



# Scope, Scale, and Dose of the World's Largest School-Based Mental Health Programs

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**Abstract:** Untreated mental health problems are among the most disabling, persistent, and costly health conditions. Because they often begin in childhood and continue into adulthood, there has been growing interest in preventive mental health programs for children. In recent years, several such programs have been implemented at regional, state, or national scale, and although many experimental studies have documented positive outcomes of individual programs, this article represents the first attempt to systematically compare the largest programs in terms of scope, scale, and dose. The school-based mental health programs discussed in this review appear to have reached more than 27 million children over the last decade, and many of these programs have collected systematic outcomes data. The role that such programs can play in low- and middle-income countries (LMICs) is a secondary focus of this article. Until recently, wide-scaled, preventive, mental health interventions for children have been studied almost exclusively in high-income countries even though around 80% of the global population of children reside in LMICs. Since a number of programs are now operating on a large scale in LMICs, it has become possible to consider child mental health programs from a more global perspective. With both the increasing diversity of countries represented and the growing scale of programs, data sets of increasing quality and size are opening up new opportunities to assess the degree to which preventive interventions for child mental health, delivered at scale, can play a role in improving health and other life outcomes.

**Keywords:** children's mental health, large-scale programs, prevention, school-based interventions

The need to prioritize child and adolescent mental health is compelling since an estimated 13% of youth under 18 years old worldwide have significant mental health problems.<sup>1</sup> The most common disorders are anxiety, disruptive behavior disorders, attention-deficit/hyperactivity disorder, and depression. Numerous studies have shown that child mental health problems often persist into adulthood, especially if left untreated in childhood,<sup>2</sup> and that adult mental illness is among the most disabling and costly conditions in public health.<sup>3</sup> The high prevalence of mental health problems and their associated negative outcomes,

not only for long-term mental health but also with respect to educational and occupational attainment as well as impaired social consequences, suggest that finding ways to prevent mental health problems should be a major priority.<sup>4</sup> For these reasons, there has been much interest in searching for effective and scalable interventions that could improve mental health from childhood to adulthood. Since the vast majority of children and adolescents spend considerable time in schools, school-based programs have received increasing attention.<sup>5,6</sup> Although results from experimental studies have demonstrated significantly improved outcomes for children who participate in such programs, until now there has been little evidence that such programs could be implemented at scale in low- and middle-income countries (LMICs) or high-income countries (HICs), and even less evidence that, if implemented at scale, these programs would lead to population-wide improvements in mental health, health, education, or social outcomes.

A recent editorial in the *Journal of the American Academy of Child and Adolescent Psychiatry* suggested that to address this gap, “large-scale programs need to be . . . evaluated as they are created and implemented in real-world settings, and further refined as evidence is generated.”<sup>7(p 793)</sup> The current review is consistent with that recommendation. Over the past few years, the scale and scope of children's mental health programs have increased considerably, now reaching whole districts, counties, states, provinces, and even whole

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countries with tens of millions of children involved. The establishment of large-scale programs in real-world settings has also created new opportunities for cross-program comparisons, continuous quality improvement, and possibly, soon, the evaluation of population-scale improvements. Toward these ends, the current review attempts to identify the largest preventive interventions for children's mental health and to compare them in terms of their scope, scale, and dose.

The degree to which such programs have been implemented in LMICs is a secondary focus of this article. Until recently, widely scaled preventive mental health interventions for children have been studied almost exclusively in HICs, even though about 80% of the global population of children reside in LMICs.<sup>6</sup> Since a number of programs are currently operating at a large scale in LMICs, it is now possible to consider child mental health programs from a global perspective. With both the growing scale of programs and the increasing diversity of countries represented, data sets of increasing quality and size are becoming available. The access to large data sets makes it possible to conduct the analyses needed to assess the impact of preventive interventions for child mental health on improving population health in a wide range of real-world settings.

## METHOD

To identify the largest programs, we conducted an initial search using PsycINFO and MEDLINE for articles published in English before December 2015 with combinations of the following key search terms: school or school-based, mental health, therapy, treatment, program, intervention, prevention, and national or state. This search identified 497 references. After the exclusion of duplicates and studies that did not examine children or mental health interventions, 45 studies remained. Several of the references identified were review articles, and we examined the programs mentioned in those reviews for other possible program candidates. We also reviewed the reference lists of three recent review articles on preventive interventions in HICs,<sup>5</sup> LMICs,<sup>6</sup> and social-emotional learning programs<sup>8</sup> to identify any additional large-scale mental health programs that might have been missed. In addition, we queried experts in the field. We focused this review on mental health preventive interventions for children implemented in school settings. Although programs focused on other types of interventions (such as those for substance abuse, anger management, or suicide prevention or those aimed at more global social-emotional learning) sometimes assess indicators like psychiatric impairment or societal outcomes (e.g., employment, disability, violence, or quality of life) that are of importance in public health, we excluded such programs unless they specifically mentioned the term *mental health* in their overall program goals and unless they measured specific mental health or illness variables in their program evaluations. The final result was a list of eight programs (see Table 1) that met all of these criteria. We then contacted a developer or key researcher for each of the

