



## What interventions help teens and young adults prevent and manage behavioral health challenges?

**Answer:** Findings from this review suggest that targeted interventions incorporating some type of cognitive behavioral therapy (CBT) can lead to small, but positive improvements in a range of behavioral health outcomes for teens and young adults. Resilience-focused interventions (which often incorporate CBT approaches) that target both individual and environmental factors also demonstrate small, positive improvements in depression, anxiety, and illicit drug use. Given the wide variation in intervention design, populations studied, and outcomes measured, further work is needed to understand how, why, and for whom promising interventions may be most effective, particularly for racial/ethnic minorities, LGBTQ youth, and members of other historically disadvantaged groups.

### Context for this review

At the request of the Colorado Health Foundation, AcademyHealth undertook this review to assess existing evidence on interventions to help teens and young adults prevent and manage behavioral health challenges in middle and high school, college, community, and workplace settings. We examined previously synthesized research concerning the effectiveness of interventions targeting three areas: depression/anxiety, substance use, and suicide prevention. The goal of the review was to help the Foundation identify promising interventions across a broad range of behavioral health challenges experienced by teens and young adults.

### Findings

We grouped our findings according to the three broad categories of behavioral health challenges described above. A consistent finding throughout is the effectiveness of resilience-based approaches – which aim to improve at least one individual (e.g., self-esteem) and environmental (e.g., school connectedness) factor – in improving substance use, depression, and anxiety among teens and young adults.<sup>1</sup> Please see Appendix 1 for definitions of key terms used in this review.

**Depression and Anxiety.** Interventions that target populations at high risk for behavioral health challenges and include some type of cognitive behavioral therapy (CBT) – in which individuals learn how to recognize, explore and change relationships between negative thinking, behavior and depressed mood – are promising approaches for reducing depression and anxiety symptoms in teens and young adults. In particular, approaches that target low-income populations and incorporate aspects of resilience-focused interventions are more effective than approaches that do not target environmental factors.

**Substance Use.** Universal interventions that seek to improve social skills and increase knowledge about the social factors that contribute to substance use in teens and young adults can lead to reductions in illicit drug use. Targeted brief interventions incorporating some type of CBT can lead to small reductions in substance use, in particular, alcohol consumption, although the effect is minimized when compared to receiving an education-only intervention.

**Suicide Prevention.** Psychosocial interventions – such as dialectical behavior therapy in which individuals receive individual CBT and group therapy focused on skill building – delivered in school, community and health care settings are promising strategies for reducing suicidal behavior among teens and young adults. While many other types of suicide prevention interventions have been shown to improve knowledge of suicide and knowledge of suicide prevention among students, school staff and others, evidence is lacking on whether and how these interventions impact young peoples' actual behavior.

### Additional considerations

- Interventions vary in how they combine and implement different types of therapy or curriculum components, which limits researchers' ability to directly compare them.
- Lack of long-term follow-up and adequate control groups in school-based intervention studies are key limitations of the research. Implementing interventions over long periods of time is difficult due to limits on the amount of school time that teens and young adults can spend on activities that are not strictly academic.

*AcademyHealth conducted this rapid review over a six-week period using an established protocol that emphasizes timeliness, efficiency, and responsiveness to decision makers' needs. The review synthesizes peer-reviewed systematic reviews published since 2010. A primary analyst undertook and revised the review. Two additional AcademyHealth analysts and two external experts provided input on the initial findings and draft report. Appendix 4 lists the search terms and databases used in this rapid review.*

## Appendix 1: Definitions

**Cognitive behavioral therapy (CBT).** In CBT, individuals learn how to recognize, explore and change relationships between negative thinking, behavior and depressed mood.<sup>3, 17</sup>

**Dialectical behavior therapy.** Dialectical behavior therapy is a modified form of CBT, in which individuals receive one-on-one therapy in addition to group skills training classes to help learn and use new skills for mindfulness, emotion regulation, and distress tolerance, among others.<sup>14</sup>

**Interpersonal therapy (IPT).** In IPT, individuals resolve interpersonal problems through a range of techniques (e.g., role playing), which are also intended to improve their access to social support and decrease interpersonal stress. These changes positively impact emotional processing and interpersonal skills and ultimately are intended to improve depression and anxiety symptoms.<sup>24</sup>

**Gatekeeper training.** In gatekeeper training, individuals who interact regularly with young adults and teens (e.g., teachers, school counselors) are trained to recognize warning signs for suicide and respond appropriately.<sup>31</sup>

**Mindfulness interventions.** Mindfulness is defined as “paying attention in a particular way: on purpose, in the present moment, non-judgmentally.”<sup>20, 25</sup> Interventions targeting mindfulness vary, but most incorporate a training period of guided meditation techniques focusing on mindful attention and awareness of breath, body, or mind and followed by independent practice.<sup>25</sup> Mindfulness interventions are often included with other components, such as yoga, cognitive-behavioral strategies, or relaxation skills training.

**Resilience-focused interventions.** A resilience-focused intervention addresses at least one individual (e.g., self-esteem) and at least one environmental (e.g., school connectedness) resilience protective factor and can employ a variety of approaches including CBT. Although there is some variation, resilience has been defined as the process of, capacity for, or outcome of successful adaptation in the context of risk or adversity.<sup>16</sup> It is generally accepted that protective factors, both within an individual and in their environment, can help moderate risk for adversity and therefore facilitate “resiliency” that can in turn reduce the likelihood of poor outcomes such as depression, anxiety, or substance use.<sup>5</sup>

**Social competence interventions.** Social competence is having the personal knowledge and skills to deal effectively with the choices, challenges, and opportunities presented throughout life.<sup>22</sup> Interventions that target social competence use a variety of approaches including group skill building and role playing to improve social competence in teens and young adults. These programs teach generic self-management personal and social skills, such as goal-setting, problem-solving and decision-making, and also teach cognitive skills to resist media and interpersonal influences, to enhance self-esteem, and to manage anxiety and stress.<sup>12</sup>

**Social influence interventions.** Social influence interventions involve equipping teens and young adults with the skills and knowledge to resist peer and other social pressures to drink or use drugs. Approaches often involve correcting overestimates of the drug use rates of adults and adolescents, recognizing high-risk situations, increasing awareness of media, peer and family influences, and teaching and practicing refusal skills.<sup>12</sup>

**Third-wave CBT.** Although the evidence is still emerging for the adolescent population, third-wave CBT approaches are becoming more prevalent. Unlike CBT, these techniques target the process instead of the content of thoughts, with the goal of helping people to become aware of and accept their thoughts in a non-judgmental way.<sup>19</sup> These interventions can include mindfulness-based interventions (MBIs).

## Appendix 2: Summary of Evidence

AcademyHealth identified 14 systematic reviews published since 2010 that evaluate interventions to help teens and young adults (ages 12-26) prevent the onset of behavioral health challenges and manage existing challenges. Our review included school-, community-, secondary institution-, or work-place-based solutions for this age group. In most cases, the research focused on middle school, high school, and college settings. We did not find systematic reviews that focused specifically on young adults in the workplace or evaluated community-based interventions in isolation of programs in other settings. At the direction of the review's funder, we examined previously synthesized peer-reviewed research concerning the effectiveness of interventions targeting three areas: depression and anxiety, suicide prevention, and substance use. Please see Appendix 3 for a high-level summary of findings by outcome. Where possible below, we call out evidence of particular interest to the funder about resilience-based interventions and information specific to populations facing additional health disparities.

This review includes evidence on universal approaches to prevention, which focus on a specific population regardless of risk (e.g., an entire school, grade, or class). We also include evidence on targeted approaches to prevention, which focus on a population at high risk for a certain disorder. Targeted interventions can be further split into selective interventions that focus on populations with a specific risk factor for the disorder (e.g. family history) and indicated interventions, which target populations exhibiting symptoms or signs suggestive of a disorder (e.g., early signs of substance use).<sup>26</sup>

### Depression and Anxiety

AcademyHealth identified six systematic reviews (see Appendix 5a and 5b) that examined the effectiveness of interventions to help teens and young adults prevent and manage depression and anxiety. Most of these reviews focused on CBT interventions delivered to youth or young adults in school- or community-based settings, though one review explored the effectiveness of a broader range of interventions.

- **Cognitive behavioral therapy (CBT).** We identified one systematic review that examined the effectiveness of CBT, Third-wave CBT, and Interpersonal Therapy (IPT) for children and adolescents ages 5-19. Among the 75 studies included, 67 were from middle/high school settings, and eight from college or university settings. The authors found that universal and targeted depression interventions both made small improvements in self-rated depressive symptoms immediately post-intervention and reduced the likelihood of depression diagnosis by a clinician.<sup>17</sup> This review found that, compared to universal interventions, targeted interventions – those that focus on individuals at higher risk for depression – had a larger effect in reducing depressive symptoms for a longer period of time (e.g., up to 12 months), though this was not the case for reductions in depression diagnosis. Universal interventions were less effective, as the review did not find evidence of an effect in reduction in depression diagnosis at six month follow-up. Universal interventions also had no effect on depressive symptoms at any point past the end of the study. Although targeted interventions were found to be more effective, authors caution that these studies did not include attention placebo controls, which control for factors like involvement in a trial and attention from researchers.<sup>17</sup> This is relevant because studies of universal interventions mentioned previously that did include these attention placebo controls found no effect on depressive symptoms or depression diagnosis.

Despite concerns about the design of some studies, review authors noted the promise of targeted interventions and singled out one approach tested in two of the included trials.<sup>6,27</sup> In these trials, a CBT-based intervention was modified to fit particular personality factors that defined four high-risk groups (hopelessness, impulsive, sensation seeking and anxiety sensitive). The studies found that the intervention reduced depression scores in all four high-risk groups, suggesting that effects were not specific to one risk factor and providing support for further stratification and modification of CBT approaches. Across all studies, authors found that neither the mode of delivery (i.e. face-to-face, including group or individual combined, versus online/telephone) nor the type of facilitator who delivered the intervention had a “material impact” on the magnitude of the overall treatment effect.<sup>17</sup>

- **Interpersonal therapy (IPT).** Review authors noted that although few trials included in the systematic review examined IPT – a therapy that helps individuals address relationship concerns or conflicts through a variety of techniques including role-play – these approaches are worthy of further exploration as these studies had the largest effect sizes of all therapy types included in the review.

