Table B-2**).[66] The study compared the impact of a comprehensive **learning collaborative implementation approach** with a discrete educational strategy in increasing screening for eating disorders in patients ages 10 to 21 years within pediatric primary care practices. **Table 6** summarizes the implementation and comparisons strategies; further details about implementation strategies used in these studies are reported in **Appendix B**.

The study involved 303 practitioners working in 85 pediatric primary care practices within an independent practice organization in Eastern Massachusetts. It compared a multifaceted active-learning strategy with a discrete print-learning strategy. Although the practitioners in the print-learning group received educational materials, those in the active-learning group participated in a learning collaborative model. Practitioners in the active-learning group further undertook cyclical tests of change, a process classified as an "evaluate and iterate implementation" strategy.

Table 6. Strategies used in study on screening for eating disorders

Author, Year Study design and risk of bias	Clinical Intervention	Implementation Strategy[a]									Comparison Strategy[a]
		Overarching Implementation Approach	Evaluate & Iterate	Interactive Assistance	Select, Adapt, Tailor	Develop Relationships	Train & Educate	Support Clinicians	Engage Patients	Change Infrastructure	
Gooding 2017[66] NRSI with high risk of bias	Screening	Learning collaborative	Conduct cyclical tests of change	N/A	N/A	N/A	Engage in learning collaborative, make training dynamic	N/A	N/A	N/A	Train & Educate (distribute materials)

[a] Implementation strategies are defined in Table A-7.
N/A = not applicable; NRSI = non-randomized study of interventions.

3.1.4.2 Overview of Potential Barriers and Facilitators

Most of the practitioners in the active-learning and print-learning groups were physicians (74% and 76%) and had been in practice for about 20 years (20.4 years and 19.6 years). The other participants were either nurse practitioners or physician assistants. Notably, at the outset of the study, only 4.5 percent of patients seen by practitioners in both groups had documented screening for eating disorders in their medical charts. The study authors did not report whether provider characteristics influenced outcomes. The implementation strategies, however, had variable influence on provider knowledge and satisfaction. Practitioners in the active-learning group had greater knowledge (median eating disorder knowledge score: 11 versus 7 out of a possible 12; p-value not reported) and expressed greater satisfaction with their training compared with those in the print-learning group ($p<0.01$). Still, both groups reported similar levels of comfort in screening and medical monitoring, and treatment of eating disorders were also similar for both groups before and after receiving their respective implementation strategies.

3.1.4.3 Results for Implementation, Service, and Patient Outcomes

3.1.4.3.1 Learning Collaborative

Findings of the study indicated that a **learning collaborative** may increase reach, reflected by the rate of screening, but the evidence is very uncertain (insufficient SOE). Compared to the print-learning group, the active-learning group showed a greater increase in screening documented in charts from pre- to post-intervention (active-learning: from 4.7% to 22.0%; print-learning: from 4.5% to 5.7%; $p<0.0001$). Although in high-risk patients (whose body mass index [BMI] was below the 5th percentile for age and sex or whose BMI drop from the prior year was in the largest 5% of BMI reductions), the active-learning group also showed a numerically greater increase in documented screening, the difference between groups did not reach statistical significance (active-learning: from 14.3% to 30.0%; print-learning: from 3.2% to 8.7%; $p=0.9$).

Practitioners' self-reported screening was higher than documented in charts; however, the increase in practitioner-reported screening was comparable between the two groups (active-learning: from 65.9% to 70.8%; print-learning: from 45.6% to 49.7%; $p=0.8$).

3.1.5. Findings by Clinical Area: Substance Use Disorders

3.1.5.1 Characteristics of Included Studies

For substance use (including alcohol and tobacco) screening, we included three RCTs,[61, 65, 68] two of which were cluster RCTs (**Table B-3**).[61, 68] We assessed the risk of bias as *low* for one study.[61] For the remaining two studies, we assessed the risk of bias as *some concerns* due to concerns about randomization (baseline differences in the patient population)[68] and potential deviations from the intervention (providers trained to provide counseling treated participants from both the clinical reminders and comparison groups), as well as missingness of data (individuals who engaged in substance use behaviors may be less likely to return for followup visits with provider).[65] **Table 7** provides a description of the implementation strategies evaluated across the three studies; further details about implementation strategies used in these studies are reported in **Appendix B**.

One trial compared the effectiveness of adding provider reminders to form a **clinician support-based implementation approach** to technology without reminders.[65] This study was

conducted over 24 months in five urban pediatric primary care centers in Boston to assess the feasibility and acceptability of implementing a computer-facilitated screening and clinician-delivered brief intervention (cSBI) for youth ages 12 to 18 years.[65] A total of 54 providers were trained to provide counseling, after which patients (n=869) were randomized to receive either cSBI with provider reminders or technology without reminders.[65]

The remaining two trials, both cluster RCTs, assessed the impact of **incorporation-based approaches** to increase screening rates[61, 68] One evaluated the implementation of SBIRT within seven urban Federally Qualified Health Centers in Baltimore City.[61] The study compared the use of two different service delivery models—a Specialist model and a Generalist model—to improve screening rates over the course of 20 months. In both groups, medical assistants administered the CRAFFT substance use screen and scored the results; patients with scores of 2 or higher (classified as *high-risk* patients) then received brief intervention. In the specialist model (intervention group), behavioral health counselors delivered the brief intervention, wherein the generalist model (comparison group) required primary care providers to deliver the brief intervention. Study authors hypothesized that outcomes would be better at generalist sites that included support for clinicians but no embedded behavioral health counselor.[61]

The second study to assess the impact of behavioral health incorporation to improve substance use screening for adolescents ages 12 to 18 years was a three-arm trial conducted within a large general pediatric clinic in Baltimore City.[68] Providers were randomized to one of three arms: (1) providers were trained to deliver SBIRT independently; (2) providers had access to a trained behavioral healthcare practitioner, who was embedded within the practice to deliver SBIRT; and (3) usual implementation, wherein providers received no training or access to a behavioral healthcare practitioner. All patients completed a self-administered comprehensive health screening tool embedded in the electronic health record (EHR), the Teen Well Check Questionnaire (TWCQ), at registration for their well-child care visit.[68] The pediatrician or the behavioral health provider assessed patients who endorsed mental health or substance use risk in the TWCQ using the CRAFFT+. For this review, we categorized the more intensive intervention (behavioral health incorporation plus clinician support) as the primary implementation strategy and report outcomes when compared with the clinician support only.[68] In addition, we report outcomes from the comparison of the arm that included provider support only versus usual implementation.[68]