programs and conducted a telephone interview with him or her in order to better understand specific program conceptualization and dissemination (see Supplemental Appendix I for the contact person and website for each program, available online at <http://links.lww.com/HRP/A56>).

Following a widely accepted health service categorization, we used the three-tiered model of interventions to compare programs.<sup>9,10</sup> Tier 1 programs focus on mental health promotion or primary prevention and are applied to whole populations (e.g., all of the students in a given school or classroom). Tier 2 interventions target specific vulnerable populations (e.g., children who have experienced potentially traumatic events or are already demonstrating some problems). Tier 3 interventions are aimed at supporting children with diagnosed disorders. This review focuses primarily on prevention and therefore on Tiers 1 and 2 since Tier 3 is often synonymous with actual treatment. Several of the programs we review include Tier 3 components, but those programs were not excluded, although programs that focused exclusively on Tier 3 were excluded.

It is important to make early note of the limitations inherent in studying this area, for while numerous child mental health preventive interventions have been created and implemented, they are still difficult to categorize precisely. Locations for intervention, target populations, and child characteristics selected for intervention include many possible sources of heterogeneity, as do the unique qualities of each specific school setting. For these reasons this review should be viewed more as a heuristic process or an attempt to gain perspective during a time of innovation than as a definitive list of programs. It may also be important to note that since our review was confined to studies published in English, it is possible that there are other large-scale programs that we are not aware of and are not included in this review.

## SCHOOL-BASED MENTAL HEALTH PROGRAMS REVIEWED

The eight school-based preventive mental health interventions identified as having reached the largest populations of children are Positive Behavior Interventions and Supports (PBIS);<sup>11</sup> FRIENDS;<sup>12</sup> Positive Action (PA);<sup>13</sup> Promoting Alternative Thinking Strategies (PATHS);<sup>14</sup> Skills for Life (SFL);<sup>15</sup> MindMatters;<sup>16</sup> Good Behavior Game (GBG);<sup>17</sup> and Cognitive-Behavioral Interventions for Trauma in Schools (CBITS).<sup>18</sup> Seven of these interventions were developed in HICs (either the United States or Australia), and the eighth (SFL) was developed in a LMIC (Chile). Each program is described below, with particular emphasis on results of randomized, controlled trials (RCTs) and program efficacy.

### Positive Behavior Interventions and Supports

PBIS, one of the most widely implemented programs reviewed here, emphasizes a positive social culture and establishes sufficient behavioral support for all students through a three-tiered prevention model. Several studies provide evidence that

Table 1								
Scale and Scope of the Large-Scale School-Based Mental Health Programs								
Program	Acronym	No. years active	No. of students to date	Scale	No. of schools (in the last year)	Tiers	Target group	Low- and middle-income countries
Positive Behavioral Interventions & Supports	PBIS	21	10,500,000	District	21,000	1, 2, 3	K–12	No
FRIENDS	FRIENDS	19	8,000,000	National	2,000	1, 2, 3	K–Adult	Yes
				State				
				District				
Positive Action	PA	34	5,000,000	District	15,000	1, 2	PreK–12	No
Promoting Alternative Thinking Strategies	PATHS	15	2,000,000	District	4,000	1	K–6	No
Skills for Life	SFL	18	1,000,000	National	2000	1, 2, 3	1–4	Yes
MindMatters	MM	18	300,000	National	1000	1	PreK–Adult	No
				District				
Good Behavior Game	GBG	47	200,000 <sup>a</sup>	District	89	1	K–6	Yes
Cognitive-Behavioral Intervention for Trauma in Schools	CBITS	14	97,250	District	N/A	2	5–12	No

<sup>a</sup> Given the way that the Good Behavior Game has spread with multiple versions, it is not possible to accurately determine how many students the program reaches each year or has reached over the past 47 years. Instead, we have summed the number of students and schools from the PAX (<http://goodbehaviorgame.org>) and AIR (American Institutes for Research, <http://www.air.org/topic/p-12-education-and-social-development/good-behavior-game/>) versions of the Good Behavior Game, which operationalize differing implementations of the original model. The number of students listed here is from the trials of both programs but is assumed to be much higher because the program was continued in many schools after the trials were completed. K, kindergarten; PreK, prekindergarten.