- **Third-wave CBT.** Review authors found small reductions in depressive symptoms for third-wave approaches – those that target the process instead of the content of thoughts – though the magnitude was greater for IPT approaches.
  - **Mindfulness-based interventions.** One additional systematic review that examined the effect of mindfulness-based interventions (MBIs) in primary and secondary schools found that MBIs may have a small but positive and statistically significant impact on both cognitive and socio-emotional outcomes.<sup>25</sup> However, the interventions had no impact on behavioral and academic outcomes. Mindfulness interventions have received growing support and attention in schools as one approach to improving socioemotional development in children and adolescents. Mindfulness is defined as “paying attention in a particular way: on purpose, in the present moment, non-judgmentally”.<sup>20, 25</sup> In order to target mindfulness, MBIs are often included with other components, such as yoga, cognitive-behavioral strategies, or relaxation skills training. There were a total of 61 studies included in the review, but only the 35 randomized or quasi-experimental studies were used in the meta-analysis. All interventions were conducted in a group format and ranged in duration, meeting frequency, and intensity. There were few differences across outcomes, except for behavioral outcomes, suggesting that the interventions produced similar results across studies on cognitive, socio-emotional and academic outcomes despite the diversity of structure and format for interventions. While the review found small, positive improvements, authors noted the high level of bias in included studies, the potential implementation costs that could lower the benefit to schools, and the need for more rigorous evaluation of specific MBI features.
- **Exercise.** At the request of the review’s funder, we included evidence evaluating the impact of exercise on mental health outcomes in this review. We identified two systematic reviews that examined the effect of physical activity on behavioral health outcomes.
  - One review evaluated the impact of physical activity on self-esteem and self-concept in children and adolescents. Self-esteem is defined as feelings of one's personal self-worth, which is a person's evaluation of his or her own worth. Self-concept is a person's perceptions of himself or herself (e.g., what a person thinks about him or herself).<sup>1</sup> The review found that interventions including physical activity alone (i.e., not bundled with other interventions) made small improvements in self-worth and self-concept in adolescents, with the strongest association occurring in schools versus other settings such as community centers. The authors suggested this strong association could be because exercise is often mandated and provided free of charge in school settings. They also noted a relatively low publication bias and very low levels of differences across the randomized controlled trials included in the meta-analysis.
  - A second review evaluated the impact of physical activity on a broader range of outcomes including depression, anxiety, self-esteem, self-concept, and emotional disturbance, among others.<sup>32</sup> The authors found that increased levels of physical activity were associated with small, but statistically significant reductions in depression, anxiety, psychological distress, and emotional disturbance among young adults and teens. Like the review cited above,<sup>2</sup> both RCT and non-RCT studies included in the review showed improvements in levels of self-concept and self-esteem among teens and young adults. These findings are similar to a 2006 Cochrane review that included only RCT studies.<sup>21</sup> In terms of program design, the authors noted that RCT studies involving circuit training/strength training activities and mixed activity interventions (i.e., those that combined aerobic and resistance training exercises) demonstrated the greatest effect size. The review included interventions delivered in a variety of settings by different types of instructors. Reviewers found that when the intervention was led by teachers, researchers, or physical education specialists, participants showed small, but statistically significant improvements in both RCT and non-RCT studies. The reviewers found that the intervention effect did not depend on the age of the student or vary greatly depending on whether or not the student was obese/overweight or of typical weight. Based on the latter observation, the reviewers suggest that children appear to benefit from physical activity regardless of their weight/height ratio.
- **Computer-delivered and web-based interventions.** Often combining elements of different psychosocial approaches, computer or online-interventions have gained in popularity as a new and relatively low-cost method of reaching adolescents and young adults. We identified two reviews that included evaluations of computer-delivered and web-based interventions.<sup>9,10</sup> Findings suggest that computer-delivered or web-based interventions are effective when compared to no intervention, however, the effect size is smaller when compared to other interventions that include active components (e.g., in-person therapy). Both reviews note that the included studies were different across populations, interventions, and outcomes, thus preventing meta-analysis.

- One systematic review examined the effectiveness of computer-delivered or web-based interventions accessed via computer, laptop, or tablet in improving depression, anxiety, and psychological well-being among university students (including continuing education students through age 51).<sup>10</sup> Among the 17 included studies, 11 evaluated selective or indicated interventions while the remaining interventions were universal or difficult to categorize. Findings suggest these interventions can be effective in improving students' depression, anxiety, and stress outcomes when compared to inactive controls, though results are less impressive when computer-delivered or web-based interventions are compared to active controls, such as face-to-face cognitive behavioral therapy.<sup>10</sup> A meta-analysis conducted by the review authors did not significantly favor the intervention or the comparison intervention, which may suggest they have a similar effect on improving anxiety and depression outcomes. The risk of bias in included studies was moderate, primarily due to publications lacking adequate methodological detail.
- A second review of reviews, which evaluated a number of interventions aimed at improving adolescent mental health, found eight systematic reviews evaluating the effectiveness of “digital platforms” or computer-delivered and web-based interventions.<sup>9</sup> Review authors noted that skills-based online modules can have positive impacts on anxiety and depression symptoms, in particular those that use CBT approaches. However a meta-analysis could not be completed and more research is needed to identify the specific components and conditions that enhance effectiveness.
- **Resilience-focused interventions.** We identified one systematic review that examined the effectiveness of resilience-focused interventions in schools on improving the mental health of children and adolescents ages 5-18.<sup>11</sup> A resilience-focused intervention, as defined by the author, addresses at least one individual (e.g., self-esteem) and at least one environmental (e.g., school connectedness) resilience protective factor and can employ a variety of approaches including CBT. Although definitions of “resilience” vary, it has been defined as the process of, capacity for, or outcome of successful adaptation in the context of risk or adversity.<sup>16</sup> It is generally accepted that protective factors, both within an individual and in his or her environment, can help moderate risk for adversity and therefore facilitate “resiliency” that can in turn reduce the likelihood of poor outcomes such as depression, anxiety, or substance use.<sup>5</sup>

The review found that universal school-based resilience interventions (i.e., those delivered to an entire cohort or population) can have a positive effect on many of the depressive and anxiety symptoms experienced by children and adolescents. However, there is significant variation in effectiveness depending on age, length of follow-up, and mental health outcome measured. In a meta-analysis of adolescent trials only, the review authors found that these interventions had a smaller positive effect for adolescents compared to children.<sup>11</sup> The authors suggested that this finding implies a need to more effectively tailor resilience-focused interventions to target protective factors that are developmentally appropriate at the age of implementation.<sup>33</sup> Among the array of intervention types included in the review, the authors found that interventions incorporating CBT were most promising, as they had a statistically significant effect for depressive symptoms, anxiety symptoms, and general psychological distress. There were no significant effects for non-CBT-based, resilience-focused interventions.

Though not specific to resilience-based interventions, a second review examined the effectiveness of a broad range of interventions to improve adolescent mental health and found that community-based mental health and behavioral programs that target low-income urban youth and focus on both individual and environmental factors were more effective than individual-only approaches.<sup>9</sup> While the authors did not specifically identify these interventions as resilience-based, this finding provides support for the use of key features of resilience-based interventions for low-income populations.

## Substance Use

AcademyHealth identified five systematic reviews (see Appendix 5c) that examine the effectiveness of interventions for reducing substance use in adolescents and young adults.

- **Resilience-focused interventions.** One systematic review found that universal school-based interventions that address adolescent resilience protective factors as part of any intervention approach are effective in reducing illicit substance use, but not alcohol or tobacco use in adolescents ages 5-18.<sup>18</sup> The review authors reported only on substance use outcomes, not on other measures of resilience. They used a similar definition as mentioned above,<sup>11</sup> and defined a resilience-focused intervention as one that addresses at least one individual (e.g., self-esteem) and at least one environmental (e.g., school connectedness) resilience protective factor. The review authors note that

because the majority of included studies were “multi-dimensional” – i.e., addressed resilience protective factors as part of a broader intervention approach – it is unclear whether the observed effect on illicit substance use was due to the resilience component of the interventions or another component. This, however, does provide some support for bundling interventions that target a wide variety of behavioral health outcomes.

- **Other interventions.** Four systematic reviews evaluated interventions for reducing substance use more broadly.
  - **Universal interventions.** One Cochrane review found that universal school-based interventions that were based on a combination of social competence and social influence approaches, which both typically address resilience protective factors (like problem solving and self-esteem), were effective in reducing illicit drug use in the long term when compared with information-only or no intervention.<sup>12</sup> This finding is consistent with that of the resilience-focused systematic review noted above.<sup>18</sup>
  - **Brief interventions** are evidence-based practices that typically employ a type of CBT or motivational interviewing (among other approaches), are delivered in an hour or less, and are designed to motivate individuals at risk of substance abuse and related health problems to change their behavior by helping them understand how their substance use puts them at risk and to reduce or give up their substance use. According to one systematic review, adolescents who received a brief intervention did better in reducing their alcohol and cannabis use than adolescents who did not receive an intervention. However, adolescents who received a brief intervention did not seem to do better in reducing their alcohol and cannabis use than adolescents who received information-only interventions.<sup>8</sup> It is important to note that the systematic review cited here included only six studies.
  - **Computerized brief interventions.** A computerized brief intervention is any activity delivered through online or offline electronic devices in an hour or less with a therapeutic or prevention component.<sup>28</sup> One review found that computerized brief interventions reduce alcohol consumption in the short-term when compared to no intervention; the effect size is small though statistically significant.<sup>28</sup> The authors note that interventions incorporating an evaluation of alcohol use may have a larger effect. The evidence was too limited on cannabis use to draw meaningful conclusions. While the review authors raised issues with the quality of reviewed evidence, they noted that these types of interventions should continue to be studied and considered as they are relatively easy to administer with low costs and no demonstrated adverse effects.

## Suicide Prevention

AcademyHealth identified three systematic reviews (see Appendix 5d) examining the effectiveness of interventions to prevent suicide. Most of these reviews focused on interventions delivered to youth or young adults in school- or community-based settings, though one review explored the effectiveness of a broad range of interventions – including school-based programs – in relation to the general population.