Table 7. Strategies used in studies on screening for alcohol, tobacco, and substance use

Author, Year Study design and risk of bias	Clinical Intervention	Implementation Strategy[a]									Comparison Strategy[a]
		Overarching Implementation Approach	Evaluate & Iterate	Interactive Assistance	Select, Adapt, Tailor	Develop Relationships	Train & Educate	Support Clinicians	Engage Patients	Change Infrastructure	
Knight 2019[60, 65] (RCT with some bias concerns)	SBI	Support clinicians (reminders)	N/A	N/A	N/A	N/A	Make training dynamic	Provide reminders	N/A	Use technology	Technology without reminders
Mitchell 2020[57, 58, 61, 62] (Cluster RCT with low risk of bias)	SBIRT	Incorporation	Conduct audit and feedback	Centralize technical assistance	N/A	Identify and prepare champion	Conduct ongoing training	Create new clinical team; facilitate relay of clinical data to providers	N/A	N/A	Clinician support without incorporation
Sterling 2015[68] (Cluster RCT with some bias concerns)	SBIRT	Incorporation (with clinician support)	Conduct audit and feedback	Centralize technical assistance; provide ongoing consultation	N/A	N/A	Conduct educational meetings; distribute educational materials	Create new clinical team; provide reminders	N/A	N/A	Clinician support without incorporation
		Support clinicians	Conduct audit and feedback	Centralize technical assistance; provide ongoing consultation	N/A	N/A	Conduct educational meetings; distribute educational materials	Provide reminders	N/A	N/A	Usual implementation

[a] Implementation strategies are defined in Table A-7.
N/A = not applicable; RCT = randomized controlled trial; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

3.1.5.2 Overview of Potential Barriers and Facilitators

The trial assessing **clinician support** to facilitate implementation of cSBI reported practice type and compatibility of cSBI within existing clinical workflows but did not report whether these were impacted by the implementation strategies leveraged.[65] The trial involved 54 primary care providers distributed between community practices (n=3) and hospital-based clinics (n=2). The cSBI was generally well-received by patients, but some providers expressed reservations regarding the use of tablets to administer screenings.[65] Some providers also expressed concerns about the additional time required for the cSBI and suggested that it be incorporated into the EHR to minimize disruptions to the clinical workflows and decrease the amount of time required to administer the screening and brief intervention.[65]

Within the two-arm cluster RCT that assessed an **incorporation-based approach** within specialist and generalist sites, both adolescent and provider characteristics were similar across sites.[61] The SBIRT intervention was tailored to each site to improve incorporation into the facility's workflow and processes. Additionally, leadership support for implementation was reported, with the designation of the medical director as an "Organizational Champion."[61] In the three-arm cluster RCT, researchers compared the implementation of SBIRT among a diverse patient population.[68] There were slight differences in patient characteristics and mental health symptoms across study arms. For instance, compared to the usual implementation arm, there were more female patients (57.4% in the pediatrician-only arm, 52.0% in the embedded behavioral healthcare provider arm, and 47.0% in the usual implementation arm) and more Black patients (34.5% in the pediatrician-only arm, 33.9% in the embedded behavioral healthcare provider arm, and 28.4% in the usual implementation arm) represented in the incorporation with clinician support and clinician support-only arms. There were no reports on whether the incorporation-based approaches had any effect on potential barriers or facilitators in either study.[61, 68]

3.1.5.3 Results for Implementation, Service, and Patient Outcomes

3.1.5.3.1 Clinician Support

The impact of **clinician support** on service outcomes for substance use was only reported in the three-arm cluster RCT.[68] Compared with patients who received care from providers in the usual implementation arm, patients in the clinician support arm were more likely to receive brief interventions for substance use or mental health (16.4% vs. 1.8%; aOR=10.37; 95% CI, 5.45 to 19.74) (moderate [SOE]).[68] However, clinician support likely has no effect on the rate of referrals to specialty treatment, compared to usual care (aOR=1.11 (95% CI: 0.83 to 1.49) (low SOE).[68]

The trial evaluating a **clinician support-based approach** to implement cSBI with provider reminders reported better delivery of brief advice and provision of information on health risks of alcohol and cannabis use (four separate outcomes) for high-risk youth (i.e., who reported any use of alcohol or cannabis in the past 12 months at baseline); the adj RR ranged from 1.21 to 1.36 (moderate SOE) versus cSBI without reminders but little to no effect on patients' substance use outcomes.[65] Clinician support (in the form of dynamic training and reminders) was associated with improved brief advice delivery for alcohol and cannabis use, aRR 1.21 (95% CI, 0.95 to 1.52) and aRR 1.36 (95% CI, 1.09 to 1.69), respectively, and information about health risks of alcohol and cannabis use, aRR 1.22 (95% CI, 1.04 to 1.44) and aRR 1.34 (95% CI, 1.09 to 1.65), respectively, versus technology without reminders. The addition of provider reminders likely

increases time to first post-visit alcohol use for high-risk adolescents (97 median days [interquartile range {IQR} 51 to 222] vs. 44 [21 to 143]; adj hazard ratio [HR]=0.69 [0.47 to 1.02]) (moderate SOE) but results in little to no difference in time to first post-visit heavy episodic drinking for high-risk adolescents (366 median days [IQR 124 to 366] vs. 213 [51 to 366]; adj HR=0.66 [0.40 to 1.10]) (moderate SOE). The use of clinician support also likely has little to no effect on time to first post-visit alcohol use among low-risk adolescents (366 [338 to 366] vs. 366 [334 to 366]; adj HR=0.87 [0.57 to 1.31]) (moderate SOE).[65] However, high-risk adolescents in the cSBI arm with provider reminders reported a longer time to first use of cannabis post-intervention compared with high-risk adolescents in the technology without reminders group (101 median days [IQR 33 to 226] vs. 83 [27 to 152]; adj HR=0.62; 95% CI, 0.41 to 0.94) (moderate SOE).[65] These findings suggest that the clinician support-based implementation approach is likely to increase the length of time post-visit for cannabis use (moderate SOE).[65]

3.1.5.3.2 Incorporation

Both cluster RCTs that evaluated **incorporation-based implementation approaches** reported rate of screening or assessment. In the two-arm trial, adolescents receiving care from an incorporated clinical team reported screening rates similar to those reported by adolescents receiving care from a primary care-only clinical team in the implementation phase (64.1% vs. 59.2%, p=0.52) and in the sustainability phase (73.9% vs. 65.6%, p-value NR) (high SOE)[61] In the three-arm trial, compared to clinician support only (i.e., pediatricians trained to provide SBI), adding behavioral incorporation via an embedded behavioral healthcare provider does not increase assessment rates (24.3% vs. 25.5%; aOR=0.93 [95% CI, 0.72 to 1.21]) (high SOE).[68]

