# A Systematic Review of School-Based Interventions Aimed at Preventing, Treating, and Responding to Suicide-Related Behavior in Young People

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**Abstract.** *Background:* Suicide, in particular among young people, is a major public health problem, although little is known regarding effective interventions for managing and preventing suicide-related behavior. *Aims:* To review the empirical literature pertaining to suicide postvention, prevention, and early intervention, specifically in school settings. *Method:* MEDLINE, PsycINFO, and the Cochrane Central Register of Controlled Trials (CCRCT) as well as citation lists of relevant articles using terms related to suicide and schools were searched in July 2011. School-based programs targeting suicide, attempted suicide, suicidal ideation, and self-harm where intent is not specified were included. No exclusion was placed on trial design. All studies had to include a suicide-related outcome. *Results:* A total of 412 potentially relevant studies were identified, 43 of which met the inclusion criteria, as well as three secondary publications: 15 universal awareness programs, 23 selective interventions, 3 targeted interventions, and 2 postvention trials. *Limitations:* Overall, the evidence was limited and hampered by methodological concerns, particularly a lack of RCTs. *Conclusions:* The most promising interventions for schools appear to be gatekeeper training and screening programs. However, more research is needed.

**Keywords:** suicide prevention, schools, systematic review

## Background

Suicide-related behaviors, including suicide, suicide attempt (SA; defined as "a nonfatal, self-inflicted potentially injurious behavior with any intent to die as a result"; Crosby, 2007), which may or may not result in injury, or death (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007), and suicidal ideation (SI, "thoughts of engaging in behavior intended to end one's life"; Crosby, 2007), are common among school-aged adolescents.

Lifetime rates of 9.7% for SA and 29.9% for SI have been reported (Evans, Hawton, Rodham, & Deeks, 2005), while data from the United States reported 12-month prevalence rates of 7–10.6% for SA and up to 24% for SI among 12–17-year-olds (Nock et al., 2008).

People who have made a SA are not only at elevated risk of dying by suicide in the future (Owens, Horrocks, & House, 2002; Suominen et al., 2004), but also of premature mortality via other causes, including homicide, cardiovascular disease, and diseases of the respiratory system (Hawton & Fagg, 1988). SI and SA are also distressing in their own right and have been associated with low self-esteem, externalizing attitudes, interpersonal difficulties, and emotional dysregulation (Adrian, Zeman, Erdley, Lisa, & Sim, 2010; Boudewyn & Liem, 1995; Lundh, Karim, & Quilisch, 2007). Adverse effects are not restricted to the individual: For every person who dies by suicide, it is estimated that significantly more of their family members and friends or peers will be negatively affected (Cerel, Jordan, & Duberstein, 2008).

For the most part, preventive approaches to suicide adopt the framework originally developed by Mrazek and Haggerty (1994) to describe mental health interventions. This was later applied to suicide prevention by Silverman and Maris (1995). It classifies interventions as either universal, selective, or indicated, on the basis of how their target groups are defined. *Universal interventions* target whole populations with the aim of reducing risk factors or

enhancing protective factors across an entire population. *Selective interventions* target subgroups that are not showing signs of suicidal behavior but that are displaying risk factors that could place them at greater risk in the future. Finally, *indicated interventions* target people who are already displaying suicidal behavior, for example, who have expressed SI or made a SA.

At present, little is known regarding effective interventions for managing suicidality (Robinson, Pirkis et al., 2008), including among adolescents, and in particular from randomized controlled trials (RCTs) (Burns, Dudley, Hazell, & Patton, 2005; Robinson, Hetrick, & Martin, 2011).

Although young people are often reluctant to seek professional help (De Leo & Heller, 2004; Evans, Hawton, & Rodham, 2005; Rickwood, Deane, & Wilson, 2007), research conducted in a high-school setting has found that students most frequently rated the school counselor as the most likely to be helpful when it comes to mental-health-related difficulties, compared to other health professionals (Robinson et al., 2010). Indeed, schools are an obvious and accepted environment for implementing suicide-prevention initiatives for young people displaying early signs of suicide risk (Hawton, Rodham, Evans, & Weatherall, 2002; Mental Health Foundation & Camelot Foundation, 2006; Robinson, Yuen et al., 2011), and a recent review of curriculum-based (i.e., universal) suicide-prevention programs found that such programs have the potential to improve the knowledge, attitudes, and help-seeking behavior in young people. There are a variety of suicide-prevention approaches that can be adopted by schools at the universal, selective, and indicated levels, although at present these have not been considered within a single review.

The current study conducted a systematic review of the empirical literature pertaining to universal, selective, and indicated suicide-prevention programs, and postvention programs, delivered within a secondary-school setting.

# Method

## Search Strategy

The literature search involved school-based programs aimed at either prevention or treatment of suicide-related behaviors, and postvention programs implemented in response to suicide within a school setting. A systematic search of bibliographic electronic databases MEDLINE, PsycINFO, and the Cochrane Central Register of Controlled Trials (CCRCT) was performed in July 2011. The following terms formed the basis of the search strategy: suicid* OR "self-harm" OR "self harm" OR "deliberate self-harm" OR "DSH" OR "self-injurious behavior" OR "self-inflicted wounds" AND school* OR school-based OR curriculum OR curriculum-based. Further papers were identified through hand searching the references of all subsequently included studies and relevant reviews.

Two review authors (JR and GC) independently screened the titles of all retrieved articles. Potentially relevant articles were retrieved and the full text assessed for inclusion in the review. The same two review authors classified all studies independently, and disagreements were resolved through discussion. Studies were classified as either universal prevention programs, selective interventions (gatekeeper training programs and screening interventions), indicated or treatment interventions, or postvention programs.