- **Psychosocial interventions.** We identified one systematic review that examined the impact of a range of psychosocial interventions delivered in school, community or health care settings to improve suicide-related outcomes in individuals ages 12 to 25.<sup>7</sup> Included interventions were cognitive behavioral therapy, dialectical therapy, problem-solving therapy, psychoeducation, and community treatment or support delivered primarily to individuals with a history of suicidal ideation or attempt, and to a lesser extent, to individuals with elevated risk due to history of depression or deliberate self-harm. In all, just over half of the 32 analyses included in the review showed a significant effect of the intervention on suicidal ideation, suicide attempts, deliberate self-harm, and/or suicidality at immediate post-intervention or follow-up. Among the effective programs, nearly 60 percent delivered a psychotherapeutic intervention, while the remaining effective programs contained less formal psychosocial interventions, such as social support and motivational interviewing. Thirty-five percent of effective programs were delivered in school environments.
- **Gatekeeper training.** Gatekeeper training – in which individuals are trained to recognize warning signs for suicide and respond appropriately – has been studied in several populations since 2005, including military personnel, public school staff, peer helpers, youth workers, and clinicians, among others.<sup>31</sup> However, the link between gatekeeper training and suicidal behavior has yet to be fully established, particularly in educational settings. A 2014 systematic review focused on suicide prevention interventions for secondary students with no known history of mental illness found that gatekeeper

training programs made small improvements in short-term suicide knowledge among students, peer advisors residing in student accommodation, and faculty and staff, and also increased suicide prevention self-efficacy among peer advisors.<sup>14</sup> However, results varied across studies and evidence examining the effect of gatekeeper training on gatekeeper behavior and students' suicidal behavior was lacking. The authors of a more recent systematic review that focused on a general population came to a similar conclusion, noting that "no RCT (randomized controlled trial) has shown that gatekeeper training alone affects suicide rates."<sup>31</sup>

- **Other school-based programs.** We identified one review that examined systematic reviews and individual studies on many different types of suicide prevention interventions implemented across a range of ages, including during childhood and early adulthood. Drawing on findings from the reviewed systematic reviews, the authors found consistent evidence that school-based programs improve knowledge and attitudes toward suicide, but show no effect on actual suicide behavior.<sup>31</sup> However, the authors identified three large randomized controlled trials emphasizing mental health literacy, suicide risk awareness, and skills training in schools that showed significant effects on suicide attempts and ideation.

In addition, we identified a systematic review examining two other types of interventions for preventing suicide in university and other post-secondary educational settings.

- **Classroom instruction.** In three randomized controlled trials assessed by one systematic review, classroom-based didactic and experiential programs increased short-term knowledge of suicide and knowledge of suicide prevention. The authors found no studies testing the effects of classroom instruction on suicidal behavior or long-term outcomes.<sup>15</sup>
- **Institutional policy.** This systematic review also examined a controlled before-and-after study that analyzed the effects of an institutional policy implemented at a Midwestern university that restricted student access to laboratory cyanide and mandated professional assessment for suicidal students. Relative to 11 comparable control institutions, the authors found a significantly lower cumulative incidence of suicide at the intervention institution in the years following the policy change. The authors were not able to separate the effects of the two intervention components as they were implemented at the same time.<sup>15</sup>

### Appendix 3: Summary of Evidence by Outcome

Outcome Category	Intervention Type	Review	Setting	Evidence Summary
Depression	Cognitive Behavioral Therapy (CBT) Third-Wave CBT Resilience-based CBT	Hetrick, 2016	Middle/high school AND College/University	Targeted prevention programs can lead to a small reduction in depression diagnosis at post-intervention assessments and in the short-term (up to three months) and medium-term (four to twelve months). In addition, they effectively reduce self-reported symptoms, at least in the short-term. Universal prevention programs are not effective in reduction of clinical symptoms, and there are small effects observed only at immediate post-assessment for self-reported symptoms and diagnosis of depression.
	Interpersonal therapy	Das, 2016	Middle/high school	Targeted CBT can, with small effects, effectively reduce symptoms of depression in secondary schools.
		Dray, 2017	Middle/high school	CBT resilience-based interventions can effectively reduce depressive symptoms in the short-term children and adolescents. Effects are small. Non-CBT resilience-based interventions are not effective.  Variation across sub-groups demonstrates a need to understand the specific characteristics of target population, intervention, and outcome
	Web-based interventions (includes some CBT-based interventions)	Davies, 2014	College/University	Web-based interventions can be effective in reducing depression in university students when compared to non-active controls. However, there is no evidence of improved outcomes when compared to other active interventions.
Anxiety	CBT, Third-Wave CBT, and Interpersonal therapy	Hetrick, 2016	Middle/high school AND College/University	Depression prevention programs demonstrate potential to reduce anxiety symptoms in the short-term (up to three months) and medium-term (four to twelve months).
		Das, 2016	Middle/high school	Targeted CBT can effectively reduce symptoms of anxiety. Effect sizes vary across studies.
		Dray, 2017	Middle/high school	CBT resilience-based interventions will lead to small and short-term reductions in anxiety.  Variation across sub-groups demonstrates a need to understand the specific characteristics of target population, intervention, and outcome.
	Mindfulness-based interventions (MBIs)	Maynard, 2017	Middle/high school	Mindfulness-based interventions can have a small impact on improving anxiety in children and adolescents.
	Web-based CBT interventions	Davies, 2014	College/University	Web-based CBT interventions, compared to no intervention, can improve anxiety in university students. However, when compared to a different active intervention, they do not show any statistically significant improvement in outcomes.
Suicide	Classroom-based instructional programs	Das, 2016	Middle/high school AND College/University	The use of classroom based information-only curriculum programs and experiential programs improved short-term knowledge of suicide and knowledge of suicide prevention. There is no impact on attitudes or behaviors.
		Harrod, 2014	College/University	Classroom-based teaching improves short-term knowledge of suicide and of suicide prevention. There is some evidence that didactic teaching programs is slightly more effective when compared to experiential interventions for increasing knowledge of suicide. It does not have any demonstrated impact on suicide prevention self-efficacy.
	Gatekeeper training programs	Harrod, 2014	College/University	Gatekeeper programs may have a small impact on knowledge of suicide prevention and suicide prevention self-efficacy, but the evidence is limited and no other suicide-related outcomes are impacted.
	CBT, DBT, and other psychosocial interventions	Calear, 2016	Middle/high school AND Community	There is little evidence to suggest that interventions can improve rates of suicidal ideation, suicide attempts, deliberate self-harm, and /or suicidality immediately after the intervention. While some individual studies find the intervention effective in at least one outcome, there is significant heterogeneity in intervention setting, content, and approach as well as in outcomes. No meta-analysis was included in the review.
	Institutional Policy	Harrod, 2014	College/University	Mandatory assessment for suicidal behavior and restriction of means can reduce the number of suicides in colleges. These findings were based on a study of one university compared to several controls and using a before-and-after analysis.



Stress	Mindfulness-based interventions	Maynard, 2017	Middle/high school	MBIs can result in a small improvement in adolescent stress.
	Web-based interventions	Davies, 2014	College/University	Web-based interventions are effective at reducing stress when compared to an inactive control. Attrition bias is a concern, almost double for intervention versus inactive controls
Other Behavioral Health Outcomes	Creative activities	Das, 2016	Community	Activities such as music, dance, singing, drama, and visual arts may have a small positive effect on self-confidence and self-esteem in adolescents. This finding was based on one systematic review with weak quality evidence.
	Mindfulness-based interventions	Maynard, 2017	Middle/high school	MBIs lead to a small improvement self-esteem, social skills, engagement, internalizing behaviors, and other socioemotional behaviors.
	Resilience-based CBT interventions	Dray, 2017	Middle/high school	Small improvements in internalizing and externalizing problems and general psychological distress are observed with resilience-based CBTs.
	Physical activity	Mingli, 2015	Middle/high school AND College/University	Physical activity can lead to a small improvement in self-concept and self-worth.
	Web-based interventions	Davies, 2014	College/University	There is no evidence to suggest that web-based interventions improve psychological distress in college students. Evidence was limited.
Alcohol Use	Universal Resilience interventions	Hodder, 2017	Middle/high school	Universal resilience interventions do not reduce alcohol use.
	Brief interventions	Carney, 2016	Middle/high school	When compared to information provision, brief interventions have no effect on alcohol quantity consumed or dependence. When compared to assessment only controls, brief interventions have small impacts in alcohol-related outcomes, but only in the short- and medium-term.
	Computerized brief intervention	Smedlund, 2017	Middle/high school AND College/University	Computerized brief interventions with assessment and feedback are more effective than no intervention at reducing alcohol consumption. In addition, multi-dose treatment is better than single-dose treatment. There may be short-term benefits to computerized brief interventions compared to assessment only interventions. No observed differences in gender specific feedback compared to non-gendered feedback. The majority of evidence included received a low or very low quality rating.
	Social norms interventions	Foxcroft 2015	College/University	There is some evidence for the effectiveness of web feedback and individual face-to-face feedback in reducing alcohol-related problems, binge drinking quantity of alcohol consumed, frequency of alcohol consumed, and peak blood alcohol content (BAC) among college and university students. However, the effect size was small and the reviewers suggest this information is unlikely to provide any advantage in practice.
Tobacco Use	Resilience interventions	Hodder, 2017	Middle/high school	Interventions did not reduce tobacco use in any subgroup.
Cannabis Use	School-based universal interventions	Faggiano 2014	Middle/high school AND College/University	When compared to curricula or no intervention, social competence interventions reduced use of cannabis. Combined programs can have a small effect on cannabis use in the long term while social influence programs are unlikely to reduce cannabis use.
	Brief interventions	Carney, 2016	Middle/high school	When compared to information provision, brief interventions had no effect on cannabis quantity consumed, frequency, or dependence. When compared to assessment-only controls, brief interventions reduced cannabis frequency, abuse, and dependence at long-term follow up.
	Computerized brief intervention	Smedslund, 2017	Middle/high school AND College/University	Computerized brief interventions generally did not impact cannabis consumption. Evidence was limited or non-existent for many cannabis outcomes and comparisons.
Other substance use (hard drugs, etc.)	School-based universal interventions	Faggiano 2014	Middle/high school AND College/University	When compared to curricula or no intervention, neither social competence interventions or combined programs reduced use of hard drugs. Social influence, when compared to curricula or no intervention, may reduce use of hard drugs in the long-term.
	Resilience interventions	Hodder, 2017	Middle/high school	Resilience interventions can reduce the use of illicit substances.
Cognitive (executive function, memory, cognition, attention)	Mindfulness-based interventions	Maynard, 2017	Middle/high school	MBIs can lead to small to modest improvement in cognitive function.