In one of the two cluster RCTs, incorporation had little to no effect on the rate of brief advice provided compared to clinician support in the implementation phase (30.4% vs. 28.3%; aOR=0.84 [95% CI, 0.26 to 2.70]), but the evidence is uncertain (low SOE). Similarly, an incorporation-based approach may result in lower rates of brief intervention, compared with support for generalists only (low SOE). Patients at the incorporated specialist sites were less likely to receive brief intervention than the generalists sites in the implementation phase (8% vs. 38%; aOR=0.15 [95% CI, 0.04 to 0.56]).[61] The differences achieved in these service outcomes remained during the sustainability phase of the study brief intervention: 3.8% vs. 43.8%, p<0.001; aOR=NR [low SOE]).

In contrast, patients in the incorporation arm of the three-arm cluster RCT were more likely to receive brief interventions for substance use or mental health compared to clinician support only (25.5% vs. 16.4%; aOR=1.74 (95% CI, 1.31 to 2.31) (moderate SOE).[68] Although the results for overall provision of brief intervention are inconsistent for the two studies,[61, 68] when examining brief intervention for substance use only (i.e., excluding brief intervention for mental health), the results are consistent and favor the comparator strategy. Providers in the clinician support-only arm provided brief interventions that contained substance use content more often than did providers in the arm with embedded behavioral healthcare providers (88 [91.7%] vs. 95 [55.6%], P<0.001).[68] Rates of referral to specialty treatment were also lower at the sites that included an embedded behavioral healthcare provider (aOR=0.58 (95% CI, 0.43 to 0.78) (low SOE).[68]

No evidence was available on the impact of the incorporation-based implementation approaches on patient outcomes.

3.1.6. Findings by Clinical Area: General Behavioral Health

3.1.6.1 Characteristics of Included Studies

For more general behavioral health assessments, we included two RCTs with some concerns for bias due to patients being aware of their study assignment (lack of blinding),[59, 64] a stepped-wedge trial with high risk of bias,[55] and one nonrandomized study with high risk of bias due to confounding and missingness of data[67] (**Table B-4**). One of these studies assessed the implementation of a screening-only intervention using a **technology-based approach**,[67] two assessed implementation of screening with brief intervention using a **clinician support-based approach**,[59, 64] and one assessed implementation of a stepped-care SBIRT model using an **incorporation-based approach**. **Table 8** summarizes the implementation and comparisons strategies; further details about implementation strategies used in these studies are reported in **Appendix B**.

The nonrandomized study assessing the outcomes of implementing a health risk assessment screening using a **technology-based implementation approach** during primary care visits focused on adolescents ages 14 to 18 years.[67] The health risk assessment was completed electronically via tablet and covered topics of tobacco, alcohol, and drug use as well as depression and suicide risk. Responses were aggregated into a report via the online platform to guide clinicians in their discussions with adoelscents. The study involved 22 clinics in Florida (20 in the implementation group, 2 in the control group) working in collaboration with a practice-based learning network. About half of involved clinicians were family practitioners (46.3%) and about half were pediatricians (47.5%). Clinicians were in practice for a median of 9 years.

Two RCTs assessed a **clinician support-based implementation approach** to implement electronic screening for health risk behaviors among adolescents ages 13 to 18 years using the HEADDS pneumonic (Home, Education, Activities, Drugs, Depression, Sexuality, and Safety). Distributing educational materials only was compared to adding personalized feedback delivered to the patient at screening as well as a summary delivered to the provider to inform the appointment.[59, 64] Both RCTs were conducted at five pediatric clinics in the Pacific Northwest.

Lastly, the **incorporation-based implementation approach** to implement SBIRT was assessed using a stepped-wedge design with 5 phases among 59 practices with 354 primary care providers serving over 300,000 patients in Massachusetts.[55] The practices embedded behavioral health clinicians and participated in a learning collaborative to share and discuss their implementation experiences and challenges. The learning collaborative consisted of each practice's behavioral health team, which was expected to include at least one primary care provider, the clinic's medical home care coordinator, and a behavioral health clinician hired by the practice. Each practice's behavioral health team was then supported by the off-site behavioral health incorporation team. The off-site support included education, consultation on behavioral health needs, and support for care delivery by each site's behavioral health team. Most providers involved were physicians (70%), followed by nurse practitioners (29%), then physician assistants (1%). Across phases of implementation, the practices' patient panel size ranged from 3,195 to 7,765 patients (resulting in 726 to 801 patients per primary care provider).

Table 8. Strategies used in studies on general behavioral health

Author, Year Study design and risk of bias	Clinical Intervention	Implementation Strategy[a]									Comparison Strategy[a]
		Overarching Implementation Approach	Evaluate & Iterate	Interactive Assistance	Select, Adapt, Tailor	Develop Relationships	Train & Educate	Support Clinicians	Engage Patients	Change Infrastructure	
Thompson 2016[67] (NRSI with high risk of bias)	Screening	Technology	Monitor delivery performance	Provide facilitation	Tailor based on practice and setting	N/A	Conduct educational meetings	N/A	N/A	Use technology and change physical equipment	No strategy
Richardson 2019[64] (RCT with some bias concerns)	SBI	Support clinicians	N/A	N/A	N/A	N/A	Distribute educational materials	Facilitate relay of clinical data to providers	Prepare patients to be active participants	N/A	Distribute educational materials only
Richardson 2021[59] (RCT with some bias concerns)	SBI	Support clinicians	N/A	N/A	N/A	N/A	Distribute educational materials	Facilitate relay of clinical data to providers	Prepare patients to be active participants	N/A	Distribute educational materials only
Walter 2021[55] (Stepped-wedge trial with high risk of bias)	SBIRT (stepped care)	Incorporation (with learning collaborative)	N/A	Provide clinical supervision; provide ongoing consultation	N/A	Change organizational culture	Engage in learning collaborative; conduct educational meetings	Create new clinical team; facilitate relay of clinical data to providers	N/A	N/A	No strategy

[a] Implementation strategies are defined in Table A-7.
N/A = not applicable; NRSI = non-randomized study of interventions; RCT = randomized controlled trial; SBI = screening and brief intervention; SBIRT = screening, brief intervention, and referral to treatment.