Studies were included if they were single interventions conducted in a school setting, which were targeting suicide, SA, SI, or self-harm (where intent is not specified), and contained a suicide-relevant outcome. No exclusion was placed on study design. Studies were excluded if they were reviews, articles on perceptions of need, risk factors, or prevalence.

# Results

A total of 394 studies were retrieved from the electronic databases and a further 19 studies were identified by hand-searching reference lists. After removing duplicates, 412 records were assessed for eligibility. In total, 157 full-text articles were retrieved for further examination. Of these, 46 publications, reporting on 43 different studies, were included in the review. In three cases, studies retrieved in the search were secondary publications of already retrieved articles; these studies were included under the data extraction for the primary article and noted in the extraction tables. The flow of studies through the review process can be seen in Figure 1.

Fifteen studies examined universal prevention programs, 23 examined selective programs (12 were gatekeeper training studies, and 11 were screening studies), 3 were indicated interventions, and 2 were postvention programs.

## Universal Interventions

A total of 15 studies met the inclusion criteria for the review (see Table 1). Programs were implemented in schools between 1988 (Spirito, Overholser, Ashworth, Morgan, & Benedict-Drew, 1988) and 2011 (King, Strunk, & Sorter, 2011), with the majority of interventions taking place in the United States. Sample sizes ranged from 128 (LaFromboise & Howard-Pitney, 1995) to 4,133 participants (Aseltine, James, Schilling, & Glanovsky, 2007) and involved students from grade 8 through to grade 12.

Aims of these programs included the reduction of suicide-related behaviors (Aseltine & DeMartino, 2004; Aseltine et al., 2007; King et al., 2011; LaFromboise & Howard-Pitney, 1995), changing unwanted attitudes toward suicidal behavior and suicidal peers (Aseltine & DeMartino, 2004; Aseltine et al., 2007; Ciffone, 1993, 2007; LaFrom-

 

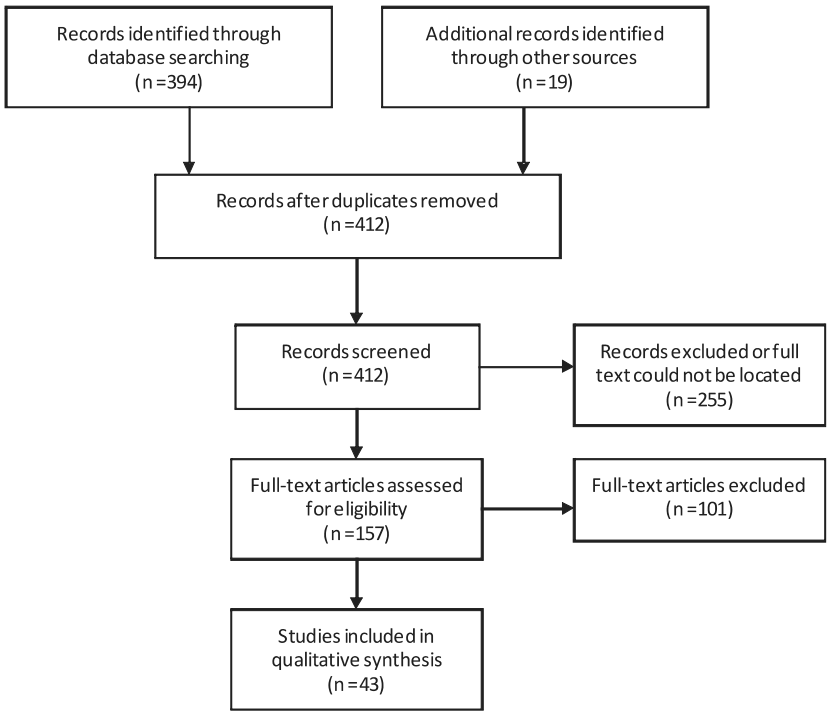


*Figure 1.* Prisma flow diagram



boise & Howard-Pitney, 1995; Overholser, Hemstreet, Spirito, & Vyse, 1989), and increasing student's knowledge of suicide risk factors, warning signs in themselves and others, and help-seeking strategies.

The content of the programs included videos depicting young people experiencing suicidal and/or depressed feelings, discussion groups on recommended ways in which to deal with someone who is depressed or suicidal, and the link between suicide and mental disorders. Some programs (such as the SOS program) included both a teaching and screening component.

Program lengths varied from a single session (Cigularov, Chen, Thurber, & Stallones, 2008; Kalafat & Gagliano, 1996; Portzky & van Heeringen, 2006) to multiple-session programs implemented over 4 to 12 weeks (King et al., 2011; Klingman & Hochdorf, 1993; Orbach & Bar-Joseph, 1993; Overholser et al., 1989; Spirito et al., 1988). A range of teaching materials and techniques were employed.

## Outcomes

### Suicide-Related Behaviors

Six studies measured suicide-related outcomes, all of which demonstrated significant reductions in at least one suicide-related outcome, including reduction in number of self-reported SAs (Aseltine & DeMartino, 2004; Aseltine et al., 2007), or in the number of students currently considering a SA, making a suicide plan, and attempting suicide within the past 3 months (King et al., 2011). The studies conducted by Klingman and Horchdorf (1993) and Orbach and Bar-Joseph (1993) both used the Israeli Index of Suicide Potential (IISP) to measure students' risk of suicide. In both studies, at postintervention, students showed a statistically significant reduction in their "risk" of suicide.