## Appendix 4: Search Strategy

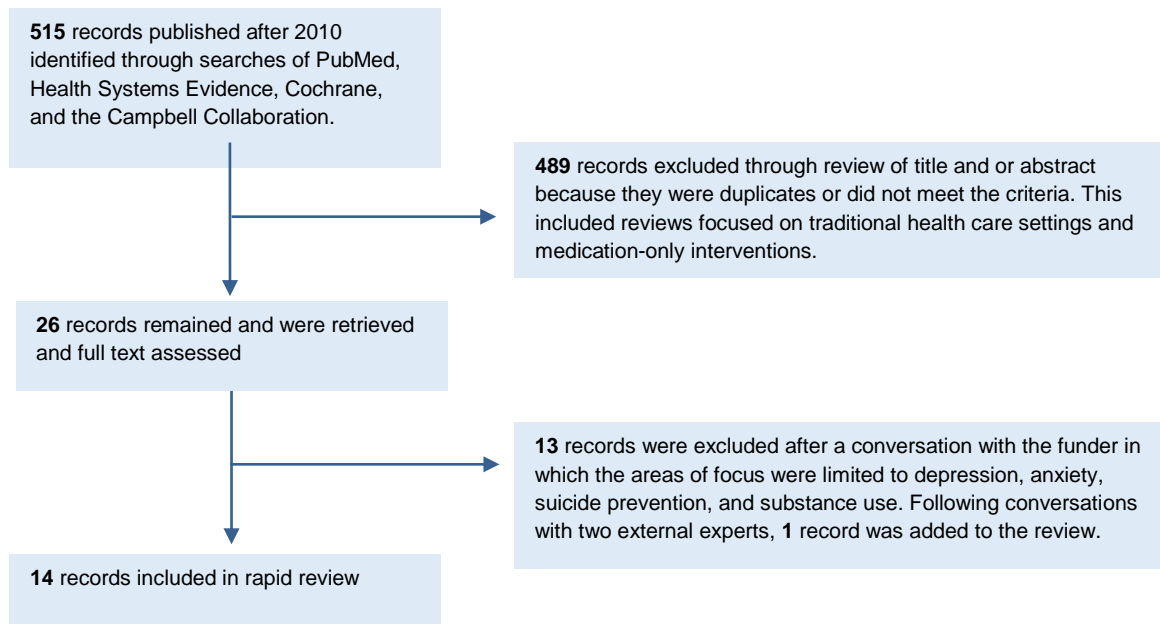
Figure 1 shows the basic Boolean search term strategy used for the review, and Figure 2 lays out the process for selecting articles found through the search for inclusion in the rapid review.

We modified searches as appropriate to reflect the search capabilities of each database used. Initial searches began with searches that combined terms from the “behavioral health” columns in Figure 1 below combined with “setting” terms. If needed in order to narrow the results, terms from the “intervention” column were also applied. We searched the following databases and websites: Health Systems Evidence, the Cochrane Library, the Campbell Collaboration, and PubMed.

**Figure 1:** Search terms used

Behavioral Health		Setting		Intervention
mental health OR behavioral health	AND	school OR middle school OR high school	AND	intervention
anxiety OR depression		university OR college OR community college		therapy
suicide OR suicide prevention		community organization		prevention
substance use disorder OR alcohol OR marijuana OR cannabis OR opioids OR drug use		school OR middle school OR high school		peer support
attention-deficit/hyperactivity disorder OR ADHD OR oppositional defiant disorder OR conduct disorder*		university OR college OR community college		
eating disorder OR anorexia nervosa OR bulimia *				
*Systematic reviews found via this search were later excluded based on input from the funder.				