3.1.6.2 Overview of Potential Barriers and Facilitators

Two of the four studies reported on potential barriers and facilitators of implementation for screening[67] and SBIRT[55]. The nonrandomized study evaluating a **technology-based approach** to implementing screening reported characteristics that reflect the participating practices' infrastructure, including type of practice, patient population, and use of an electronic medical record system. Participating practices included Federally Qualified Health Centers (n=4), private practices (n=6), hospital-affiliated clinics (n=2), and academic medical centers (n=10).[67] The practices varied in the proportion of their patients who were adolescents ages 14 to 18 years, with some practces (20%) having fewer than 10 percent adolescent patients and most practices (56.7%) having 10 to 50 percent adolescent patients. Two-thirds of the practices (66.7%) had electronic medical records and not all practices used the same system. As such, the health risk assessment was web-based so that all practices could use it, which meant that it could not be integrated into the practices' electronic medical record systems and had to be managed separately. Authors of this study but did not report whether any potential barriers or facilitators were impacted by the technology-based implementation approach or influenced outcomes.

In a stepped-wedge trial evaluating an **incorporation-based approach** to implementing SBIRT, more than half of practices (63%) ultimately hired an incorporated behavioral health counselor, which was more common among practices with three or more primary care providers (77%) than smaller practices with one to two primary care providers (13%; P<0.001).[55] Authors further reported on level of engagement in the implementation strategies but did not indicate whether engagement influenced outcomes. All practices participated in at least one learning collaborative session, but closer to one-third of primary care providers (35%) participated in at least one session. One-quarter (27%) of primary care providers earned continuing medical education credits through session attendance, completing a quality improvement project, and participating in surveys. Most practices (71%) and close to half of primary care providers (44%) leveraged the consultation services available from the off-site support team. Importantly, engagement in the implementation strategies did appear to impact provider-level factors. Most primary care providers (>90%) in the first three phases of the project self-reported increased their knowledge about symptom rating scales, guided self-management, psychotropic medications, and level-of-care decisions; imparted greater confidence in their ability to manage behavioral health problems; and improved the quality of their behavioral healthcare.

3.1.6.3 Results for Implementation, Service, and Patient Outcomes

3.1.6.3.1 Technology

Findings from one nonrandomized study indicate that, compared to no strategy, a **technology-based implementation approach** may increase screening and brief intervention for mental health concerns and for risky behavior, but the evidence is very uncertain (insufficient SOE).[67] Adolescents in the intervention group reported significantly higher rates of being screened for risky behaviors and for depression, mental health, emotions, and relationships, as reflected in Young Adult Health Care Survey (YAHCS). Each domain of the YAHCS could range between 0 and 1, with higher numbers indicating higher rates of screening, and scores were adjusted for gender, race/ethnicity, and age. For risky behaviors, the intervention group had a score of 0.36 (standard error [SE] 0.06) and the comparator group had a score of 0.05 (SE 0.11), which reflected a significantly higher rate of screening (p=0.03). For depression, mental

health, emotions, and relationships, the intervention group had a score of 0.42 (SE 0.05) and the comparator group had a score of 0.08 (SE 0.09), which reflected a significantly higher rate of screening ($p<0.01$). Adolescents receiving care leveraging the **technology-based approach also** reported significantly higher scores of receiving care that was private and confidential than those in the comparator group (YAHCS: 0.85 vs. 0.57, $p<0.0001$).[67]

3.1.6.3.2 Clinician Support

Receipt of brief intervention following screening was reported in the two RCTs assessing a **clinician support-based approach** to implementation.[59, 64] In both RCTs, patients receiving care from clinicians who received a summary report had a higher rate of receiving counseling for moderate- and high-risk behaviors than patients receiving care from clinicians who did not receive a summary report (proportion of patients that received counseling by arm not reported; 1.32, 95% CI, 1.07 to 1.63[64] and aRR 1.36, 95% CI, 1.04 to 1.78[59] Similar results were reported in both studies when assessing receipt of counseling for moderate- and high-risk behaviors separately (although the 95% CI for the aRR for receiving counseling for high-risk behaviors reported in 1 of the studies just crossed the null: aRR 1.61, 95% CI, 0.95 to 2.73).[64]

Only one of the RCTs evaluating **clinician support** reported patient satisfaction with the well-care visit process.[59] There was no difference in satisfaction between the patients who themselves and their providers received real-time feedback and the patients who themselves and their providers did not (controlling for age, gender, and clinic; data not reported).[59]

Both RCTs reported mental health risk scores following brief intervention.[59, 64] Across these studies, the patients who themselves and their providers received real-time feedback had a lower mean risk behavior score at 3-month followup compared the patients who themselves and their providers did not receive real-time feedback, although the pooled mean difference was not statistically significant (MD -0.19, 95% CI, -0.54 to 0.17; **Figure E-1**). These findings indicate that a clinician support-based implementation approach has little to no effect on risk behaviors at 3-month followup (high SOE). One of these studies further reported mean risk behavior scores as calculated from the adapted version of the Check Yourself tool at 6 months and again found no difference between the groups (adjusted score difference 0.12 (95% CI, -0.29 to 0.52, $p=0.57$).[59] This indicates that a clinician support-based implementation approach probably has little to no effect on risk behaviors at 6-month followup (moderate SOE)

3.1.6.3.3 Incorporation

Findings from a stepped-wedge trial indicated that **incorporation-based implementation approach** may increase screening rates, but the evidence is very uncertain (insufficient SOE). Universal behavioral health screening increased from 55.6 percent in the control period to 73.9 percent in the implementation period (aOR 1.25, 95% CI, 1.21 to 1.29; $P<0.001$).[55]

Regarding further followup after screening, primary care-provided behavioral health visits increased from the control to implementation period (107 visits per 1,000 patient years control vs. 177 visits during the implementation period; aOR 1.2, 95% CI, 1.1 to 1.3; $P<0.001$). Specialist delivered psychotherapy visits also increased from the control to implementation period (15 visits per 1,000 patient years control vs. 176 visits during the implementation period; aOR 6.7, 95% CI, 5.8 to 7.7; $P<0.001$); the impact on psychotherapy visits was likely largely due to the addition of a behavioral health specialist to the clinical team. These findings indicate that an incorporation-based implementation approach may increase followup via primary care

behavioral health visits (insufficient SOE) and may increase initiation of treatment via psychotherapy visits with a specialist (low SOE).