### Knowledge of Suicide

Knowledge of suicide was conceptualized in a number of ways and included knowledge of, and how to respond to, suicidal warning signs in self and peers as well as knowledge of potential helpful contacts in a crisis. Knowledge concerning "suicide myths" and making the link between suicide and mental illness were also measured. Nine of the 15 studies measured students' knowledge of suicide and/or mental illness, and all found improvements in knowledge at postintervention (see Table 1).

### Attitudes Toward Suicide

Of the 11 studies that measured attitude toward suicide, 7 found a significant improvement in positive attitudes at posttest; 2 studies observed significant changes in attitude in females only (Overholser et al., 1989; Spirito et al., 1988), and 2 studies did not find any improvement in attitude at postintervention (Ciffone, 1993; Portzky & van Heeringen, 2006).

 

*Table 1.* Universal programs

| Study (name of program where applicable) | Design | Participants | Program length | Knowledge | Attitudes | Help-seeking | Suicide attempts |
|---|---|---|---|---|---|---|---|
| Nelson (1987) *(unnamed)* | Pretest/posttest case series | CG: $n = 189$ TG: $n = 181$ students from 8 schools (USA) | 4-h training program | *CG: 32.20 TG: 35.48 $p < .001$ | *CG: 33.86 TG: 34.95 $p < .01$ | N/A | N/A |
| Spirito et al. (1988) *(unnamed)* | Solomon 4-group design | CG: $n = 182$ TG: $n = 291$ students from 5 schools (USA) | 6-week curriculum | *TG increased knowledge [$F(1, 402) = 40.42$, $p < .001$] | Females more likely than males to endorse positive attitudes regardless of Tx, $p < .001$ | No effect of curriculum on helping behaviors (*ns*) | N/A |
| Overholser et al. (1989) *(unnamed)* | Nonrandomized experimental trial | CG: $n = 256$ TG: $n = 215$ students from 3 schools (USA) | 5 meetings of health class | Students who knew a peer that had attempted suicide had increased knowledge, $p < .001$ | Reduced negative attitude for all subjects, except males with personal experience with a suicidal peer, $p < .0001$ | No change at posttest *(ns)* | N/A |
| Ciffone (1993) *(unnamed)* | Nonrandomized experimental trial | CG: $n = 121$ TG: $n = 203$ students from 3 schools (USA) | 15-min video followed by 40-min structured discussion | N/A | Increase relative to CG (*ns*) | Improvement relative to CG (*ns*) | N/A |
| Klingman & Hochdorf (1993) *(unnamed)* | RCT | CG: $n = 121$ TG: $n = 116$ students (Israel) | 12 weekly group sessions (50 min each) | *CG: 4.17 TG: 5.05 $p < .001$ | TG: higher semantic divergence between "distress" and "hope" [$F(1, 211) = 6.73$, $p < .04$] | N/A | Index of Potential Suicide: TG greater reduction than CG: [$F(1, 211) = 28.57$, $p < .001$] |
| Orbach & Bar-Joseph (1993) *Suicide Prevention Program* | RCT | CG: $n = 178$ TG: $n = 215$ from 6 schools (Israel) | 7 weekly meetings (2 h each) | N/A | N/A | N/A | *Grp X time interaction for suicidal tendencies, [$F(1, 17) = 7.08$, $p < .05$] |
| Kalafat & Elias (1994) *(unnamed)* | Solomon 4-group design | 235 students from two schools (USA) | 3 lessons (45 min each) | *MANOVA showed sig group effect [$F(7, 234) = 12.82$, $p < .001$] | *MANOVA showed sig group effect [$F(14, 225) = 1.87$, $p < .03$] | *Overall group effect ($p < .002$), with no pretesting effects | N/A |
| LaFromboise & Howard-Pitney (1995) *Zuni Life Skills Development Curriculum* | Nonrandomized experimental trial | CG: $n = 59$ TG: $n = 69$ students (USA) | 3 times a week over 30 weeks | N/A | N/A | N/A | Suicide vulnerability: * CG: 58.36 TG: 54.34 $p < .07$ |
| Kalafat & Gagliano (1996) *(unnamed)* | Nonrandomized experimental trial | CG: $n = 57$ TG: $n = 52$ students from one school (USA) | 5 small group discussions | N/A | N/A | Tell adult response Low ambiguity story: *CG: 1.8% TG: 40.4% $p < .001$ High ambiguity story: *CG: 0% TG: 28.8% $p < .001$ | N/A |