**Figure 2:** Process for selecting articles for inclusion in this rapid review



## Appendix 5: Systematic Reviews

Table 5a: Depression and Anxiety

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<p>Dray, et. al., <a href="#">Systematic Review of Universal Resilience-Focused Interventions Targeting Child and Adolescent Mental Health in the School Setting</a>. Pub Med, 2017 Oct; 56(10):813-824.</p>	<p><i>To examine the effectiveness of resilience-focused interventions in schools to improve the mental health of children ages 5-18.</i></p> <p><b>Age range:</b> 5-18 years old</p> <p><b>Mental health outcomes:</b> Depressive symptoms, anxiety symptoms, and other behavioral outcomes (hyperactivity, conduct problems, internalizing problems, externalizing problems, general psychological distress)</p> <p><b>Interventions included:</b> Resilience-focused interventions (both CBT-based and non-CBT based).</p> <p><b>Intervention scope:</b> <i>Universal</i></p>	<p><b>Date range:</b> 1995-2015</p> <p><b>Inclusion criteria:</b> The review included randomized controlled trials (RCTs) that used universal, school-based interventions, and had a control group. The studies included had strategies to improve a minimum of three or more internal resilience protective factors (behaviors or characteristics commonly associated with improved behavioral health). They measured at least one of seven mental health outcome/areas of focus.</p> <p><b>Exclusion criteria:</b> Studies conducted in war zones.</p>	<p><b>Studies included:</b> Fifty-seven total RCTs were included, and forty-nine were analyzed in the meta-analysis. They were either RCTs (12) or cluster-randomized controlled trials (CRCTs) (45).</p> <p><b>High-level findings:</b> Resilience-focused interventions can have a positive effect on many of the depressive and anxiety symptoms of children ages 5-18. However, there is significant variation depending on age, length of follow-up, and mental health outcome measured. These variations highlight the need for continued evaluation to study and identify the variables that impact outcomes. The meta-analysis found that there was a statistically significant effect of the resilience-focused interventions on (1) depressive symptoms (2) internalizing problems (3) externalizing problems (4) general psychological distress.</p> <p>Based on an additional analyses comparing CBT-based versus non CBT-based resilience-focused interventions, there was a statistically significant effect for CBT-based resilience focused interventions for depressive symptoms, anxiety symptoms, and general psychological distress. There were no significant effects for non-CBT-based, resilience-focused interventions.</p> <p>Overall, the observed variation across sub-groups demonstrates that the specific characteristics of the intervention, mental health focus, and the individual treated have a significant impact on whether there will be an observed improvement.</p>	<p>Using the GRADE criteria, a systematic approach to making judgements about quality of evidence and strength of recommendations, the authors rated the quality of evidence for outcomes as moderate (Grade Working Group ND.) However, the reviewers gave depressive symptoms a low quality rating because they showed significant publication bias.</p> <p>In addition, given the difficulties associated with blinding and standardized implementation and outcome measurement, the author's flagged 77% of the studies for high risk of bias. Finally, the reviewer' rate of bias for performance and detection bias close to 95%.</p>	<p>The meta-analysis comparing short-term and long-term follow-up demonstrates that there is variation over time on the impacts of the intervention.</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
			The external validity of findings are likely to be dependent on the specific characteristics of subjects, environmental, and method of delivery.		
<p>Hetrick, <i>et al.</i> <a href="#">Cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in children and adolescents.</a></p> <p>Cochrane Database of Systematic Reviews, 2016, Issue 8.</p>	<p><i>The effect of cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in children and adolescents.</i></p> <p><b>Age range:</b> 5-19 years old</p> <p><b>Mental health outcomes:</b>  (1) Depression diagnosis at 12 month follow up  (2) Self-rated depressive symptoms post-intervention  (3) Anxiety and general functioning</p> <p><b>Interventions included:</b>  CBT  Third-wave CBT  Interpersonal Therapy</p> <p><b>Intervention scope:</b>  <i>Universal:</i> The review authors included twenty-nine studies that targeted the general population.</p> <p><i>Targeted:</i> The authors included fifty-three studies targeted to higher risk populations.</p>	<p><b>Date range:</b> June 2010-September 2015</p> <p><b>Inclusion criteria:</b>  The studies include utilized universal interventions and targeted (indicated/selected) interventions aimed at young people at risk of developing a depressive disorder. The study designs included were RCTs and cluster RCTs. The interventions reviewed were intended for children who did not meet diagnostic criteria for depression.</p> <p><b>Exclusion criteria:</b>  Trials in which participants were recruited based on other psychological problems such as post-traumatic stress disorder (where depression was a secondary outcome) were excluded from the review. In addition, the author's did not include studies that evaluated educational or curriculum-based interventions, interventions designed to help children overcome specific situations such as divorce, and pharmacologic treatments. Finally, head-to-head trials where CBT, IPT or third wave CBT was only compared to another type of psychological intervention (e.g. no control group was present).</p>	<p><b>Studies included:</b> A total of eighty-three independent trials were included in middle/high school settings (67) and in college-university settings (8).</p> <p><b>High-level findings:</b>  The authors conclude that there is still not enough evidence to support the implementation of depression prevention programs. The results show small positive benefits of depression prevention interventions, for both the primary outcomes of self-rated depressive symptoms post-intervention and depression diagnosis by a clinician up to 12 months. Authors note that the effect was not present beyond 12 months. Authors rated this evidence as moderate to low quality according to the GRADE criteria (Grade Working Group N.D.).</p> <p>The results for the secondary outcomes, including anxiety and general functioning, showed little effect seen beyond 12 months. There was limited data for anxiety and general functioning.</p> <p>For universal interventions there was no evidence of an effect in reduction of depressive disorder, but a small effect on depressive symptoms at medium-term follow-up (primary outcome). The post-intervention assessment, short-term follow-up had small to moderate effects. There were no observed effects at the long-term follow-up. When universal interventions were compared to an attention-placebo control, there was no evidence of effect.</p>	<p>The authors note the lack of attention placebo-controlled trials (a control intervention that controls for non-specific factors like involvement in a trial and attention from researchers) used for targeted interventions is a key limitation to consider. This is important because among trials implemented in universal populations a number used an attention placebo comparison in which the intervention consistently showed no effect.</p> <p><b>Selection Bias:</b> Authors rated less than half of the trials included in this review as low risk of bias for random sequence generation or allocation concealment, suggesting that selection bias may be high.</p> <p><b>Performance and Detection Bias:</b> This is likely to be high in the majority of trials given that blinding of participants in most trials was not possible and that most trials relied on</p>	<p>The authors note that the estimates of numbers needed to treat to benefit compare well with other public health interventions. However, which programs should be implemented, and how, is not clear.</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
			<p>For targeted approaches there is evidence of an effect on both depressive disorder and depression symptoms at medium-term follow-up, post-intervention assessment, and short term follow-up, but not at long-term follow-up.</p> <p>There were significantly larger effects for targeted programs in terms of reduced depression symptom severity but not for reduction in depressive disorder. Authors note that a larger effect for indicated targeted interventions is to be expected because of the higher levels of depression at the start of the intervention. They note it is unclear whether the type of population impacted the results of the intervention.</p> <p>The findings suggest that IPT approaches have the largest effect (albeit only tested in two trials)</p> <p><i>Mode of delivery</i>            Authors found that neither the mode of delivery (i.e. face-to-face including group or individual combined versus online/telephone) nor the type of facilitator who delivered the intervention had any material impact on the magnitude of the overall treatment effect.</p>	<p>participant self-reported depression symptoms.</p>	
<p>Mingli, <i>et al.</i>  <a href="#">Does Physical Activity Intervention Improve Self-Esteem and Self-Concept in Children and Adolescents?</a>  <a href="#">Evidence from a Meta-Analysis.</a>            Pub Med,</p>	<p><i>The objective of this systematic review and meta-analysis was to understand the impacts of physical activity on self-esteem and self-concept in children and adolescents.</i></p> <p><b>Age range:</b> 3-20 years old.</p> <p><b>Mental health outcomes:</b>            Self-esteem            Self-concept            Self-worth</p>	<p><b>Date range:</b> Up to July 2014</p> <p><b>Inclusion criteria:</b>            The studies included met the following criteria:            (1) Intervention was a form of supervised physical activity or included supervised physical activity            (2) Enough data to estimate overall effect size of the intervention on self-concept or self-esteem</p>	<p><b>Studies included:</b> The review analyzed a total of thirty-eight studies. The study designs included randomized controlled trials (25) and non-randomized controlled trials (13). Of those included, most were school-based (24) and most took place in the U.S. (18).</p> <p><b>High-level findings:</b>            Meta-analysis were conducted based on whether the intervention was physical activity (PA) alone or physical activity combined with other interventions. The meta-analysis for PA alone, using a RCT design, indicated small but significant</p>	<p>The authors assessed quality of evidence included with the Cochrane risk of bias tool. The risk of bias in RCTs was generally moderate to high. The author's considered whether there was use of randomized sequence generation (48%), allocation concealment (40%), blinding (28%), and follow-up information (28%) Most</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
PLoS One. 2015; 10(0).	<p><b>Interventions included:</b> Physical activity (school-based, gymnasium-based, family-based, clinic-based, detention-facility-based, or camp-based)</p> <p><b>Intervention scope:</b> <i>Universal:</i> Some studies evaluated universal interventions.</p> <p><i>Targeted:</i> Some studies targeted intervention to groups of individuals, such as overweight/obese children or children with asthma.</p>	<p>(3) Participants were between the ages 3-20 years old</p> <p>(4) The study used a control or comparison group with no physical activity intervention</p> <p><b>Exclusion criteria:</b> Not specified.</p>	<p>positive effects on both self-worth and self-concept. There were no significant effect on self-esteem. The meta-analysis for PA alone, using a non-RCT design, showed no significant effects on outcomes. Finally, the meta-analysis for PA combined with other strategies found no statistically significant effects on outcomes.</p> <p>The meta-regression analysis revealed that there was a stronger association between PA interventions on observed outcomes in school- and gymnasium-based interventions than elsewhere.</p>	<p>RCTS did report participant inclusion and exclusion criteria or explain the reasons for dropout.</p> <p>The authors determined that the risk of bias in the included non-RCTs was generally low.</p> <p>The conclusions of the review are limited by the heterogeneity of PA interventions across included studies.</p>	
<p>Davies <i>et al.</i> <a href="#">Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being among university students: a systematic review and meta-analysis.</a> J Med Internet Res, 2014 May 16;16(5):e130</p>	<p><i>This review examines the effect of computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being among university students.</i></p> <p><b>Age range:</b> 17-51 years old. (Continuing education students included.)</p> <p><b>Mental health outcomes:</b> Psychological distress, stress, depressive, or anxiety.</p> <p><b>Interventions included:</b> Any intervention delivered via a website or offline computer program and accessed via computer, laptop, or other technological device.</p> <p>Just over half the interventions were semi-guided. Interventions including human support were included in the review, provided they were</p>	<p><b>Date range:</b> No restriction.</p> <p><b>Inclusion criteria:</b> Studies were included if they were randomized controlled trials that (1) aimed to improve symptoms relating to depression, anxiety, psychological distress, and stress; (2) involved computer-delivered or web-based interventions accessed via computer, laptop, or tablet; and (3) focused on higher education students.</p> <p><b>Exclusion criteria:</b> Not specified.</p>	<p><b>Studies included:</b> Seventeen studies evaluating fourteen distinct interventions. Seven were completely self-guided and nine were semi-guided.</p> <p><b>High-level findings:</b> Findings suggest that web-based and computer-delivered interventions can be effective in improving students' depression, anxiety, and stress outcomes when compared to inactive controls, but some caution is needed when compared to other trial arms and methodological issues were noticeable.</p> <p>The authors note that when compared to active control and comparison interventions (e.g., face-to-face CBT), computer-delivered and Web-based interventions were not significantly supported in improving depression or anxiety. They note that this could be expected given that active control and comparison interventions involve actively doing something versus the lack of intervention in the control.</p>	<p>Risk of bias was considered by the authors to be moderate, as many publications did not sufficiently report their methods. For example, only a minority of studies reported their randomization method; this has been reported previously in reviews of computer CBT, technology-based interventions, and interventions to improve help-seeking and stigmatizing attitudes and beliefs in university students.</p> <p>Aside from one trial, which aimed to treat diagnosable social phobia, none of the studies explored post-intervention diagnosis of mental disorders.</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<p>delivered by laypersons or non-health care professionals and were a complementary component of intervention.</p> <p><b>Intervention scope:</b>  <i>Universal:</i> 4 studies  <i>Targeted:</i> 11 studies</p>		<p>Neither the intervention nor comparison intervention were significantly favored in the meta-analysis, which may suggest that they have a similar effect on improving anxiety and depression outcomes.</p>		
<p>Ahn S, Fedewa A. A meta-analysis of the relationship between children's physical activity and mental health. <i>J Pediatr Psychol.</i> 2011 May;36(4):385-97. doi: 10.1093/jpepsy/jsq107.</p>	<p><i>This synthesis sought to address the following questions: (1) What are the overall effects of physical activity on children's mental health? (2) Do these effects vary depending on the intervention, sample, and study design characteristics? In particular, is physical activity more important for children who are classified as obese or overweight?</i></p> <p><b>Age range:</b> 3-18</p> <p><b>Mental health outcomes measured:</b>            Depression/dejection, anxiety, global self-esteem, self-concept, distress/post-traumatic stress disorder and emotional distress, psychological distress or a combination of multiple symptoms, suicide ideation, attention deficit hyperactivity disorder, life satisfaction, somatic symptoms, problems in social functioning, conduct/behavioral problems, cognitive impairment, and psychosis.</p> <p><b>Interventions included:</b> A broad range of physical activity programs that the review authors categorized as</p>	<p><b>Date range:</b> 1960 – 2010</p> <p><b>Inclusion criteria:</b> Studies were included if they (1) investigated the effect or relationship of some type of physical activity and children's mental health; (2) targeted populations ranging from pre-school to high school age (3-18 years); (3) involved data that had been used only once in a manuscript; (4) were published in English.</p> <p><b>Exclusion criteria:</b> Studies were excluded if they (1) were qualitative or conceptual studies; (2) did not provide sufficient information for calculating effect size; (3) used advanced data analysis techniques such as regression.</p>	<p><b>Studies included:</b> 73 studies, most of them conducted in the U.S. (55) and the remaining studies conducted in Brazil, Germany, Hungary, South Africa, Switzerland, the U.K., China, Canada and Australia.</p> <p><b>High-level findings:</b> The review found that increased levels of physical activity had significant effects in reducing depression, anxiety, psychological distress, and emotional disturbance in children. The reviewers note that both RCT and non-RCT studies also showed that physical activity increased children's levels of self-esteem. The reviewers note that the type of physical activity children received had varying effects on their mental health, with RCT studies showing the greatest effect for circuit training/strength training activities and mixed activity interventions (i.e. those that combined aerobic and resistance training exercise).</p> <p>Findings also suggest that individualized or class-wide interventions lead by teachers, researchers or PE specialists are especially effective in reducing mental health problems among children.</p> <p>Interestingly, both RCT and non-RCT studies demonstrated equal effects for children who were obese/overweight and those who were of typical weight, suggesting that children appear to benefit from physical activity regardless of their weight/height ratio.</p>	<p>The reviewers state that slight publication bias existed for their analysis, which they note reflects the way individual studies in the field are conducted and disseminated. Taking into account this potential validity threat, the reviewers note that the overall effect size between physical activity and children's mental health remained significant.</p> <p>The majority of included studies did not include children's ethnicity or socioeconomic status, limiting the reviewers' ability to include these variables as potential moderators for the relationship between physical activity and child mental health outcomes.</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	(1) aerobic training, (2) resistance/strength/circuit training, (3) flexibility training, (4) regular physical education (PE) program, (5) sport participation such as ski, football and volleyball, (6) movement/motor skill training, (7) yoga (including meditation), (8) combined, and (9) not informed.		However, the reviewers note that effect sizes from RCT studies were significantly greater for children who were diagnosed as cognitively impaired or emotionally disturbed compared to children who were typically developing and did not have an emotional disorder.		