PBIS promotes the successful management of school culture and children's academic achievement.<sup>19–21</sup> Program effectiveness is especially strong over time (up to 5+ years) and when the program is implemented with high fidelity.<sup>20</sup> For example, across studies, academic achievement is a primary target (e.g., reading assessments and school outcomes such as suspensions), with effect sizes ranging from 1.08 to 1.71.<sup>21</sup> Notably, effects (particularly relating to school-outcome data) have been sustained consistently over long-term follow-up periods.<sup>22</sup>

#### FRIENDS

FRIENDS is a manualized, cognitive-behavioral-based program aimed at reducing anxiety and other internalizing disorders that teaches children, parents, and teachers skills for managing emotions and coping with stress in a resilient/positive manner. The six primary topics are (1) identifying feelings, (2) understanding one's physiological responses, (3) learning to relax, (4) linking thoughts and feelings, (5) developing plans for coping, and (6) practicing emotion management. Several RCTs have been conducted to date. Results across trials demonstrate small but significant effect

sizes at baseline (Cohen's  $d = 0.22–0.44$ ), and sustainability of effects at 6- and 12-month follow-up periods.<sup>23–25</sup> Parent-training components provide additional support above and beyond in-school program exposure,<sup>26</sup> particularly among nonclinical (subclinical threshold) populations of youth with anxiety. The method of delivery has also been assessed, and program implementation by health personnel (e.g., psychologists) appears to have greater effects on reduction of mental health problems than those delivered by school/education professionals.<sup>25</sup> Overall, since FRIENDS is designed as an anxiety-preventive intervention, reductions in anxiety, as demonstrated across multiple studies, are consistent with the program's theoretical model.

#### Positive Action

PA targets social-emotional learning from pre-kindergarten to twelfth-grade students. Lessons focus on self-management skills, social skills, character building, and mental health. The six primary units encourage "positive actions": (1) actions for improving the self, (2) being honest with the self and others, (3) getting along with others, (4) managing the self, (5) body

and mind, and (6) philosophy and thoughts-actions-feelings about self. One matched-pair RCT demonstrated a 37% decrease in violence-related behaviors, a 27% decrease in disruptive behaviors, and a 41% decrease in bullying among students who participated in the program versus a control group.<sup>27</sup> Similar effects—specifically, dose-response effects—have occurred long-term, particularly for disciplinary-behavior reductions and academic-achievement improvements.<sup>13,28</sup>

### Promoting Alternative Thinking Strategies

The PATHS curriculum targets five major domains of functioning, including self-control, emotional understanding, positive self-esteem, relationships, and interpersonal problem-solving skills. An additional goal is the reduction of aggression and other problem behaviors. Lesson activities include role playing, storytelling, and attribution training. According to the CASEL social-emotional learning (SEL) program guide,<sup>29</sup> PATHS incorporates several factors essential for effective, school-based SEL implementation, including integration of approach and theory, multi-grade-level design, focus on the role of emotions and emotional development, ongoing support and training, and multiple outcome measures for program assessment. RCT research on PATHS generally suggests that if implemented with fidelity, PATHS practices are associated with reduced disciplinary infractions and aggression in U.S. schools, but these findings were not replicated in a recent UK study.<sup>30</sup> Of note, several cluster RCTs have demonstrated that control students have increases in normative beliefs about aggression over time, whereas PATHS students improved in nonviolent interpersonal functioning (e.g., nonviolent problem solving and non-aggressive social skills).<sup>30,31</sup> Effects on academic achievement has also been documented: writing proficiency and math proficiency were 1.5 and 1.63 times higher, respectively, for the intervention versus control groups.<sup>32</sup> Although these effects are relatively small for academic achievement, this result is not surprising since academic improvement is not the primary target of PATHS (conduct behaviors are). The fact that effects have carried over into academic achievement suggests the broader influence of PATHS on multiple areas of child well-being.

### Skills for Life

The SFL intervention is based on the three-tiered model recommended by the World Health Organization.<sup>9</sup> In Tier 1, children, teachers, and parents receive primary prevention activities, which were designed to strengthen the school's capacity (e.g., improving classroom climate, promoting teachers' well-being, promoting parents' participation) for supporting children in their development (e.g., social and emotional challenges).<sup>33</sup> In Tier 2, secondary preventive activities are targeted toward children who have been identified at risk of emotional and behavioral problems through a screening process.<sup>34,35</sup> In Tier 3, children with severe risk are referred to external mental health services for individual evaluation and treatment.