| Study (name of program where applicable) | Design | Participants | Program length | Knowledge | Attitudes | Help-seeking | Suicide attempts |
|---|---|---|---|---|---|---|---|
| Aseltine & DeMartino (2004) *Signs of Suicide (SOS)* | RCT | CG: $n = 1073$<br>TG: $n = 1027$<br>students from 5 schools (USA) | Students in health class participated over a 2-day period | *CG: 6.49<br>TG: 7.18<br>$p < .0083$ | *CG: 3.80<br>TG: 4.05<br>$p < .0071$ | CG: 13%<br>TG: 11.9%<br>% that talked about friends' emotional problems (*ns*) | Attempts<br>*CG: 5.4%<br>TG: 3.6% |
| Portzky & van Heeringen (2006) *(unnamed)* | Solomon 4-group design | CG: $n = 85$<br>TG: $n = 81$<br>students (Belgium) | 6-week structured curriculum | *Improvement<br>$p < .001$ | No significant effect (*ns*) | N/A | N/A |
| Aseltine et al. (2007) *Signs of Suicide (SOS)* | RCT | CG: $n = 2094$<br>TG: $n = 2039$<br>students from 9 schools (USA) | Students in health class participated over a 2-day period | *CG: 4.36<br>TG: 5.00<br>$p < .0001$ | *CG: 3.83<br>TG: 3.99<br>$p < .0001$ | CG: 12.4%<br>TG: 12.8%<br>% seek help (*ns*) | Attempts<br>*CG: 4.5%<br>TG: 3.0% |
| Ciffone (2007) *South Elgin High School Suicide Prevention Program* | Pseudorandomized controlled trial | CG: $n = 200$<br>TG: $n = 221$<br>students from 2 schools (USA) | 3-day curriculum delivered in health class | N/A | *Improvement in items 1, 2, 3, 7, & 8<br>$p < .001$ | *Improvement in items 4 & 6<br>$p < .05$ | N/A |
| Cigularov et al. (2008) *Raising Awareness of Personal Power* | Rolling group design | 779 high school students from 7 schools (USA) | 50–70-min curriculum delivered in health class | $T_1$CG: 2.49<br>$T_2$CG: 3.88*<br>$p < .01$<br>$T_1$TG: 2.41<br>$T_2$TG: 3.84*<br>$p < .01$ | $T_1$CG: 38.28<br>$T_2$CG: 41.01*<br>$p < .01$<br>$T_1$TG: 38.69<br>$T_2$TG: 40.75*<br>$p < .01$ | $T_1$CG: 42.50<br>$T_2$CG: 52.76*<br>$p < .01$<br>$T_1$TG: 48.46<br>$T_2$TG: 54.52*<br>$p < .01$ | N/A |
| King et al. (2011) *Surviving the Teens* | Pretest/posttest case series | $T_2$: $n = 919$ students<br>$T_3$: $n = 416$ students (USA) | 4 sessions (50 min each) | N/A | N/A | At $T_2$, students were more likely to tell an adult if they were suicidal, $p < .001$, or if their friend was suicidal $p < .001$, which was sustained at $T_3$.<br>At $T_2$ students were more likely try and help a suicidal friend to see a counselor or adult, $p < .001$ | At $T_2$ decreased no. of students attempting suicide, $p = .035$, making a suicide plan, $p = .003$, and attempting suicide, $p = .011$ |

*Notes.* *Refers to statistically significant results; *ns* refers to nonstatistically significant results; *p* values where reported in the original are reported herein. CG: control group; TG: treatment group; $T_1$: pretest; $T_2$: posttest; $T_3$: follow-up.

### Help-Seeking Behavior

Help-seeking was generally assessed in relation to the young person's self-reported level of efficacy in seeking help for themselves or a peer. Results around changes in help-seeking were equivocal: 6 studies reported significant improvements following the intervention program (Ciffone, 2007; Cigularov et al., 2008; Kalafat & Elias, 1994; Kalafat & Gagliano, 1996; King et al., 2011); the other 5 reported no change at posttest or between groups.

## Selective Interventions: Gatekeeper Training

Twelve studies evaluating gatekeeper training programs met the inclusion criteria for the review (see Table 2).

A common goal of many of the gatekeeper training programs was to increase participants' general knowledge of youth suicide and suicide-related behavior, risk factors and warning signs, as well as changing attitudes toward suicide intervention (Stuart, Waalen, & Haelstromm, 2003; Tompkins, Witt, & Abraibesh, 2009). Another common theme was increasing gatekeeper confidence (Reis & Cornell, 2008; Robinson, Gook et al., 2008; Suldo et al., 2010) and self-efficacy (Clark, Matthieu, Ross, & Knox, 2010; King & Smith, 2000; Tompkins et al., 2009) in relation to working with suicidal students. One study (Wyman et al., 2010) trained peer leaders as gatekeepers, in order to deliver school-wide messaging regarding positive suicide-prevention practices. This study differed in its aims from the other included studies, in that a core feature was changing the culture of the school as well as equipping gatekeepers with enhanced skills.

For many of the included studies, a detailed description of the gatekeeper training program was not provided. A number of interventions used a combination of didactic presentation of information regarding youth suicide and suicide-related behavior, risk factors and warning signs, and case vignettes to facilitate group discussion (Klingman, 1990; Mackesy-Amiti, Fendrich, Libby, Goldenberg, & Grossman, 1996; Robinson, Gook et al., 2008; Stuart et al., 2003; Suldo et al., 2010). Developing active listening skills was also emphasized (Clark et al., 2010; King & Smith, 2000; Stuart et al., 2003).

## Outcomes

The majority of studies assessed outcomes relating to knowledge of and/or positive attitudes toward suicide and suicide-related behavior or intervention, confidence in dealing with suicidal behaviors and mental health, and changes in prevention practices. Studies that included outcomes measuring attitudes looked at changes regarding positive attitudes toward suicide intervention among gatekeepers and/or young people themselves.

### Knowledge of Suicide and Suicide-Related Behavior

Knowledge of suicide was predominantly measured by testing participants on their knowledge of suicide risk factors and warnings signs, with some studies also including knowledge of appropriate steps for prevention and intervention. Nine of the 12 studies measured participants' knowledge of suicide directly following the intervention. Of these, all reported an increase in knowledge at posttest and/or compared to controls. Four studies, however, also assessed gains in knowledge at follow-up with mixed results. One follow-up survey at 3 months indicated that gains in knowledge in school personnel were not maintained over time (Tompkins et al., 2009), although Robinson, Gook et al. (2008) found that, while some participants' levels of knowledge reduced over 6-month follow-up, others increased. The study by Stuart and colleagues reported that knowledge scores of student peer leaders were significantly higher at 3-month follow-up than at pretest (Stuart et al., 2003). Whereas Suldo et al. (2010) found that while gains in knowledge of intervention practices were maintained, scores on prevention, postvention, and total knowledge decreased significantly at 9-month follow-up.