Between the control and implementation period, the change in guideline-congruent prescribing was statistically significant for selective serotonin reuptake inhibitors (SSRIs) (57 prescriptions per 1,000 patient years control vs 190 prescriptions during the implementation period; aRR 1.3, 95% CI 1.2 to 1.4; P<0.001) but not for attention deficit hyperactivity disorder (ADHD) medication (254 prescriptions per 1,000 patient years control vs. 362 prescriptions during the implementation period; aRR 1.01, 95% CI, 0.96 to 1.07; P=0.60). Behavioral health visits to emergency departments also did not change (visits not reported by control vs. implementation period; aRR 0.9, 95% CI, 0.8 to 1.1; P=0.46). These findings indicate that an incorporation-based implementation approach may have little to no effect on increasing guideline-congruent ADHD prescribing but may increase guideline-congruent SSRI prescribing; however, the evidence is very uncertain (insufficient SOE).

3.2 Contextual Question 1. Findings from Studies Conducted Outside the United States

3.2.1. Summary of Findings

3.2.1.1 Characteristics of Included Studies

We found two eligible studies conducted outside the United States.[69, 70] Both were cluster RCTs comparing different strategies for implementing screening and either brief intervention or referral for a range of behavioral health risk factors. The first study assessed the use of a multicomponent implementation strategy versus a comparison arm receiving a single educational seminar for clinicians to improve screening and counseling for multiple psychosocial risk factors among 901 adolescents and young adults ages 14 to 24 years.[70] The study was conducted in 40 general practices in Victoria, Australia, and involved at least one interested clinician (general practitioner [GP] or nurse) at each practice. Across study groups, young patients' characteristics were generally similar, except that the implementation arm contained a higher proportion of patients ages 18 to 24 years and fewer in the post-randomization exit interview sample who were born in Australia. About 87 percent of participants in both study arms reported having at least one of the six health risk behaviors at the exit interview, with the most common being road risks and then tobacco and alcohol use in the last 12 months.

The second study assessed the incorporation of a 2.5-day training on managing common child mental health problems with SBI for GPs into an existing adult collaborative care program in Tehran, Iran.[69] A total of 49 GPs caring for 389 children ages 5 to 15 years (regardless of their reasons for seeking care) were enrolled in the study. Child participants seeing implementation and control GPs had similar characteristics. About 18 percent had seen a mental health professional in the 6 months prior to screening. Parents (most of whom were mothers) who saw implementation and control GPs were similar, and most had seen the participating GP at least once previously. **Table 9** summarizes the implementation and comparison strategies.

Table 9. Strategies used in non-U.S. studies

Author, Year Study design	Clinical Intervention	Implementation Strategy[a]									Comparison Strategy[a]
		Overarching Implementation Approach	Evaluate & Iterate	Interactive Assistance	Select, Adapt, Tailor	Develop Relationships	Train & Educate	Support Clinicians	Engage Patients	Change Infrastructure	
Sanci, 2015[70] (RCT)	Screening	Clinican training	Obtain and use patient and family feedback	Provide facilitation	N/A	N/A	Make training dynamic Distribute educational materials	N/A	N/A	N/A	Conduct educational meeting
Sharifi, 2023[69] (RCT)	Screening	Clinican training	N/A	N/A	N/A	N/A	Make training dynamic	N/A	N/A	N/A	Conduct educational meeting

[a] Implementation strategies are defined in Table A-7.
RCT = randomized controlled trial.

3.2.1.2 Overview of Potential Barriers and Facilitators

Both RCTs reported practice- and provider-level characteristics, but neither reported whether the implementation strategies had any impact on them or subsequent outcomes. In the Australian RCT, practices receiving a more dynamic **clinician training** strategy tended to be smaller than practices receiving a more basic training.[70] Compared with Australia's general practices, the study sample contained a larger proportion of urban practices (80% vs. 72%, respectively) and a smaller proportion of solo practices (15% vs. 21%, respectively). Clinicians had similar characteristics across arms. About 60 percent of GPs in both arms had previous training in young people's health, but more nurses receiving the dynamic training reported previous training. Only implementation arm clinicians were asked to document their method of screening—that is, whether they used the study-designed paper or electronic screening tool provided during implementation training, the alternative of a verbal screening recommended by the implementation team and based on the HEADSS framework (Home-and-Environment-Education-and-Employment-Activities-Drugs-Sexuality-Suicide/Depression), or another tool—in encounter forms. They completed this task for most (75%) of their recruitment consultations with patients. The study-designed screening tool was used in 30 percent of consultations in clinics adopting the tool, while in 43 percent of consultations with young people, these clinicians used the HEADSS verbal screening approach to identify health risks. It is unclear whether the remaining 25 percent of clinicians actually screened their patients during recruitment consultations.

Practices in the Iranian RCT shared similar characteristics, but GPs in the implementation arm were more often female than in the comparator arm (54% vs. 22%, respectively).[69] Most providers worked in solo practices, except for two GPs who worked at the same site during nonoverlapping shifts.

3.2.1.3 Results for Implementation, Service, and Patient Outcomes

Only one of two non-U.S. RCTs evaluating a **clinician training** approach measured fidelity to the implementation strategy.[70] Implementation arm clinicians had more discussions with young people about their health risks than control clinicians (60% vs. 53%, respectively) and were more likely to discuss a greater number of health risks with each person.

Only the Iranian RCT reported on service outcomes.[69] It found that implementation arm and control GPs identified similar proportions of children and adolescents as having a treatable mental health problem (59% vs. 51%, respectively), but that implementation arm GPs were more likely to report actually counseling the family about a child mental health problem (OR=1.8; 95% CI, 1.02 to 3.30, adjusted for clustering within GP and allocation variables). Compared with control GPs, more implementation arm GPs also referred children with mental health problems, and fewer reported prescribing medication, although these differences were not statistically significant. Children and youth seeing an implementation arm GP had a threefold increased odds of seeing a mental health professional during the study than children seeing a control GP (OR=3.0; 95% CI, 1.1 to 7.7).