SFL was developed by trained clinicians based on a national mental health standard, and is skill-based in its approach to workshops. Results from a large national quasi-experimental study<sup>36</sup> provided preliminary evidence that the positive impact of participation in the Tier 2 intervention on a number of behavioral and academic outcomes was significant. At-risk students who attended more sessions of the intervention showed greater improvements in parent- and teacher-rated behavioral-health measures and in annual school attendance than did at-risk students who attended fewer sessions. Effect sizes for these differences ranged from .08 to .16 (Cohen's *d*), and these differences, while small, were deemed to be important given the two-year follow-up interval from pre- to post-test. Results were also thought to have clinical significance, in that at-risk students who attended most of the workshops were 13%–28% less likely to remain at risk than were at-risk students who attended fewer workshops.<sup>36</sup>

### MindMatters

MindMatters is a program for promoting mental health that embeds practices into the everyday school curriculum with a particular focus on promoting mental health awareness (coping skills, bullying, resiliency).<sup>16,37</sup> Specific techniques include social- and emotional-learning programs, emotion-regulation strategies, and coping skills for stress and anxiety. While no RCTs have been completed to date, several published quasi-experimental studies have demonstrated its effectiveness in improving behavioral and academic outcomes.<sup>16,38</sup>

### Good Behavior Game

GBG is a program for promoting behavioral health that is administered in the classroom for all students. GBG targets high-risk behaviors, such as disruptive classroom behaviors, aggression, and noncompliance, and is aimed predominantly at primary school children. It is a brief game played in the classroom setting with goals that include the promotion of self-regulation and teamwork.<sup>17</sup> Most notably, long-term outcomes from childhood through young adulthood demonstrate the significant influence of the game on minimizing substance use in young adulthood.<sup>17</sup>

### Cognitive-Behavioral Intervention for Trauma in Schools

CBITS is a cognitive-behavioral intervention provided by mental health clinicians, aimed at reducing trauma symptoms among at-risk primary school children. The program uses a cognitive and behavioral approach to improve students' adjustment to past traumatic events (violence, natural disasters) by teaching students relaxation techniques, social-problem solving, and cognitive restructuring. The program is aimed at the general school population but has flexible programming so that it can target relevant racial, ethnic, and socioeconomic groups. Results from several trials demonstrate posttraumatic stress symptom reduction immediately post-intervention and at 3- and 6-month follow-up.<sup>39–41</sup> Effectiveness has been demonstrated among youth exposed to violence<sup>39</sup> and natural

disasters,<sup>40</sup> and youth with clinically significant posttraumatic stress.<sup>41</sup> Multiple respondents' reports have helped to solidify consistency of symptom reduction from several perspectives and across contexts (e.g., behaviors at home vs. school). Intervention fidelity has been established,<sup>39</sup> and consistency of implementation assists maintenance of program efficacy over time, across studies, and in community (urban) settings.<sup>40,41</sup>

The specific areas included under the scope, scale, and dose of each of the above programs are summarized in Text Box 1 and then described in more detail in Table 2 and in the text below.

Text Box 1 Areas Considered for the Review of School-Based Mental Health Interventions	
Area considered	Information included
Scope	Intervention type (Tier 1, 2, or 3) Age of children eligible for intervention Location of intervention Mental health problem targeted
Scale	Total number children reached to date Total number of children reached per annum Has program been implemented on a national or province/state scale? Has program been implemented in lower- and middle-income countries?
Dose	Number of hours that the student was seen Inclusion of teacher, parent, or whole-school components?

**SCOPE**

The first aspect of scope considered is the degree to which interventions are prevention oriented versus treatment oriented. As shown in Table 2, all programs provide Tier 1 (universal) support to all students. PBIS, FRIENDS, and SFL also adapt their Tier 1 programs to meet the needs of at-risk students (Tier 2). CBITS involves only a Tier 2 intervention; it provides sessions for youth at risk for posttraumatic stress and for internalizing/externalizing problems. Two programs, PBIS and MindMatters, provide their interventions by means of “continuous support,” with the programs’ materials integrated into the framework of the existing curriculum, rather than as a separate intervention activity.