### Attitude Toward Suicide

Five studies assessed attitude toward suicide with mixed results. Two studies reported an improvement in attitudes at posttest, although Stuart et al. (2003) reported a loss of favorable attitudes at 3-month follow-up. Klingman (1990) compared two types of training workshops for gatekeepers, a group-oriented workshop involving the group leader facilitating discussion about suicide awareness and the ways in which it may affect gatekeepers, and a problem-oriented workshop that focused on the "facts" associated with youth suicide and strategies that can be used to minimize such behavior. In a comparison of these two training workshops, increase in comfort dealing with topics in a classroom setting was reported only for the problem-oriented training group (Klingman, 1990). Another study reported no significant difference in attitude change scores between control and intervention groups from pretest to posttest (Tompkins et al., 2009). There were, however, effects of age and profession, with younger groups of school personnel showing positive attitudinal shifts over time as well as teachers and administrators showing positive gains, whereas support staff showed negative shifts or no change in attitude over time (Tompkins et al., 2009). The final study also did not report a significant change in overall attitude scores at posttest (Robinson, Gook et al., 2008).

### Confidence in Dealing with Suicide-Related Behaviors and Mental Health Issues

Seven studies looked at confidence in dealing with suicide-related behavior and/or mental health issues following in-

 

*Table 2.* Gatekeeper training programs

| Study | Design | Participants | Program length | Knowledge | Attitudes | Confidence | Prevention practices |
|---|---|---|---|---|---|---|---|
| Klingman (1990) *(unnamed)* | RCT | Group Oriented Workshop: $n = 15$ Problem-Oriented Workshop: $n = 15$ Junior high teachers (USA) | Two 90-min training sessions | *Increased knowledge in both groups at posttest, $p < .001$ | Nonsignificant main effect *(ns)* | *Both groups reported feeling more competent in dealing with suicidal adolescents at posttest, $p < .001$ | N/A |
| Angerstein et al. (1991) *Project SOAR* | Nonrandomized experimental trial | CG: $n = 56$ TG: $n = 56$ school counselors | Two 4-h training sessions | *increase in counselor knowledge in District A (project SOAR training) compared with District B (no training) ($p < .01$) | *Improvement in attitudes in counselors in District A (Project SOAR training) compared with District B (no training) ($p < .01$) | N/A | N/A |
| Mackesy-Amiti et al. (1996) *Preparing for Crisis* | Pretest/posttest case series | 205 school personnel and community representatives (USA) | One 4-h training session | *Increased knowledge at posttest, $p < .001$ | N/A | N/A | N/A |
| King & Smith (2000) *Project SOAR* | Posttest case series | 186 School counselors who had completed SOAR training (USA) | 8-h training course | *Counselors who had received SOAR training in the past 3 years knew more knowledgeable that those who had not. | N/A | *Counselors who had received SOAR training within the last 3 years felt more confident than those who had not received training in the past 3 years | N/A |
| Stuart et al.(2003) *Peer Gatekeeper Training (PGT) Program* | Pretest/posttest case series | 65 adolescents involved in peer-helping programs from 5 schools (Canada) | Two half-day sessions one week apart, with 3-month follow-up session | *$T_1$: 9.86 $T_2$: 10.82 $p = .002$ *$T_1$: 9.86 $T_3$: 10.68 $p = .003$ | *$T_1$: 3.77 $T_2$: 4.34 $p = .0001$ *$T_1$: 3.77 $T_3$: 4.34 $p = .0001$ *$T_2$: 4.43 $T_3$: 4.13 $p = .001$ | N/A | Students were more capable of inquiring about SI after they had completed the program |
| Katatoka (2007) | Cohort study | 95 parents of young people who had contact with the Los Angeles Unified School District (LAUSD) Youth Suicide Prevention Program | No information | N/A | N/A | N/A | N/A |
| Reis & Cornell (2008) *Question Persuade and Refer (QPR)* | Retrospective cohort study | CG: $n = 252$ school personnel TG: $n = 238$ school teachers & counselors (USA) | 1–½ h training program | *TG increased knowledge $p < .001$ | N/A | 74% of QPR trained participants said the course increased their confidence in dealing with potentially suicidal students | *TG levels of prevention practice – more no-harm contracts made |