**Table 5b: Other/Multiple**

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
Das, et. al. <a href="#">Interventions for Adolescent Mental Health: An Overview of Systematic Reviews</a> . Pub Med, 2016 Oct; 59(4 Suppl): S49-S60..	<p><i>This review examines the evidence on a variety of mental health interventions for adolescents and youths, including school-based and community-based treatments.</i></p> <p><b>Age range:</b> 11-19 years old (adolescents) and 15-24 years old (youths)</p> <p><b>Mental health outcomes:</b> Anxiety Depression Suicidal behavior Eating disorders Self-esteem and other behavioral indicators</p> <p><b>Interventions included:</b> School-based (12) 1) Targeted group-based (nurture groups) 2) Screening tools</p>	<p><b>Date range:</b> Up to December 2015</p> <p><b>Inclusion criteria:</b> All systematic reviews targeting the appropriate age ranges with prevention and management interventions for mental health improvement were included.</p> <p><b>Exclusion criteria:</b> Reviews were excluded if they were nonsystematic, if they targeted populations other than youths and adolescents, or if they did not report any mental health outcomes.</p>	<p><b>Studies included:</b> Thirty-eight studies were included. The studies included some assessing school-based interventions (12) and some assessing community-based interventions (6).</p> <p><b>High-level findings:</b> Both targeted group-based interventions and cognitive behavioral therapy resulted in improvements in symptoms for depression and anxiety in school-based interventions.</p> <p>Youths and adolescents who received cognitive behavioral therapy, when compared to a wait list control had significant positive improvement in their anxiety symptoms.</p> <p>School-based suicide prevention improved knowledge and understanding of suicide but had no</p>	<p>The reviewers used AMSTAR (an 11 point system) to evaluate the quality of evidence. The school-based interventions had a median score of 7.5 while the community-based interventions had a median score of 5.</p> <p>Significant variation in both interventions and outcomes made a meta-analysis not feasible for the majority of interventions tested. This diversity in intervention and outcome measured weakens the applicability of evidence and its interpretation, and the reviewers call for more rigorous evaluation of interventions within subgroups to better evaluate effectiveness.</p>	



Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<p>3) Cognitive behavioral therapy (CBT)  4) Psychoeducation  5) Interpersonal therapy  6) Suicide prevention programs  7) Day therapy programs</p> <p>Community-based (6)  1) General programming  2) CBT</p> <p>Digital platforms (8)  1) Mass media interventions  2) Computerized or media-based CBT  3) Online services facilitating mental health help-seeking  4) Networked communication</p> <p>Individual-/family-based (12)  1) Exercise  2) Eating disorder awareness  3) CBT  4) Psychological therapy and/or antidepressants</p> <p><b>Interventions scope:</b>  <i>Universal</i>  <i>Targeted</i>  The included studies report a mix of intervention types.</p>		<p>observed effect on suicide attitudes or behaviors.</p> <p>Community-based “creative activities” showed evidence of small improvements self-esteem and self-confidence.</p>	<p>There was no analysis of potential bias.</p>	
<p>Maynard, et al. 2017.  <a href="#">Mindfulness-based interventions for improving cognition, academic achievement, behavior and socio-emotional functioning of</a></p>	<p><i>The aim of this review was to evaluate the effect of mindfulness-based interventions (MBIs) in primary and secondary schools on students' cognitive, socio-emotional, behavioral, and academic outcomes.</i></p> <p><b>Age range:</b> 2-5 years old (preschool), 5-11 years old</p>	<p><b>Date range:</b> 1990-2017</p> <p><b>Inclusion criteria:</b>  Randomized controlled trials (RCT), quasi-experimental designs (QED – studies using a comparison group design, but assigned groups to condition non-randomly), single-group pre-post test (SGPP), and single subject design (SSD - alternating treatments, multiple</p>	<p><b>Studies included:</b> Sixty-one studies were included. Study designs included RCTs (25), quasi-experimental design (19), SGPP (9), and SSD (8). Only thirty-five studies were included in the meta-analysis, made up of RCTs (21) and QEDs (14) selected based on sufficient data to calculate an effect size.</p> <p><b>High-level findings:</b>  The results indicate that MBIs may have a small but positive and</p>	<p>The author's designated the quality of evidence as ranging from moderate to low quality.</p> <p>There was a moderate to high risk of bias across all studies and particular concern that observer expectancy biased reported outcomes. Only one study included in the meta-analysis used any form of blinding and reporting bias was not addressed in studies</p>	<p>The authors noted that while there exists a wide variety of intervention characteristics, the outcomes across all studies were consistent (with the</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<a href="#">primary and secondary students.</a> Campbell Systematic Reviews 2017:5.	(primary school), 11-18 years old (secondary school)  Studies were done at either pre-school, elementary, middle, or high school levels.  <b>Mental health outcomes:</b> Socioemotional (anxiety, stress, engagement, social skills, self-esteem, emotion regulation, grit, internalizing behaviors)  <b>Interventions included:</b> Mindfulness-based interventions (MBI is considered a “third wave” of cognitive behavior therapy [CBT])  <b>Interventions scope:</b> <i>Universal:</i> All studies included were universal.	baselines, or withdrawal design) were included. RCTs and QEDs had a wait list control, no treatment, treatment-as-usual, or alternative treatment groups. The included studies were (1) conducted in a primary or secondary school and (2) contained a mindfulness component or strategy. In addition, to meet inclusion criteria, the study must have reported at least one of the following types of outcomes: cognition, academic performance, behavior, socioemotional, physiological.  <b>Exclusion criteria:</b> Studies not reporting if (1) post-test data or testing an intervention were not included (2) subjects were in inpatient hospitals or residential settings or (3) the primary subjects were parents or teachers.	statistically significant impact on both cognitive and socio-emotional outcomes. However, the intervention had no impact on behavioral and academic outcomes. The findings are limited by the quality and availability of evidence.	included. Both threaten the internal validity of included evidence.  Additional sources of bias evaluated by the authors included:  <b>Selection Bias:</b> Moderate overall bias (approximately 50% low/moderate and 50% high)  <b>Attrition Bias:</b> 74% of studies rated low risk  <b>Publication Bias:</b> Not observed in socioemotional outcomes, low risk in all other outcomes. More rigorous evaluation is needed to understand the impacts of implementing MBIs in school settings.	exception of behavioral).  The cost of implementing MBIs is not well-documented.  This study only reviewed “shorter-term” interventions.

**Table 5c: Substance Use**

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
Hodder, et al. <a href="#">Systematic review of universal school-based ‘resilience’ interventions targeting adolescent tobacco,</a>	<i>The aims of the review were to 1) assess whether universal school-based ‘resilience’ interventions are effective in reducing the prevalence of tobacco, alcohol or illicit substance use by adolescents, and 2) describe such effectiveness</i>	<b>Date range:</b> January 1994-August 2015  <b>Inclusion criteria:</b> Studies were included if they were randomized controlled trials or cluster randomized trials that 1) involved participants aged 5 to 18 years old attending school and 2)	<b>Studies included:</b> Seventeen cluster randomized trials and two randomized controlled trials. The trials were conducted in the U.S. (13), Australia (3), Hong Kong (1), Croatia (1), and Sweden (1). Seventeen trials involved a universal-only approach and two involved a combined universal and selective prevention approach.	In assessing the quality of evidence using the GRADE system, the review authors found that the overall quality level was moderate for the alcohol and illicit substance use outcomes and low	The review authors are based in Australia.

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<p><a href="#">alcohol or illicit substance use: A meta-analysis.</a> Prev Med. 2017 Jul;100:248-268</p>	<p><i>per intervention characteristic subgroups.</i></p> <p><b>Age range:</b> 5-18 years old</p> <p><b>Mental health outcomes measured:</b> Primary outcomes of interest were tobacco use, alcohol consumption, and illicit substance use. Secondary outcomes were any reported adverse outcomes to participants, schools or school staff identified in included studies.</p> <p><b>Interventions included:</b> School-based resilience interventions. Resilience interventions are those addressing individual (e.g. self-esteem) and environmental (e.g. school connectedness) protective factors of resilience.</p> <p><b>Intervention scope:</b> <i>Universal:</i> The review's primary focus was on interventions with "universal prevention approaches." The review authors identified seventeen studies of this type that met their search criterion.</p> <p><i>Targeted:</i> The review also included studies with "a combined universal and selective prevention approach" (i.e. studies involving universal and targeted interventions). The review authors identified two</p>	<p>implemented a universal school-based resilience intervention (i.e. intervention was delivered to an entire population of students, regardless of an individual's risk of substance use). In order to be included, interventions needed to address at least one individual and at least one environmental resilience protective factor (e.g. self-esteem and school connectedness, respectively).</p> <p><b>Exclusion criteria:</b> Studies were excluded if they focused exclusively on interventions targeting students at elevated risk for substance abuse or students who had already initiated substance abuse. However, studies that combined a universal with a targeted prevention approach were eligible.</p>	<p><b>High-level findings:</b> The review found evidence that universal school-based interventions addressing adolescent 'resilience' protective factors as part of any intervention approach are effective in reducing illicit substance use among adolescents. Effects were evident for interventions that addressed 'resilience' protective factors as part of a multi-dimensional approach, those that adopted a universal-only prevention approach, interventions that were implemented within a school setting only, and those studies reporting long-term effects.</p> <p>The review authors note that because the majority of included studies were "multi-dimensional" – i.e. addressed resilience protective factors as part of a broader intervention approach – it is unclear whether the observed effect on illicit substance use was due to the resilience component of the interventions or another component.</p> <p>The review did not find evidence to support use of these universal school-based intervention approaches to reduce tobacco or alcohol use among adolescents.</p>	<p>for the tobacco outcomes (Grade Working Group N.D.).</p> <p>Among other limitations, the review authors noted considerable variability across included studies with respect to the intervention approach, the 'resilience' protective factors addressed as part of the intervention, and the outcomes measured.</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	studies of this type that met their search criterion.				
<p>Smedslund, et al. <a href="#">Effect of early, brief computerized interventions on risky alcohol and cannabis use among young people</a>. Campbell Systematic Reviews, 2017:6.</p>	<p><i>The review seeks to combine evidence on the effectiveness of early, computerized brief interventions for young individuals with risky consumption of alcohol and cannabis use.</i></p> <p><b>Age range:</b> 15-25 years old</p> <p><b>Mental health outcomes:</b> Substance use in the short-term (&lt; 6 months) and in the long-term (&gt; 6 months), including:</p> <ul style="list-style-type: none"> <li>• Alcohol use</li> <li>• Cannabis use</li> <li>• Any reported adverse outcomes</li> </ul> <p><b>Interventions included:</b> Computerized brief intervention, specifically with the comparison of:  1) Assessment and feedback versus no intervention  2) Assessment and feedback versus assessment only  3) Assessment and feedback versus education  4) Comprehensive feedback versus brief feedback  5) Computer feedback versus counsellor feedback  6) Comparisons between two types of active interventions  7) Feedback plus moderation skills versus feedback only</p>	<p><b>Date Range:</b> Up to May 2016</p> <p><b>Inclusion criteria:</b> The review included randomized controlled trials or quasi-randomized controlled trials that evaluated a computerized brief intervention. The studies included only used computerized brief interventions intended to reduce use of alcohol or cannabis. They also had a comparable condition, either no intervention, waiting list control, or alternative brief intervention (either computerized or non-computerized). Study participants were ages 12-25 (high school and university students) and had risky consumption of alcohol and/or cannabis. Both efficacy and effectiveness studies were included.</p> <p><b>Exclusion criteria:</b> Any studies that used non-randomized allocation, such as self-selection. Studies were excluded if they described participants as young but did not have any further age specification. Finally, studies whose effect size was not reported or could not be calculated were also excluded.</p>	<p><b>Studies included:</b> Sixty studies were reviewed. The studies took place in either a college or university setting (51), in the general population (5), or in the emergency department (4). Fifty-three studies reported on alcohol outcomes, three reported on cannabis, and four examined both. Studies were conducted in the US (44), New Zealand, the Netherlands, Sweden, Australia, Germany, Switzerland, Brazil, Sweden, Belgium, the Czech Republic, and Germany.</p> <p><b>High-level findings:</b> <i>Alcohol</i> Overall, computerized brief interventions have the potential to reduce alcohol use. The review found small to moderate impacts on alcohol consumption in individuals receiving computerized brief intervention compared to no intervention or to active non-computerized intervention. Overall, short-term effects were larger than long-term effects. There was moderate quality evidence that multi-dose assessment and feedback was more effective than single-dose assessment. There was low quality evidence to suggest that assessment and feedback is more effective than no intervention and that assessment and feedback is more effective than assessment alone.</p> <p><i>Cannabis</i> There was significantly less evidence reporting outcomes for cannabis consumption. The evidence available indicates that changes to cannabis consumption are small (when comparing assessment and feedback to no intervention) or nonexistent (when comparing assessment and feedback to assessment only).</p>	<p>Using the GRADE criteria to evaluate quality of evidence, the authors found the evidence to be low or very low quality. The small sample size in many studies led to a reduction in quality rating because of imprecision. The authors highlight issues with blinding of participants (the nature of the intervention often prevents blinding). In addition, they noted that attrition and reporting bias were significant sources of concern for many studies included.</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<p>8) Gender-specific feedback versus gender-neutral feedback</p> <p>9) Multi-dose assessment and feedback versus single-dose assessment and feedback</p> <p><b>Intervention scope:</b> <i>Targeted</i></p>				
<p>Carney, <i>et al.</i> <a href="#">Brief school-based interventions and behavioral outcomes for substance-using adolescents.</a> Cochrane Database of Systematic Reviews, 2016, Issue 1.</p>	<p><i>This review seeks to examine the effectiveness of school-based brief interventions in reducing substance abuse in adolescents.</i></p> <p><b>Age range:</b> 16-19 years old</p> <p><b>Mental health outcomes:</b> Primary outcomes were frequency, quantity, abuse, and dependence on alcohol and cannabis. Secondary outcomes included engagement in criminal activity related to substance use and engagement in delinquent-type behaviors related to substance abuse.</p> <p><b>Interventions included:</b> Brief school-based interventions for substance-abuse in adolescents</p> <p><b>Intervention scope:</b> <i>Targeted:</i> All six studies included interventions tailored to individuals already using substances.</p>	<p><b>Date range:</b> 1996-February 2015</p> <p><b>Inclusion criteria:</b> Studies were included if they were randomized controlled trials (RCTs) that evaluated brief school-based interventions in high schools and higher education institutions to combat substance abuse in students, and had a control group with either no intervention, placebo, assessment only, education, or other intervention. The outcomes had to include short, medium, and long-term follow-up and the settings were high school and higher education institutions specifically for adolescents ages 16-19.</p> <p><b>Exclusion criteria:</b> Studies that tested interventions on adolescents outside of their school were not included.</p>	<p><b>Studies included:</b> Six randomized controlled trials were included. Four of the studies only included evaluation of students using either cannabis or alcohol, while two studies included any type of substance abuse. Four of the studies occurred in public secondary schools. Two of the studies occurred in higher education institutions for adolescents ages 16-18. The studies took place in the United Kingdom and the United States.</p> <p><b>High-level findings</b> When compared to assessment only interventions, brief interventions improved alcohol quantity, frequency, and dependence in the medium-term but not in the long-term. Alcohol abuse was reduced in the medium- and long-term. Cannabis frequency, dependence, and abuse was reduced in the long-term.</p> <p>There was medium quality evidence that the brief intervention did not have a significant effect alcohol or cannabis frequency, quantity, or dependence when compared to information-only controls.</p> <p>Brief interventions are more effective (despite small and somewhat inconsistent effects at different follow-up periods) than no intervention (assessment only). However, they are likely no more impactful than information only provision.</p>	<p>The evidence was evaluated using the GRADE criteria. The authors concluded that the quality of overall evidence was moderate to low. The rating was reduced because of the risk of bias, imprecision, and inconsistency. The following issues contributed to this reduction in quality:</p> <ol style="list-style-type: none"> <li>(1) No blinding of adolescents</li> <li>(2) Uncertainty as to whether the allocation was known or unknown by observer</li> <li>(3) Small sample size</li> <li>(4) Selective reporting</li> <li>(5) Outcomes were self-reported</li> </ol> <p>The small number of studies included (n=6) undermines the external validity of the review.</p>	