The scope of interventions can vary regarding the targeted domains of child functioning. Since the development of mental health interventions is both supported and represented by a well-studied body of literature, interventions aimed at

improving “mental health” are the focus of this review. Even within this focus, however, the programs included in the present review overlap with a number of closely related fields, variously labeled as *social-emotional learning/SEL*, *well-being*, *resilience*, or *anti-bullying*. As indicated in Table 2, five of the eight programs included contain elements of SEL, although the primary target of those programs is still mental health. CBITS is the only program that is formulated as a Tier 2–only framework, and it is also the only program that contains no SEL components.

Interventions that are solely or primarily SEL, although widely disseminated, have been excluded from this review. For example, Lions Quest, one of the most widely disseminated programs, describes itself as a purely SEL program, and it does not explicitly target mental health as an outcome. Although it has been implemented in 90 countries (many of them LMICs) and has demonstrated effectiveness in several RCTs, those studies have generally investigated the relationship between SEL and one or more of the following outcomes: positive behavior, drug and alcohol awareness, connection to school, and academic performance. These behaviors could potentially have a direct impact on mental health outcomes, but the existing studies do not examine that particular connection.

**SCALE**

In investigating the scale of preventive mental health intervention programs for children, we took into account four separate factors: the total number of children reached to date, the number of children reached per annum, whether the program has been implemented at scale (national, provincial, or state), and whether it has been implemented in a LMIC. As noted above, our estimates of scale were based primarily on telephone interviews with the developers or evaluators of each program. Because of the different ways that large-scale programs are rolled out, these numbers can only be rough estimates; hence, rounded numbers are presented.

As shown in Table 1, the programs covered by this review, along with the approximate number of students reached to date, are (1) Positive Behavioral Interventions and Supports (10,500,000), (2) FRIENDS (8,000,000), (3) Positive Action (5,000,000), (4) Promoting Alternative Thinking Strategies (2,000,000), (5) Skills for Life (1,000,000), (6) MindMatters (300,000), (7) Good Behavior Game (200,000), and (8) Cognitive-Behavioral Intervention for Trauma in Schools (97,250).

The geographical scale of each program review, whether national, state/province, or school district, is presented in column 6 of Table 1. Three of the programs have reached national scale (FRIENDS and MindMatters in Australia, and SFL in Chile); FRIENDS has also been implemented on a state/province level in the United States. A number of programs have been implemented by whole school districts, including PATHS, PA, CBITS, PBIS, MindMatters, and GBG.

FRIENDS is perhaps one of the most globally disseminated programs, implemented in more than a dozen countries.

Table 2 Program Dosage on Each Tier of Implementation									
Program	Primary focus	Theoretical basis for intervention	Who delivers	Tier 1		Tier 2		Tier 3	
				No. sessions	Dosage (hours)	No. sessions	Dosage (hours)	No. sessions	Dosage (hours)
PBIS	Behavior	Other (behavioral)	Teacher	Continuous support <sup>a</sup>	Continuous support	Continuous support + 20 minutes/day	Continuous support + 20 minutes/day	Continuous support + individual sessions	Continuous support + individual sessions
FRIENDS	Specific symptom area: anxiety, depression, resilience	CBT, SEL	Teacher, psychologist, mental health professionals	10 student, 2 boosters, 2 teacher/parent	17.5–21	10 student, 2 boosters, 2 teacher/parent	17.5–21	10 student, 2 boosters, 2 teacher/parent	17.5–21
PA	Overall mental health	SEL/other	Teacher, psychologist, mental health professionals <sup>b</sup>	140 <sup>c</sup>	47	N/A <sup>d</sup>	N/A	N/A	N/A
PATHS	Behavior (general SEL)	SEL	Teacher	36–52	18–26	—	—	—	—
SFL	Behavior, overall mental health, academic achievement	CBT, SEL	BA-licensed psychologists or social workers <sup>d</sup>	12	5	10 student, 3 parent, 2 teacher	19	1 interview with local team	1
MM	Overall mental health	SEL	Teacher	Continuous support	Continuous support	—	—	—	—
GBG	Behavior, overall mental health	Other (behavioral and life course/social-field theory)	Teacher	Daily 30 minutes × 36 weeks (full school year)	90	—	—	—	—

(Continued on next page)

**Table 2**  
**Continued**

		Tier 1	Tier 2	Tier 3
CBITS	Specific symptom area: posttraumatic stress	—	10 group, 1–3 individual, 2 parent, 1 teacher	—
	Mental health professional <sup>f</sup>	—	11–16	—
	CBT	—	—	—

BA, bachelor's degree; CBITS, Cognitive-Behavioral Intervention for Trauma in Schools; CBT, cognitive-behavioral therapy; GBG, Good Behavior Game; MM, MindMatters; PA, Positive Action; PATHS, Promoting Alternative Thinking Strategies; PBIS, Positive Behavioral Interventions & Supports; SEL, Social-emotional learning; SFL, Skills for Life.