| Study | Design | Participants | Program length | Knowledge | Attitudes | Confidence | Prevention practices |
|---|---|---|---|---|---|---|---|
| Robinson et al. (2008) *(unnamed)* | Pretest/posttest case series | 213 school staff (Australia) | 1 or 2 day training program (7 h/day) | N/A | No significant main effect (*ns*) | *Improved confidence working with people who self harm at post test and follow-up, $p < .001$ | At 6-month follow-up 75% of respondents reported having changed their practice in some way |
| Wyman et al. (2008) *QPR* | RCT | 322 school staff<br>$T_2$: CG: $n = 127$<br>TG: $n = 249$ (USA) | 1–½ h training program | *$T_2$ CG: 71.78<br>TG: 76.30, $p < .001$ | N/A | N/A | *TG: increase in times staff member reported asking about suicide, $p < .0001$. No effect of training on suicide identification or communication with students |
| Tompkins et al. (2009) *QPR* | Case-control study | $T_2$CG: 24<br>TG: 78<br>$T_3$CG: 21<br>TG: 18<br>School staff (USA) | 1–½ h training program | *TG more general knowledge at T2 [$F(1, 99) = 59.98$, $p < .001$]. Gains in knowledge were not maintained at $T_3$ (*ns*) | No change in attitude (*ns*) | N/A | N/A |
| Clark et al. (2010) *Samaritans of New York Suicide Awareness and Prevention Program* | Pretest/posttest case series | 365 school personnel, and community health workers (USA) | 2 sessions (3 h in total) | N/A | N/A | Higher reported self-efficacy at posttest, $p < .001$ on all items | N/A |
| Suldo et al. (2010) *(unnamed)* | Pretest/posttest case series | 100 school psychologists<br>$T_2$: $n = 57$<br>$T_3$: $n = 43$ (USA) | 4-h workshop | *$T_1$: 39.70<br>$T_2$: 42.19, $p < .05$<br>*$T_1$: 39.70<br>$T_3$:40.85, $p < .05$ | N/A | * Improved confidence at $T_2$ in all activities, $p < .05$. All gains were maintained at$T_3$ | N/A |
| Wyman et al. (2010). *Sources of Strength Suicide Program* | RCT | CG: 2675 students<br>TG: 453 peer leaders (USA) | 4–6 h of training for adult advisors. 4 h of interactive training for peer leaders | N/A | N/A | * TG greater expectation adults could help suicidal peers, more rejection of codes of silence, and decreased maladaptive coping strategies $p < .001$ | *TG greater likelihood of seeking help from adults ($p < .001$); use of SOS coping resources ($p < .002$); and increased number of identified trusted adults ($p < .001$) |

*Note.* *Refers to statistically significant results; *ns* refers to nonstatistically significant results; *p* values where reported in the original are reported herein. CG: control group; TG: treatment group; $T_1$: pretest; $T_2$: posttest; $T_3$: follow-up.

tervention, with all studies reporting an increase. Nearly three-quarters (74%) of Question, Persuade, Refer (QPR)-trained participants said the course increased their confidence in dealing with potentially suicidal students (Reis & Cornell, 2008); QPR trainees also had significantly higher preparedness and self-efficacy scores following training (Wyman et al., 2008). In another study, participants reported improved confidence in all suicide-related activities, including assessment, referral to community agencies, counseling and postvention; gains which were maintained at 9-month follow-up (Suldo et al., 2010).

### Prevention Practices

Prevention practices were measured in a number of ways, including changes in actual knowledge of policies, procedures, and referral pathways as well as ability to engage in prevention practices such as making no-harm contracts asking about SI, or assessing for suicide risk.

Eight studies reported on changes in prevention practices following intervention, with all studies reporting a positive change in behaviors or knowledge. Three studies reported an increase in participants' knowledge of suicide intervention steps after completing training (King & Smith, 2000; Klingman, 1990; Tompkins et al., 2009). With regard to behavior change, QPR trainees made more no-harm contracts than controls (Reis & Cornell, 2008) and were more likely to ask about suicide following training (Wyman et al., 2008); students who completed the Peer Gatekeeper Training (PGT) program were also more capable of inquiring about SI than at pretest (Stuart et al., 2003). Robinson, Gook et al. (2008) reported that, at 6-month follow-up, 75% of respondents reported having changed their practice in some way. In the Wyman et al. (2008) study, suicide identification behaviors increased most in staff who were already communicating with students about suicide and distress.

## Selective Interventions: Screening Programs

Screening programs focus upon the early identification of people who may be at risk but who have not sought help or been identified by professionals as needing support. Screening programs may focus purely on identifying people already showing suicide risk, although they may also seek to identify people at risk of other difficulties, which would place them at elevated risk of suicide, for example, for depression, anxiety, or substance misuse.

Screening young people for risk typically involves a two-stage process: Stage one involves administering a brief screening instrument in order to detect those people who may be at risk, and stage two involves an in-depth, face-to-face clinical interview designed to identify which of the young people identified as potentially at risk via stage one require ongoing support and which do not.

Eleven studies examining the implementation of screening programs in schools were eligible for inclusion, 7 of which sought to identify students at risk of suicide and reported on the follow-up referral rate of these students (see Table 3). The remaining 4 studies aimed to investigate the feasibility, efficacy and/or psychometric properties of screening interventions (Gould et al., 2005; Scott et al., 2010; Shaffer et al., 2004; Thompson & Eggert, 1999) and are discussed separately.

### Number of Young People Identified as "At-Risk" and Follow-Up Referral Rate

The number of young people identified as "at-risk" through screening varied from 4% (de Wilde, van de Looij, Goldschmeding, & Hoogeveen, 2011) to 45% (Brown & Grumet, 2009), with several studies reporting a follow-up referral rate of over 50% (Brown & Grumet, 2009; Gould et al., 2009; Hallfors et al., 2006; Husky, Sheridan, McGuire, & Olfson, 2011).

Gould et al. (2005) examined whether asking about SI or behavior during screening creates distress or increases SI among high-school students generally, or students reporting depressive symptoms, substance use problems, or SA. There was no difference in levels of distress reported by participants who had completed the screening containing questions regarding suicidal behaviors compared to those who had completed a screening instrument with no reference to suicide-related behaviors, suggesting no evidence of iatrogenic effects of suicide screening.