Both RCTs evaluating a **clinician training** approach measured mental health outcomes.[69, 70] The Australian RCT used multivariate adjusted analyses and found that implementation arm clinicians had a significantly greater odds of detecting at least one risk-taking behavior than control clinicians at the study's exit interview (i.e., immediately post-consultation with a participating clinician) in the cohort sample (N=901) (OR=1.65; 95% CI, 1.11 to 2.46), and more specifically, alcohol use (OR=2.29; 95% CI, 1.25 to 4.20), and fear or abuse in relationships

(OR=13.8; 95% CI, 1.71 to 111).[70] Odds of identifying health risks among young people at 3 and 12 months post-implementation differed between groups after accounting for missing data with multiple imputation. Compared with control patients, implementation arm patients had significantly lower odds of endorsing past-month illicit drug use at 3 months (OR=0.52; 95% CI: 0.28 to 0.96) and 12 months (OR=0.40; 95% CI: 0.20 to 0.80) post-implementation strategy. In the Iranian RCT, parent-reported child mental health problems as measured by Strengths and Difficulties Questionnaire total scores improved in both groups over time but did not differ between groups at 3- or 6-month followup.[69]

The Iranian study also did not find any significant between-group findings for any of the service or mental health outcomes it reported among subgroups based on children's age or gender.[69]

4. Discussion

The aim of this review was to assess the effectiveness and risk for harms of implementation strategies for mental health and substance use screening and counseling in primary care as recommended by the U.S. Preventive Services Task Force and Bright Futures Periodicity Schedule.

4.1 Summary Of Results

The studies included in this review assessed a number of overarching implementation approaches, including engaging clinical teams in learning collaboratives, providing support for clinicians, providing technological assistance, and adding new team members to incorporate behavioral health into primary care.

As shown in the evidence map (**Table 4**), the size and direction of effect and strength of evidence varied across the approaches and clinical areas of interest. Compared to clinical interventions that involved minimal or no implementation approaches, the use of implementation strategies consistently led to higher screening rates, responses to a positive screen, and a greater initiation of treatments. Studies comparing different types of implementation approaches reported comparable effectiveness with occasional exceptions in individual outcomes.

Engaging in learning collaboratives increased screening rates for depression and eating disorders.[56, 63, 66] Support for clinicians resulted in higher depression screening rates and more frequent brief interventions.[54] Integrating behavioral health into primary care settings enhanced screening for general behavioral health risks and facilitated the initiation of treatment.[55] Additionally, leveraging technology increased screening for risky behavior and mental health concerns.[67] The underlying evidence is mostly very uncertain and findings have to be interpreted cautiously.

When clinician support was employed as an implementation approach, evidence of moderate or low strength indicates that it neither reduced risk behaviors [59, 64] nor led to an increase in referrals for specialty substance use treatment,[68] compared with the distribution of educational materials or the absence of any implementation strategy, suggesting that improved screening may not translate to improved health outcomes.

Studies comparing different types of implementation strategies reported comparable effectiveness with occasional exceptions in individual outcomes. Evidence of high or moderate strength demonstrated that clinician support and behavioral health incorporation had comparable effectiveness in enhancing screening and brief advice.[61] Brief interventions for substance use, however, were utilized more frequently with clinician support than behavioral health incorporation.[61] Evidence of moderate strength found that time to alcohol and cannabis use was comparable when employing clinician support with reminders or leveraging technology without reminders as implementations strategies.[65] An exception was time to alcohol or cannabis use among high-risk patients, which was more likely to be longer among youth in the arm that included clinician support and reminders.[65]

Although the addition of behavioral health incorporation to clinician support did not result in an increase in screening, it increased the frequency of brief interventions while simultaneously reducing referrals to specialty treatments.[68] These findings are based on evidence of high or moderate strength.

Interestingly, we also identified instances where the study results favored the comparator group, rather than implementation approach, though these could potentially be attributed to

chance findings. A learning collaborative approach resulted in more depression screenings but fewer responses to a positive screen compared to no implementation strategy.[63] This suggests that increased screening may detect more cases but may also lead to some screen-detected cases not being addressed once they are detected. In one study assessing behavioral health incorporation compared with clinician support for addressing substance use, the behavioral health incorporation group had less brief intervention than the clinician support group.[57, 58, 61, 62] The authors hypothesized that clinicians preferred to offer brief intervention themselves rather than take the extra step to contact the behavioral health support in a clinic. For substance use, a combination of clinician support and behavioral health incorporation led to fewer appropriate referrals to specialty treatment than clinician support alone.[68] The study authors raised concerns that primary care practitioners felt that any responsibility for addressing substance use ended when they made the referral to the incorporated behavioral health clinician, reducing referrals for patients whose severity of substance use merited referral to specialty care.

While fidelity was not graded because it was not considered as critical for decision making by the TEP, studies assessing fidelity reported that implementation strategies seemed to lead to improvement in fidelity to the intervention. A clinician support-based approach improved fidelity to second-stage screening for depression,[54] and a learning collaborative increased the use of a validated tool for screening for depression.[63]

4.2 Evidence Gaps

We noted several conditions for which there was either no information or very little information available. Although our review identified three studies on screening for depression and suicide risk among children and adolescents; one on screening for eating disorders, one on tobacco, alcohol, and drug use assessment; three on counseling on alcohol, tobacco, and unhealthy and illicit drug use; and four studies on implementation of general behavioral health screening, it did not identify any studies on implementation of screening for anxiety among children and adolescents or maternal depression among teenage mothers, which were also of interest for this review.

From the limited evidence available, several of the 10 priority outcomes for this review had either very little or no evidence (see the evidence map, **Table 4**). None of the included studies assessed the acceptability or feasibility of the implementation approaches utilized nor were patients' quality of life or adverse events assessed. Only one study assessing implementation of depression screening assessed equity.[54] Two studies (one focused screening for depression[56] and one on screening and counseling for substance use[61]) assessed sustainability. This limits our ability to globally understand the extent to which the implementation approaches evaluated are effective in achieving key implementation and patient outcomes. The lack of data on whether gains resulting from the approaches are sustained is particularly concerning, as it remains unclear what long-term effects these implementation efforts are having.

4.3 Implications for Practice

The combination of limited evidence and lack of certainty about the available evidence in some areas impedes our ability to provide a clear response to the decisional dilemmas that this report was intended to address. Primary care offices have many factors to consider when determining how best to implement screening and counseling for mental health and substance use disorders. The findings here are not conclusive, and thus are unable to provide a clear path

for implementation of this important work. Nonetheless, the results do provide some insights that may guide those seeking to address screening for mental health and substance use disorders in primary care.

Firstly, the implementation approaches and strategies studied seem to be designed to acknowledge the heavy demand placed on primary care providers and clinics. Primary care providers face numerous barriers to addressing mental health and substance use disorders in primary care, including lack of training in mental health conditions and substance use disorders, lack of time, poor reimbursement of mental health and substance use screenings, and lack of appropriate resources to support clinicians in the setting of a positive response to a screen.[27] Outside support may help increase screenings and initiation of treatment, though more evidence is needed. As noted above, providing outside help to clinicians and clinics was a key component of many of the included studies. The outside help took many forms, such as engaging participating providers and practices in learning collaboratives and supporting clinicians, which were noted to be common overarching implementation approaches. Specific strategies also sought to help primary care providers and clinics in the form of providing clinical data to providers, offering practice facilitation and supervision, and providing reminders to clinicians.