<sup>a</sup> Continuous support means that the program is integrated into the framework of the school curriculum and environment; teachers are trained to follow program concepts/guidelines for the entire length of time that the children are in the school setting.

<sup>b</sup> Classroom teachers implement Tier 1, and mental health specialists or school counselors implement Tier 2 or Tier 3.

<sup>c</sup> Number of sessions varies, depending on grade level. School-age children typically receive 140 sessions. Target dose for all grade levels is 15 minutes/day, four days/week.

<sup>d</sup> Sites can adapt Tier 1 (universal) program to match needs of at-risk children.

<sup>e</sup> In Chile, many mental health services are provided by entry-level clinicians who have a college degree plus a certificate documenting an additional year of clinical training in psychology or social work. Most of the SFL services are provided by these entry-level clinicians.

<sup>f</sup> CBITS online training manual is also available for school teachers.

FRIENDS has been implemented on a national, state, and district scale in Australia since the early 1990s, with the first RCT completed in 2001.<sup>12</sup> It has recently become a national program in New Zealand, where the government makes it available to all of its elementary schools (although the rate of actual participation is unknown). Additionally, for the past five years, FRIENDS has been an official program of the province of Alberta, Canada. The program has been adapted for use in the United Kingdom<sup>42</sup> and also in Brazil, Finland, Hong Kong, Ireland, Japan, Sweden, and Taiwan.

SFL is another program running on a national scale. It is offered by the Chilean department of education and implemented in all 15 of the country's regions and most of its large school districts. The program targets schools with high levels of poverty and other indicators of social risk. As of 2016, SFL was running in more than 2000 elementary schools, where it reaches about 320,000 first through fourth graders each year. Related programs for middle-school and preschool children probably bring the number of students reached each year in Chile to about half a million.

Finally, MindMatters/KidsMatter is a program provided by the government of Australia. It has been operating since 1996 and has been a national program for the past decade, with revisions and expansions (including the merging of preschool, primary, and young-adult versions with the secondary school version). MindMatters, an Australian initiative that promotes children's mental health in the school setting, was originally designed for secondary school students and has recently been expanded to provide a version for primary schools (KidsMatter), preschools, and young adults. Some estimates have suggested that MindMatters is used, in some form, in up to half of all secondary schools in Australia and a similar proportion of elementary schools, and that New Zealand is moving ahead with an implementation plan to ensure its incorporation in all the country's elementary schools.

Although none of the other five programs covered by this review have been implemented at the state/provincial or national level, three have been implemented in whole school districts or in a large number of individual schools, and these programs include some of those that have actually reached the most students. PBIS, PA, and PATHS have been implemented to cover a total of about 17 million children thus far. These programs have been operating for an average of about 25 years, highlighting their feasibility. All three have strong affiliations with universities or research institutes and have been evaluated, as described earlier, in more than 30 RCTs.

It is important to note that of the eight programs in the current review, three—FRIENDS, SFL, and GBG—have been implemented to scale in LMICs. FRIENDS has been implemented in more than 800 schools in Brazil and in several dozen schools in Mexico. SFL was created by Chilean health and mental health professionals in collaboration with educational professionals in the late 1990s, when Chile was considered to be a LMIC. Chile's recent economic progress led it to

be reclassified as a HIC in 2013, but for the purpose of this review, it has been classified as a LMIC based on its history. SFL remains a “homegrown” program with no replications in other LMICs or HICs. The third program to reach large-scale implementation in LMICs is GBG. While most replication studies of GBG have been completed in HICs such as Belgium, France, Netherlands, United Kingdom, and United States, the program has also been implemented on a smaller scale in Brazil.

## DOSE

The concept of dose, although very important, can be difficult to calculate across programs since the units of intervention vary so widely. While the dose of most programs can be described using the number of hours of intervention each student receives per day/week/year, two of the programs (PBIS and MindMatters) focus on providing the intervention through what they call “continuous support,” which means that the program is integrated into the framework of the existing school curriculum or environment rather than added on as a new protocol. Teachers are trained to follow program concepts/guidelines throughout the time that students are in the school setting, as noted in Table 2.