### Rate of True and False Positives (Sensitivity and Specificity)

One study specifically aimed at assessing the degree of overlap between students identified through school-based suicide screening and those thought to be at risk by school administrative and clinical professionals (Scott et al., 2009). Overall 489 (28.3%) students were positively identified by the Columbia Suicide Screen (CSS). Thereof 41.1% ($n$ = 201) were also identified by school professionals – meaning that 58.9% ($n$ = 288) were not identified by school professionals. With respect to false positives, 37.3% of those identified by the CSS and 63.4% identified by school professionals did not have a significant mental-health problem. Therefore, the CSS accurately identified (or has a positive predictive value of) 62.7% compared to 36.5% for school professionals. Twenty-one students (18.3%) with a mental health problem or suicide risk were missed by both school staff and the CSS.

Using the same dataset Scott et al. (2010) tested four screening algorithms to evaluate changes in sensitivity and costs of the CSS screening program. These were (1) high-threshold CSS algorithm – any SI or prior lifetime suicide or four or more emotional items rated as medium, bad, or very bad problem; (2) low-threshold CSS algorithm – any

 

*Table 3.* Screening interventions

| Study | Design | Participants | Screening program | No. participants identified as needing a follow-up or "at risk" | Follow-up referral rate |
|---|---|---|---|---|---|
| Gutierrez et al. (2004) | Retrospective cohort | 390 students in grades 9–12 (13–19 years) (USA) | The Suicidal Ideation Questionnaire (SIQ) and the Reynolds Adolescent Depression Inventory (RADS) | 11% ($n$ = 44) identified as needing to be followed up; 3.1% were at risk/in crisis; 4.4% were of notable concern; 3.8% were in apparent need | Of the 44 students screened, 27% received intensive intervention, 39% received intermediate intervention, and 34% were monitored |
| Hallfors et al. (2006) | Nonrandomized experimental trial | 1329 students from 10 schools, grades 9–12 (USA) | The Suicide Risk Screen (SRS) | 29% were rated as "at-risk" and 9% reported having made a SA within the past year | Of the 389 students rated as at-risk and invited for a follow-up interview, 69% attended |
| Brown & Grumet (2009) | Retrospective cohort | 229 Black or African American students between 11 and 18 years (USA) | The Columbia Health Screen | 45% ($n$ = 102) returned a positive result, 20% ($n$ = 45) endorsed current or previous SI or attempt. 3% ($n$ = 6) required immediate hospitalization due to imminent risk of suicide | 62% of youth who returned a positive screen attended at least 1 appointment with a mental health services provider within 1 month of screening (linked) and 70% were linked by 6 months |
| Gould et al. (2009) | Retrospective cohort | 2342 adolescents aged 13 to 19 years (USA) | The Suicidal Ideation Questionnaire-Junior Version (SIQ-JR) and the Beck Depression Inventory (BDI) | During the initial screening process, 317/2342 young people were identified as at risk. Of these, 223 (70%) participated in the follow-up | Of the 78 participants who received a referral to services at the initial screen, 76.9% said that the screening had influenced them in their decision to seek help. There were 54 "new service users" |
| Scott et al. (2009) | Cross-sectional | 1729 students from 7 high schools. (11–19 years) (USA) | The Columbia Suicide Screen (CSS) | 489 (28.3%) students were positively identified by the screening. Of them, 41.1% ($n$ = 201) were also identified by school professionals | 37.3% of those identified by the CSS did not have a significant mental health problem; therefore the CSS accurately identified 62.7% of students with a significant MH problem or suicide risk |
| de Wilde et al. (2011) | Retrospective cohort | 3692 first-grade secondary school students (mainly 12–13-year-olds) (Netherlands) | Strengths and Difficulties Questionnaire (SDQ) | 4% ($n$ = 95) reported suicidal thoughts and/or behavior. 1.4% ($n$ = 53) had both emotional problems and suicidal thoughts/behavior | Of those reporting suicide-related behavior, only 36% were subsequently followed up by the school nurse<br>Of those reporting emotional problems and suicidal behavior, 45% were followed up |
| Husky et al. (2011) | Retrospective cohort | 2488 ninth-grade students from six public high schools (USA) | The Diagnostic Predictive Scales-8 (DPS-8) | 19.6% of screened adolescents were deemed to be at-risk and received a second-stage clinical interview. Of those identified as at-risk, 26.4% were currently receiving services for a mental health concern | Among adolescents who received any referral 76.3% received at least one follow-up visit, and 56.3% received "minimally adequate treatment" (3 or more sessions, or clinician termination of sessions) |