Secondly, the execution of implementation approaches aimed at supporting clinicians (such as learning collaboratives) is beyond the capacity of a single primary care practice and likely falls under the purview of larger organizations, like state/regional chapters of professional societies, state-based collaboratives, accountable care organizations, or practice-based networks. Within implementation science, the organizations leading such efforts are known as "intermediary/purveyor organizations (IPOs)."[71] IPOs are positioned to provide the technical assistance, clinical data outputs, and other outside help that was frequently present in the studies included in this review.

Another important note is that, even with help, the effort required from the primary care providers themselves for participation in the implementation efforts found in this review was at times significant. For example, a learning collaborative to implement screening for depression included a formal quality improvement project for each of the participating practices as well as attendance at least three of six all-practice calls held over 7 months.[63] With time already limited for primary care providers, such extra efforts may not always be feasible and may be a function of the incentives of study participation. Similarly, incentives such as resources for the office and providing continuing medical education or maintenance of certification credits may boost participation in these efforts, but those seeking to support primary care clinics as they build in efforts for screening and counseling of mental health and substance use disorders will need to be mindful of what they are asking the individuals in those clinics to contribute.

In particular, efforts to support primary care providers as they increase screening and counseling for mental health and substance use disorders should take the time to confirm with primary care providers that the efforts are acceptable to them, a noted gap of this review. Although certain types of reminders and feedback have been shown to improve adherence to guidelines and improve care across a range of settings and conditions,[72] reminders and alert fatigue are also contributors to clinician burnout.[73, 74] The data suggests that there is a fine line between a helpful reminder to boost adherence to guidelines and giving so many reminders to primary care providers that the "help" in fact becomes a burden.

The studies with findings that favored the comparator strategy also have some important implications for practice. More screening will lead to more cases being detected, and thus it may be easier for a case to be missed, as was noted in a study of screening for depression in this

review.[63] Practices will need to consider the adequacy of the mechanisms they have in place to address a positive response to a screening test. The findings from studies that incorporated behavioral health support into the practice also had findings favoring the comparator strategy, with behavioral support leading to less brief intervention when compared to clinician support in one study[57, 58, 61, 62] and fewer referrals to specialty treatment when compared with clinician support alone in another.[68] Whether this is desirable or not depends on a practice's intent when incorporating a behavioral health clinician into their practice. Perhaps a practice intends to reduce the need for referrals and address more mental health and substance use disorders within primary care. In this case, the decreased need for additional intervention is the preferred effect. In other cases, the aim of the incorporated behavioral health support is to boost use of specialty care by having an embedded behavioral health clinician build rapport and trust and thus motivate children, adolescents, and their families to connect to necessary specialty care. Those seeking to incorporate behavioral health support into primary care will need to consider the intended aims of such support before implementing such a change to ensure that the support is meeting its goals.

4.4 Limitations of the Evidence

Our final yield of papers was small, at just 15 papers from 11 studies. This small number of studies was in part the result of excluding pre-post studies that lacked a control group. Although the inclusion of such studies would have resulted in a greater volume of evidence, the lack of a control group in pre-post studies limits the quality of the evidence and the ability to draw conclusions. Thus, the addition of such papers to the review would have still resulted in low or insufficient strength of evidence. We did supplement the review with an assessment of literature from other countries, which ultimately yielded two studies.[69, 70] Given the small number of studies, the findings from these international studies did not change our overall conclusions.

Additionally, we did not identify other reviews that specifically looked at the implementation of screening and counseling for mental health and substance use disorders among children in primary care, so we are not able to compare the current findings to a review looking at the same topic. However, several reviews assessing the evidence around the implementation of other aspects of mental health care have been conducted. One review focused on implementation of mental health treatment (as opposed to screening/counseling) for children and adolescents and found 19 studies.[75] They determined with moderate certainty that financial incentives improved provider adherence to evidence-based practice. Their other findings were either of low certainty or had insufficient evidence to draw conclusions. A scoping review assessed various aspects of incorporation of behavioral health services into pediatric primary care, again with a focus on treatment for mental health conditions.[76] They determined that incorporation was generally acceptable to patients, parents, and primary care offices, but noted that the effects of incorporation on screening rates had not been assessed in a randomized controlled trial at the time of the publication of the review. Another systematic review found that behavioral health incorporation to address pediatric mental health needs appeared to work well in research settings, but noted a lack of data on the translation of behavioral health incorporation to more real-world settings and called for further data on dissemination and implementation.[77] Several reviews looked at screening and counseling for children, adolescents, and young adults in other settings, including school settings[78] or using internet-[79] and app-based tools.[80] These reviews identified many barriers to implementation of screening in these other settings, including concerns about time and cost, problems obtaining consent and following up on positive results, and difficulties

with translation to the real-world due to the slow pace of research findings. The identified reviews demonstrate that understanding how to successfully implement mental health care and treatment for substance use disorders is limited across the care continuum, regardless of setting.

Inequities in mental health care and substance use treatment access with respect to race and differences in sexual orientation and gender identity have been well-documented.[12] Implementation of screening and counseling for mental health and substance use disorders in primary care has the potential to mitigate these inequities, but this review found little data to indicate whether the strategies are in fact successful in this regard.

The available data regarding the impact of these implementation approaches on referrals from primary care to specialty mental health care is unclear. One study found that clinician support made no difference in the number of referrals compared to usual care, but that same study did find that behavioral health incorporation resulted in fewer referrals to specialty care compared to clinician support.[68] Interpretation of these mixed results is further complicated by the additional nuance that the intended direction of effect may vary depending upon the intervention and the implementation approach. There is the possibility that increased screening will lead to increased recognition and thus more referrals. Conversely, the inclusion of behavioral health support within a primary care setting may be intended to reduce the need for referrals. Thus, this review is limited by both a paucity of evidence regarding referrals and the additional challenge that implementation approaches may be aiming for increased or decreased number of referrals depending on what is involved.

Publication and outcome reporting bias present inherent limitations for any systematic review. Despite our extensive searches for both published and unpublished literature, it remains impossible to ascertain the completeness of our coverage, particularly regarding studies that remain unpublished.