SFL, which has been operating on a national scale for more than a decade,<sup>15,36,43</sup> is a good example of several of the key concepts of dose used in this review. SFL aims to be a comprehensive preventive intervention for mental health by providing all three tiers of intervention. As shown in Table 2, the SFL intervention for Tier 1 involves a dose of five hours of self-care for all teachers in participating schools, with some schools also providing a similar two-hour module for parents and an additional five hours for all students. For Tier 2, all students who screen positive are referred to a ten-session (1.5 hours each) cognitive-behavioral type group run by mental health professionals. Another component of the Tier 2 intervention is that parents of the students identified as being at risk receive three sessions, and the student’s teacher, two sessions. In total, the Tier 2 intervention provides about 19 hours of intervention per student. For Tier 3, all students who are referred by their teachers as having serious problems receive a one-hour evaluation by the mental health clinician who runs the school workshops. Students who are found to need additional intervention (e.g., treatment for depression or attention-deficit/hyperactivity disorder) are referred to clinicians in the local community.

The dose of CBITS can also be readily calculated. While it is the smallest of the programs reviewed here, its impact has been demonstrated in a number of experimental studies.<sup>39–41</sup> The program provides ten group sessions, one to three individual sessions for each student, two psychoeducational sessions for parents, and one teacher session. Student sessions occur weekly and last a full class period. PATHS is another program in which the dose can be calculated in a relatively straightforward manner. The core program consists of 36–52 class lessons depending on the child’s age. At each

level, PATHS is taught an average of two to three times per week in 20–30 minute sessions and includes lesson objectives and scripts to encourage systematic implementation (although teachers have flexibility and may adapt a lesson structure based on particular group needs or teacher style). Of note, since both PA and PATHS entail comparatively large dosages, achieving fidelity in program implementation may be more challenging, especially in other cultures, in which more extensive translation and adaptation would be required.

By contrast, the FRIENDS program involves a smaller dosage, with ten weekly sessions and two booster sessions (one and three months after program completion). Each session is 75–90 minutes in length. Sessions have a specific sequence, structure, and topic (cumulative effect). For both Tier 1 and Tier 2, the dose is about 17.5 to 21 hours per student. PA (both a Tier 1 and Tier 2 program) also uses a smaller, specific intervention approach, with children typically receiving 140 15-minute sessions (35 hours) per year. GBG operates on a similar model. Children receive 30-minute lessons daily throughout the 36-week school year (90 hours altogether). The game is played each day as part of normal instruction. Both PA and CBG provide lessons that are implemented through the general school curriculum and focus on self-regulation skills, social skills, and mental health promotion.

Unlike the six programs reviewed above, the dose that each participating student receives in the remaining two programs, MindMatters and PBIS, is more difficult to calculate. We have classified these programs as providing the intervention through a systemic framework. For example, core elements of PBIS are integrated into the philosophy of the full school/organization and woven into traditional subject lessons rather than pulled out as distinct mental health lessons (see Table 2 for more detailed description). The dose of the interventions received by individual students is impossible to calculate. PBIS is provided by school staff and teachers with specific training in the model. MindMatters provides another example of the way that a continuous support/framework approach makes it difficult to assess individual student dose. Like PBIS, MindMatters provides structure and guidance within the school, but is malleable and thus allows organizations to build curricula that fit the needs of individual schools,<sup>37</sup> again making it difficult to compute the dose of the program received by individual students. MindMatters has components for different stakeholders in the school, including pupils, principals, teaching and nonteaching staff, parents, and the community around the school. Some of the manuals and exercises are directed to pupils; others are for school staff. Congruent with its universal approach, teachers gain skills to promote and support all students, regardless of mental health status.<sup>44</sup>

## DISCUSSION

This review has identified the school-based preventive interventions for children’s mental health that appear to have reached the largest populations, whether defined using the



number of participating children or of administrative entities. All of these programs have demonstrated their effectiveness using RCTs or quasi-experimental designs. Of note, the largest programs contain both Tier 1 and Tier 2 approaches, combining both universal prevention and targeted interventions for students most at-risk for psychosocial dysfunction, suggesting the benefit of multitiered interventions, especially in school settings.

The quality of evidence regarding dissemination and experimentally proven efficacy for the school-based interventions identified in this review is moderate to strong. Findings from these studies indicate that large-scale programs are being implemented in several U.S. states, Australia, and other HICs, and that these programs are also beginning to be implemented in LMICs—most notably, Brazil, Chile, and Mexico.

This review has found that the implementation of large-scale, school-based mental health programs in LMICs has been limited to programs that were either created in LMICs or, as with FRIENDS, created in HICs and subsequently revised significantly to account for cultural heterogeneity. Despite that caveat and the small number of programs, this review provides evidence that large-scale, school-based programs can be implemented in a variety of diverse cultures and educational models as well as preliminary evidence that such programs have significant, measurable positive effects on students' emotional, behavioral, and academic outcomes. Growing evidence in LMICs and also in HICs suggests that large-scale programs are sustainable, with all of those reviewed here having operated for more than ten years (and in some cases two or three decades).