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<p>Foxcroft <i>et al.</i>  <a href="#">Social norms information for alcohol misuse in university and college students.</a>  Cochrane Database of Systematic Reviews 2015, Issue 12. Art. No.: CD006748. DOI: 10.1002/14651858.CD006748.pub.</p>	<p><i>The objective of this review was to determine whether social norms interventions reduce alcohol-related negative consequences, alcohol misuse, or alcohol consumption when compared with a control.</i></p> <p><b>Age range:</b> College/university age</p> <p><b>Mental health outcomes measured:</b> The primary outcome of interest was alcohol misuse, measured as alcohol-related problems, binge drinking or measures of quantity or frequency of consumption.</p> <p><b>Interventions included:</b> This review examined social norms interventions, which use an individual's perceptions of what's "normal" to influence his or her own behavior. In the context of student drinking, these interventions are typically delivered in one of two forms: 1) social marketing approaches that use mass communications methods to educate students regarding actual drinking behaviors, and 2) personalized normative feedback interventions, which provide individuals with information about their own drinking, actual student drinking norms, and comparisons between actual student drinking and the perceived norm. Both</p>	<p><b>Date range:</b> Up to May 2014</p> <p><b>Inclusion criteria:</b> Studies were included if they were randomized controlled trials with individual or cluster designs that examined one of the following intervention types implemented with students from university or college settings: 1) universal personalized normative feedback directed at all students 2) targeted interventions focused on members of a particular group deemed to be at higher risk for alcohol problems or 3) social norms marketing campaigns that refer to normative drinking patterns.</p> <p><b>Exclusion criteria:</b> Not specified.</p>	<p><b>Studies included:</b> Sixty-six studies. Fifty-two studies were conducted in the U.S.; the remaining studies were conducted in Australia, Brazil, New Zealand, Sweden, and the U.K.</p> <p>Delivery of social norms information varied among studies and included: mailed feedback, web/computer feedback, individual face-to-face feedback, group face-to-face feedback, and general social norms marketing campaigns across college campuses.</p> <p><b>High-level findings:</b> The review found some evidence for the effectiveness of web feedback and individual face-to-face feedback in reducing alcohol-related problems, binge drinking quantity of alcohol consumed, frequency of alcohol consumed, and peak blood alcohol content (BAC) among college and university students. However, the effect size was small and the reviewers suggest this information is unlikely to provide any advantage in practice.</p> <p>The review found no effects for mailed feedback on the outcome of alcohol-related problems and no effects for marketing campaigns on frequency of alcohol consumption and typical BAC.</p> <p>Overall, the reviewers conclude that "no substantive meaningful benefit is associated with social norms information interventions for alcohol misuse by university or college students." They suggest that further research on the effectiveness of social norms information delivered via web/computer feedback or by individual face-to-face feedback is likely to alter the conclusions of this review.</p>	<p>The review authors note that, overall, the quality of evidence for the effects included in their analysis was low or moderate. The reviewers note a number of issues with included studies, including high attrition rates in more than a third of the studies, lack of blinding in many studies, and lack of information about how randomization was conducted.</p>	<p>The review authors are based in Italy and in the U.K.</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<p>approaches are represented in the studies included in this review.</p> <p><b>Intervention scope:</b>  <i>Universal:</i> Twenty-six studies provided universal interventions and recruited from all available students, and one study was aimed at low-risk students.</p> <p><i>Targeted:</i> Thirty-nine studies targeted students at increased risk.</p>				
<p>Faggiano et al. <a href="#">Universal school-based prevention for illicit drug use</a>.  Cochrane Database of Systematic Reviews 2014, Issue 12.</p>	<p><i>The objective of this review was to evaluate the effectiveness of universal school-based interventions in reducing drug use compared to usual curricular activities or no intervention.</i></p> <p><b>Age range:</b> The interventions studied were delivered at elementary school (6), middle school (6), high school (7) and college (1).</p> <p><b>Mental health outcomes measured:</b> The primary outcome of interest was use of drugs: marijuana or hard drugs (heroin, cocaine, crack). Secondary outcomes were knowledge about the harms of drugs and intention to use drugs.</p> <p><b>Interventions included:</b> Universal school-based interventions. The review authors classified the</p>	<p><b>Date range:</b> Not specified, though the review suggests the evidence is current to September 2013.</p> <p><b>Inclusion criteria:</b> Studies were included if they were randomized controlled trials or controlled clinical trials reporting the evaluation of any intervention targeting individuals or groups versus a control condition and designed to prevent substance abuse in a school setting, namely, among primary and secondary school students.</p> <p><b>Exclusion criteria:</b> Not specified.</p>	<p><b>Studies included:</b> Seventy-three articles related to fifty-one studies. The majority were conducted in the U.S. (42); the remaining studies were conducted in Australia, the U.K., China, South Africa, Hong Kong, and the Czech Republic.</p> <p><b>High-level findings:</b>  The review found that school-based programs based on a combination of social competence and social influence approaches – assessed in seven out of fifty-one studies – showed small but consistent protective effects in preventing drug use, though some outcomes were not statistically significant.</p> <p>Twenty-eight of the fifty-one studies examined programs based on social competence, which aim to improve personal and interpersonal skills. These studies showed a tendency to reduce use of substances and the intention to use and improve knowledge about drugs, but the effects were rarely statistically significant.</p> <p>Results for the eight studies that examined programs based on social influence, which aim to reduce the influence of society in</p>	<p>The review authors described the overall quality of included studies as “not really satisfactory” given a number of issues, including missing information from many studies that precluded their inclusion in a meta-analysis.</p> <p>The review authors also noted the difficulty of classifying included studies into their four categories of interest, stating that the theories underlying the programs studied were sometimes approximate, misleading, or even nonexistent. They suggest that</p>	<p>The review authors are based in Italy.</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<p>intervention and control arms into the following groups:</p> <p>1) Knowledge-focused curricula: Provides information about the risk and danger of substance abuse, with the assumption that increasing youths' knowledge should influence their attitudes and behavior toward drugs.</p> <p>2) Social competence curricula: Teaches self-management and social skills, with the assumption that youth without these skills are more susceptible to influences that promote drugs.</p> <p>3) Social influence curricula: Teaches strategies to recognize and resist peer and media pressures, with the assumption that substance use is a consequence of inaccurate perception and overestimate of substance abuse among peers.</p> <p>4) Interventions involving all three approaches.</p> <p><b>Intervention scope:</b>  <i>Universal:</i> The review focused exclusively on universal school-based interventions.</p>		<p>general on the onset of substance use, were weak and rarely significant.</p> <p>The two studies that assessed knowledge-focused interventions showed no differences in outcomes between intervention and control groups, though knowledge improved for individuals receiving the intervention.</p>	<p>program classification by itself does not provide a reliable indicator of a program's effectiveness.</p> <p>The reviewers conclude, "It must be stressed that the vast amount of research undertaken, especially since 1980, has not generated the expected amount of evidence on the effectiveness of primary prevention." They also suggest that new approaches for effectiveness analysis should be developed in order to better distinguish the role of each intervention component in an intervention's overall effectiveness.</p>	