4.5 Limitations of our Process

The synthesis of implementation science is, by its nature, more complex than the synthesis of other types of research. It must consider both the clinical intervention of interest—in this case, screening and counseling for mental health and substance use disorders—as well as the implementation approach utilized to increase uptake of the clinical intervention. The implementation approach is often multifaceted and multiple outcomes across multiple domains are often assessed. Our team included implementation science experts, experts in evidence synthesis, and a practicing primary care physician with research experience, all of whom were consulted regularly to ensure consistent application of inclusion criteria and data abstraction procedures in a manner that would be of utility to practicing primary care clinicians. Nonetheless, individualized judgments were required throughout the process. We have aimed to be transparent about where these judgments occurred but acknowledge that different people may have made different decisions. One specific example is our treatment of screening and brief intervention (SBI) and screening, brief intervention and referral to treatment (SBIRT) studies. We spent significant time and discussion attempting to determine whether SBI or SBIRT should be considered an implementation approach or an intervention. Because SBIRT has primarily been evaluated as a tool specific to screening and brief intervention for substance use/misuse, we opted to treat SBIRT as an intervention. Thus, our included SBIRT studies were seeking to use an implementation approach (such as a learning collaborative) to implement SBIRT in primary care and any studies explicitly testing SBIRT without any additional implementation strategy were excluded. As the aim of this review was on implementation in primary care, this decision

seemed appropriate. It is also a noteworthy limitation of the review, and one that may need to be reconsidered in future similar reviews, particularly if SBIRT continues to be translated to other conditions.

Another limitation of this process is the need to align previously published literature with the available implementation frameworks. We found several instances where papers were not published with an implementation framework in mind. In some instances, we were able to collectively agree that there was enough alignment between the study and the implementation framework to include the paper.[56, 67] In other cases, after extensive discussion among the study team, the decision was made that the paper could not be included due to lack of alignment with the framework and our inclusion and exclusion criteria,[81, 82] despite a clear focus on improving screening and treatment of pediatric mental health and substance use disorders. The aim of this review was to guide pediatric practitioners in strategies to implement this important aspect of care into their practice, and so we kept a clear focus on implementation, which may have resulted in some studies with a tangential focus on implementation being excluded.

4.6 Future Research Directions

As we noted, many of the interventions in this review are multifaceted, providing training, infrastructure, and behavioral health incorporation to support primary care clinics in addressing mental health and substance use screening and counseling. Future research might want to consider testing similar multifaceted interventions to ensure that primary care physicians have adequate resources in place to complete screening and counseling for mental health and substance use disorders. Additionally, because of the significant workload for primary care clinics to add screening and counseling for mental health and substance use disorders to their workflow, it is important to ensure that the implementation results in better health for the patients and not just increased work for the primary care clinicians. Future work should continue to monitor for improvement in health among patients.

Additional research is also needed to address the evidence gaps noted in this report, such as implementation of screening for anxiety, screening for postpartum depression in adolescent mothers, and the outcomes gaps noted, including those for acceptability and sustainability.

Another area for future research is assessment of implementation of screening and counseling for mental health and substance use disorders in primary care to address known health disparities in this area. Future work could consider stratifying analysis by race and/or other patient characteristics to assess the impact of the implementation approaches on equity of care for marginalized groups. Implementation targeted toward children and adolescents living in low-income neighborhoods and/or children and adolescents on Medicaid would also help to improve the understanding of which implementation approaches may be better suited to addressing inequities due to differences in socioeconomic status.

The available evidence suggests areas where certain implementation strategies may have no benefit or where different strategies may have significantly different results. Comparative studies to assess different implementation approaches to identify which is more effective may help to determine how primary care clinics can best use limited resources and/or may see significant benefit from a large investment.

Much of the implementation work was led by IPOs, organizations that provide supports to help primary care clinics complete their work. It is possible that future work will be more definitive about the importance of support for clinicians and interactive assistance in implementing screening and counseling for mental health conditions and substance use disorders

in primary care. If that should prove to be the case, then additional work will be needed to understand not only best practices within the clinics but also best practices for IPOs.

We allowed for the inclusion of interrupted times series (ITS), though only one study using this approach was ultimately included.[56] Statistical process control charts from quality improvement work may be able to be analyzed as ITS, if done over a sufficiently long time course.[83] Those leading quality improvement work are encouraged to leverage their ongoing efforts and document sufficient data to enable ITS analysis, as this would provide quality evidence and enhance future efforts to understand the impacts of more discrete implementation strategies on improving implementation of screening and counseling for mental health and substance use disorders.

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6. Abbreviations and Acronyms

ADHD = attention deficit hyperactivity disorder
AHRQ = Agency for Healthcare Research and Quality
AI = artificial intelligence
aOR = adjusted odds ratio
aRR = adjusted risk ratio
BMI = body mass index
CI = confidence interval
COMET = Core Outcome Measures in Effectiveness Trials
CRAFFT = Car, Relax, Alone, Forget, Friends, and Trouble (screening tool for substance-related risks and problems)
CQ = contextual question
EHR = electronic health record
EPC = Evidence-based Practice Center
EPOC = Effective Practice and Organisation of Care
ERIC = Expert Recommendations for Implementing Change
GP = general practitioner
GRADE = Grading of Recommendations Assessment, Development and Evaluation
HEADSS = Home-and-Environment-Education-and-Employment-Activities-Drugs-Sexuality-Suicide/Depression
HR = hazard ratio
I^2 = I-squared (measure of statistical heterogeneity)
IPO = intermediary/purveyor organization
ITS = interrupted time series
KI = Key Informant
KQ = Key Question
LGBTQIA+ = lesbian, gay, bisexual, transgender, queer or questioning, intersex, or asexual
MeSH = Medical Subject Headings
NRSI = non-randomized study of interventions
PHQ-9 = Patient Health Questionnaire-9
PICOTS = population, interventions, comparators, outcomes, timing, and setting
PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSC-17 = Pediatric Symptom Checklist-17
QCA = Qualitative Comparative Analysis
QI = quality improvement
RCT = randomized controlled trial
RoB 2 = Cochrane Risk of Bias 2

RoB 2 CRT = RoB 2 extension for cluster-randomized parallel-group trials
ROBINS-I = Risk Of Bias In Non-randomized Studies of Interventions
SBI = screening and brief intervention
SBIRT = screening, brief Intervention, and referral to treatment
SE = standard error
SOE = strength of evidence
SSRI = selective serotonin reuptake inhibitor
TEP = Technical Expert Panel
TOO = Task Order Officer
TWCQ = Teen Well Check Questionnaire
USPSTF = U.S. Preventive Services Task Force
YAHCS = Young Adult Health Care Survey