Programs vary on tiers of intervention, dosage, and target behavior. The majority of the programs, however, do contain at least a Tier 1 intervention that has been implemented on the district level. Six programs are implemented by trained teachers in the classroom, and two are embedded into the school curriculum through a system of continuous support. In both of these types of programs, children have easy access to a school-wide atmosphere of mental health promotion, which may contribute to the ability of these programs to grow to scale and thereby reach millions of children. Only two programs (SFL and CBITS) use short-term, directed interventions implemented by mental health professionals. Nonetheless, evidence suggests that both these short-term targeted programs and the curriculum-based programs (*viz.* PATHS and PBIS) have long-term positive effects on behavior.

Programs that provide interventions to the same children over multiple years (*e.g.*, GBG and PA) offer the possibility of cumulative and thus perhaps even greater impact on preventive and treatment outcomes. It is interesting to note that, of the programs reviewed here, only one (GBG) has produced evidence that its positive effects persist over an extended period of time (for more than a decade, from elementary school into adulthood).<sup>21</sup> The factors associated with longer-term and larger effects, as well as the conditions common to

programs that have grown to scale, are other important areas for future study.

Although the primary focus of this review is on the largest-scale school-based mental health interventions, some types of mental health interventions for children that are not conducted at schools are worthy of note. For example, the U.S. Head Start program can be viewed as the largest and longest-running program for children's mental health in the world; it includes mental health in addition to physical and dental health, nutrition, social-emotional development, and school readiness in its core areas of intervention.<sup>45</sup> Now reaching more than 1 million preschool children each year in the United States alone, plus many more children through similar programs in other countries, it has probably provided at least some Tier 1 mental health services to over 30 million children since its inception in 1965. Head Start focuses on children from very low-income families and has features consistent with targeted mental health preventive interventions.<sup>45,46</sup> The mixed and, at times, controversial findings from the many evaluations of Head Start should, however, sound a cautionary note regarding the complexity of evaluating mental health and all of the other types of social and emotional programs for children.<sup>47</sup>

A number of other well-known programs, such as The Incredible Years,<sup>48</sup> Nurse Family Partnership,<sup>49</sup> and Triple P,<sup>50</sup> also attempt to promote child mental health for toddlers, infants, or prenatally with interventions aimed at mothers. These programs are now also reaching large populations. It may be important to note that since our review was confined to studies published in English, it is possible that there are other large-scale programs (both school- and non-school-based) that we are not aware of.

Even without including such programs, and still excluding the somewhat more generic social and emotional-learning programs like Lion's Quest that undoubtedly also enhance children's mental health, the school-based mental health programs discussed in this review appear to have reached more than 27 million children over the last decade, and many of these programs have collected systematic data on outcomes. At a time of increasing data collection, the availability of large data sets from programs like these provides new opportunities to evaluate child mental health programs in multiple spheres, combining existing educational databases with those from mental health, health, and social service agencies, on a regional, state, or national scale. The availability of such data should facilitate and better capture the multiple effects of these interventions in the short, medium, and long term by facilitating a mixed-methods approach to studying the effects of these often-complex interventions.

Even without more definitive evidence of impact, child mental health programs will probably continue to increase in scale and scope, resulting in substantial numbers of children exposed to preventive mental health interventions. We can therefore begin to explore new evaluation frameworks

that compare existing and new programs to the expressed needs of key stakeholders (such as school staff and community groups, as well as students and parents). With the growing availability and diversity of programs, we can now pay greater attention to assessing the processes and practices of implementation that are associated with successful, widely disseminated, and sustainable programs, and also to program limitations or liabilities that may impede adoption. Concepts like fidelity, appropriateness to local settings, penetration, and adoption must be taken into account as we study what has and has not worked in the scaling up of large programs such as these. Finding ways to incorporate data from implementation and outcome measures and aligning them more with the broader outcomes interests of schools and their assessment procedures will maximize our ability to learn from these programs and implement them further.

Given the call to improve accessibility and relevance of services to school-age populations,<sup>4</sup> the evaluative frameworks of school-based mental health programs need to be improved over the coming years. The available research supports the long-held belief that such school-based programs continue to be one of the most promising types of preventive mental health interventions available for children. When combined with the exponentially growing data sets from large-scale, school-based mental health implementations, the emerging field of implementation science has the potential to provide the foundation needed to develop the evidence base and to improve population-wide health outcomes for the next generation.

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