**Table 5d: Suicide Prevention**

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<p>Zalsman, <i>et al.</i> <a href="#">Suicide prevention strategies revisited: 10-year systematic review</a>. <i>Lancet Psychiatry</i>. 2016 Jul;3(7):646-59.</p>	<p><i>This review sought to update the evidence for the effectiveness of suicide prevention efforts since the last systematic review on this topic, which was conducted in 2005.</i></p> <p><b>Age range:</b> Not specified</p> <p><b>Mental health outcomes measured:</b> Primary outcomes of interest were suicidal behavior (specifically, completed or attempted suicide, or suicide ideation). Intermediate or secondary outcomes of interest were treatment-seeking, identification of at-risk individuals, antidepressant prescription or use rates, or referrals.</p> <p><b>Interventions included:</b> The review assessed seven broad categories of interventions: public and physician education, media strategies, screening, restricting access to suicide means, treatments (including cognitive behavioral therapy, dialectical behavioral therapy, problem-solving therapy, intensive outpatient care, and pharmacological interventions), and Internet or hotline support.</p> <p><b>Intervention scope:</b> <i>Universal</i></p>	<p><b>Date range:</b> January 1, 2005 – December 31, 2014</p> <p><b>Inclusion criteria:</b> Studies were selected if they reported on the primary outcomes of interest or if they included applicable, intermediate outcomes such as help-seeking behavior or identification of at-risk individuals.</p> <p><b>Exclusion criteria:</b> Some studies were excluded due to irrelevance or very low evidence.</p>	<p><b>Studies included:</b> 1797 articles (23 systematic reviews, 12 meta-analyses, 40 randomized controlled trials, 67 cohort trials, and 22 ecological or population-based investigations)</p> <p><b>High-level findings:</b> This review examined studies on a wide range of strategies for preventing suicide across all ages, from children and youth to the elderly. The reviewers note that while “the heterogeneity of strategies and outcome measures as well as absence of good standards for evidence level in the literature” limits their ability to draw conclusions about the effectiveness of suicide prevention strategies. They note there has been major advances in the evidence base since the last systematic review on this topic in 2005.</p> <p>There is consistent evidence from systematic reviews that school-based programs improve knowledge and attitudes toward suicide, but show no effect on actual suicidal behavior (these systematic reviews included relatively few randomized controlled trials).</p> <p>However, the review identified three large randomized controlled trials emphasizing mental health literacy, suicide risk awareness, and skills training in schools that showed significant effects on suicide attempts and ideation. The authors note that prospective cohort studies assessing awareness programs in schools showed inconsistent outcomes linked to suicidal behavior.</p> <p>The review also found that gatekeeper training has been studied in several populations since 2005 – including public</p>	<p>The reviewers observe that the quality of evaluation studies involving school-based programs has improved over the past decade. They note that the main limitation of this analysis “is that the final decisions on the level of evidence rely on the investigators’ judgments and therefore reproducibility of the findings might be more difficult than in a formal meta-analysis.”</p>	<p>Potential terms to define: suicide ideation, gatekeeper training</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
	<i>Targeted</i>		<p>school staff, peer helpers and youth workers – but no RCT has shown that gatekeeper training alone affects suicide rates.</p> <p>Two studies found screening in school and primary care settings to be effective and safe in enhancing treatment referrals and service use in high-risk adolescents at long-term follow-up.</p>		
<p>Calear, et al. <a href="#">A systematic review of psychosocial suicide prevention interventions for youth</a>. Eur Child Adolesc Psychiatry, 2016 May;25(5):467-82.</p>	<p><i>This review examined psychosocial interventions (including cognitive behavioral therapy, problem solving therapy, and dialectical behavior therapy), delivered at the school, community, and healthcare level to improve outcomes related to suicide in youths.</i></p> <p><b>Age range:</b> 12-25 years old</p> <p><b>Mental health outcomes:</b> Suicide ideation, suicide attempts, suicide completion, intentional self-harm.</p> <p><b>Interventions included:</b> Psychosocial interventions, including: cognitive behavioral therapy (CBT), dialectical behavior therapy (DBT), problem solving therapy, psychoeducation, and community treatment or support.</p> <p><b>Intervention scope:</b> <i>Universal</i> <i>Targeted</i></p>	<p><b>Date range:</b> Up to December 31, 2014</p> <p><b>Inclusion criteria:</b> Studies were included if (1) the intervention was psychosocial and attempted to treat or prevent suicidal-related behaviors (2) outcomes reported included self-harm, suicide ideation, or suicide completion (3) the study was a randomized controlled trial that included a control group and (4) the study was written in English and published in a peer-reviewed journal.</p> <p><b>Exclusion criteria:</b> Studies were excluded if the intervention did not specifically target suicide behavior or if the participants were outside of the age range of interest (12-25 years old). In addition, studies which utilized a design other than RCT or which did not report a suicide-related outcome were excluded.</p>	<p><b>Studies included:</b> Twenty-nine studies. Ten studies evaluated a program delivered in a school-based setting and seven studies evaluated a program delivered in a community/non-clinical setting.</p> <p><b>High-level findings:</b> Half of the evidence reviewed reported positive and statistically significant impacts of interventions on suicide ideation, suicide attempts, and intentional self-harm. However, only one study found positive effects of the intervention on more than one outcome measure (suicide ideation and deliberate self-harm).</p> <p>Six of the seventeen programs that demonstrated efficacy were delivered in schools, while three of the seventeen were delivered in a community setting.</p> <p>Ten of the seventeen programs utilized a formal psychotherapeutic approach (CBT, etc.) while the other seven programs relied on less formal interventions such as social support, psychoeducation, and motivational interviewing.</p> <p>The majority of effective interventions were delivered to participants who had a history of suicide ideation or attempts. Because no meta-analysis was included, high-level takeaways from the review are limited.</p>	<p>The authors evaluated the included studies for allocation sequence bias, allocation concealment bias, knowledge of allocation bias, and incomplete data bias.</p> <p>Approximately one-third of the studies had low risk of bias in all four areas.</p> <p>The authors note that some of the studies had small sample sizes, which could have contributed to no observed significant effect of the intervention (underpowered).</p> <p>The diversity in participant characteristics, interventions, and measurement of outcomes prevented a meta-analysis of data.</p>	<p>The types of interventions and method of delivery varied significantly across included studies.</p>

Citation	Focus of review	Methods	Relevant findings	Limitations and quality of the evidence as reported by the author	Notes
<p>Harrod, <i>et al.</i>  <a href="#">Interventions for primary prevention of suicide in university and other post-secondary educational settings.</a>  Cochrane Database of Systematic Reviews, 2014, Issue 10.</p>	<p><i>This review examined the efficacy of suicide primary prevention interventions targeted to secondary school students who have no known or diagnosed history of mental illness.</i></p> <p><b>Age range:</b> Secondary-school students</p> <p><b>Mental health outcomes:</b> Suicide-related outcomes (suicide completion, suicide attempts, suicide ideation, knowledge of suicide prevention, suicide prevention self-efficacy, attitudes toward suicide, and gatekeeper behaviors)</p> <p><b>Interventions included:</b> Classroom instruction (experiential and didactic), institutional policy, and gatekeeper training.</p> <p><b>Intervention scope:</b> <i>Universal</i></p>	<p><b>Date range:</b> Up to June 29, 2011.</p> <p><b>Inclusion criteria:</b> Studies that evaluated interventions to prevent suicide. The study designs included were (1) randomized controlled trial (RCT) (2) controlled before-and-after (CBA) (3) controlled interrupted time series (CITS) and (4) interrupted time series (ITS).</p> <p>The interventions took place in a secondary school setting and targeted individuals who have no previous diagnosis of mental illness (primary prevention).</p> <p><b>Exclusion criteria:</b> Studies were excluded if they evaluated individual apprenticeships or if they targeted participants with a previous suicide or self-harm attempt or suicide ideation. Interventions that served to detect suicide ideation or planning or those that served to treat suicide risk or past attempts (secondary and tertiary prevention) were also excluded.</p>	<p><b>Studies included:</b> Eight studies were included. The RCTs (3) were included in the meta-analysis and the CBAs (5) were evaluated qualitatively. Three studies evaluated knowledge of suicide, three evaluated knowledge of suicide prevention, and one evaluated suicide prevention self-efficacy.</p> <p><b>High-level findings:</b> Classroom instruction leads to statistically significant, positive improvement in short-term knowledge of suicide and prevention. The effect on suicide prevention self-efficacy was not significant.</p> <p>An institutional policy to restrict access to laboratory cyanide as well as treat students already at-risk reduced the number of suicides among students in a before-and-after analysis at one university as well as reduced the rates when compared to control universities during the same period.</p> <p>Gatekeeper training programs were shown to lead to a small increase in knowledge of suicide and confidence in ability to prevent suicide. However, no changes in behavior were evaluated and results varied across included studies.</p>	<p>Overall, the studies and evidence included were deemed low quality and at high risk of bias in at least one category by the authors. The studies included varied in their participants, study design, and intervention. In addition, the small number of studies included and their relatively small sample size limit the validity of the review.</p> <p>The authors used GRADE criteria to evaluate evidence quality. The evidence for knowledge of suicide and prevention was given a moderate rating, while suicide prevention self-efficacy reviewed a low rating.</p> <p>Finally, detection bias (blinding in outcome assessment) and selection bias (random sequence generation and allocation concealment) presented the highest risk of bias in the included studies.</p>	

## Endnotes

1. In response to this finding, an expert reviewer for this rapid evidence review noted that “bundled” interventions that incorporate multiple elements and aim to address both individual and contextual factors are a promising approach for this field.
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