*Table 4.* Indicated interventions

| Study | Design | Participants | Inclusion criteria | Description of intervention | Suicide-related outcomes | Depression |
|---|---|---|---|---|---|---|
| Eggert et al. (1995) *(unnamed)* | RCT | CG: $n$ = 202 not "at-risk" students<br>$TG_1$: $n$ = 36 (assessment protocol & 1-semester personal growth class)<br>$TG_2$: $n$ = 34 (assessment protocol & 2-semester personal growth class)<br>$TG_3$: $n$ = 35 (assessment protocol-only)<br>Students in years 9–12, from 5 schools, assessed to be "at risk" of suicide (USA) | "At risk" of suicide was determined by a 3-stage procedure utilizing a combination of variables including grade scores, absenteeism, prior history of school dropout, scores on the High School Questionnaire and assessment using the Measure of Adolescent Potential for Suicide | Personal Growth Class (PGC): Students had the option of taking either a one-semester class, PGC I (5 months or 90 class days in length), or PGC II (10 months or 180 class days), both of which were delivered as one of their five or six regularly scheduled classes. Components of both included: (1) a small-group work component; (2) weekly monitoring of activities; and (3) life skills training | *Decline in suicide risk behavior over time for all TG (F sublinear (1,102) = 104.14, $p < .001$). No differences between groups (*ns*) | * Decreasing trends in depression were also seen ($F$ sublinear (1, 101) = 88.93, $p < .001$) for all TG. No differences between group (*ns*) |
| Thompson et al. (2001)[sp] *Counselors Care (C-CARE); Coping and Support Training (CAST)* | RCT | CG: $n$ = 155<br>$TG_1$: $n$ = 150 (C-CARE)<br>$TG_2$: $n$ = 155 (CAST)<br>All students were potential high school dropouts, defined as "high risk" for suicide (USA) | Youths identified as being at high risk of high school drop out, and at risk of suicide | C-CARE: a 2 h 1–1 interview consisting of the "Measure of Adolescent Potential for Suicide," then 1.5–2 h motivational counseling session<br>CAST: 12 sessions over 6 weeks (total 12 h) small group skills-training program combined with C-CAST | *TGs showed significant favorable change in attitude toward suicide and SI compared with CG, maintained at follow-up. All 3 groups showed declines in suicide risk behaviors, maintained at follow-up | *TGs showed significantly lower levels of depression at $T_3$ and $T_4$ compared with CG |
| Tang et al. (2009) *The Program of Intensive Psychotherapy for Depressed Adolescents With Suicidal Risk (IPT-A-IN)* | RCT | CG: $n$ = 37 (Treatment as usual)<br>TG: $n$ = 35 (Interpersonal Psychotherapy for adolescents)<br>Depressed high school students, aged 12–18 years, deemed to be "at risk" of suicide (Taiwan) | Depressed students with suicidal risk as determined by the SCID-I. Exclusion criteria: Personality disorder, acute psychotic symptoms, drug abuse or a serious medication condition | IPA-T-A: Focus on symptoms related to interpersonal problem domains, including interpersonal conflict, interpersonal sensitivity, role transition and grief. 2 sessions per week for 6 weeks. Treatment As Usual: Supportive counseling and psychoeducation provided in the school setting. 1–2 times/week over 6-weeks (30-60 minutes), delivered by school counselors with no training in IPT-A | Beck Scale for SI (BSS)<br>*CG:16.29<br>TG: 8.97<br>$p < .01$ | Beck Depression Inventory (BDI)<br>*CG: 31.58<br>TG: 19.97<br>$p < .001$ |

*Note.* *Refers to statistically significant results; *ns* refers to nonstatistically significant results; $p$ values where reported in the original are reported herein. CG: control group; TG: treatment group; $T_3$: posttest; $T_4$: follow-up; [sp] denotes secondary publications.

*Table 5.* Postvention programs

| Study | Design | Description of intervention | Participants | Suicide-related outcomes |
|---|---|---|---|---|
| Hazell & Lewin (1993) | Posttest case series | Intervention conducted in schools within 7 days of a student suicides, and consisted of a 90-minute counseling session, provided at school, by a child psychologist or trainee psychiatrist, to groups of 20 to 30 students. Students were selected by school staff, predominantly on the basis of close friendship with the deceased | **Treatment group:** $n = 63$<br>**Comparison group:** matched controls who did not receive counseling<br>60% of high school students ($n = 860$) completed a questionnaire assessing SI and behavior | 53% of students reported exposure to a student, friend or family member who had attempted suicide<br>77% reported exposure to a completed suicide.<br>Previous SI and behavior, and proximity to a friend who had attempted or completed suicide were significant risk factors for current SI and behavior<br>Proximity to attempted suicide was a stronger predictor than completed<br>There were no groups differences between counseled students ($n = 63$) and matched noncounseled controls<br>Of the counseled students, 40 had two or more risk factors for SI and behavior, however, 231 uncounselled students had the similar levels of risk, suggesting asking school staff to identify close friends of the deceased is an inadequate means of identifying students at risk |
| Poijula, Dyregrov et al. (2001)[sp] | Posttest case series with 3-year longitudinal follow-up | **School A –** No intervention after suicide I and II, following suicide III the school had a first-talk through (FTT) on the first day and implemented a 2-h debriefing, conducted by a clinical psychologist, on the following day<br>**School B –** Following the first suicide the school implemented 1-h classroom meetings, conducted by a teacher, a week after the suicide, in all but one 8th grade class. After suicide II a FTT was held on the first day and a 1-h debriefing was conducted by a mental health professional 4 days after the suicide<br>**School C –** Following the suicide a FTT was held on the first day and a 1-h debriefing was conducted by a mental health professional the following day | Total participants: $n = 89$ homeroom classmates of the suicide victims from the three schools<br>School A: $n = 31$<br>School B: $n = 32$<br>School C: $n = 26$<br><br>Average time between the suicide and the measurement was 6 months | **Closeness to the victim:** Classmates who indicated they were friends of the suicide victim were in the PTSD risk group more often than those who were not close, ($p = .002$)<br>**PTSD, grief and gender**: 30% of classmates assessed to be at high risk for PTSD, no gender differences. 10% of classmates were in the high intensity grief group. No significant difference in high PTSD and high intensity grief scores across schools<br>**School support –** 21.2% of students who indicated they received good support from their school were in the PTSD risk group, compared with 30.8% indicating poor support, this was not significant. Students indicating poor support were more likely to be in the high intensity grief group, $p = .01$)<br>**Secondary publication:**<br>In schools and classes where a FTT and debriefing were conducted by a MH professional, no new suicides appeared during the 4yr follow-up period. In school B teachers conducted only a classroom meeting, in all but one 8th grade class, following suicide I – a second suicide was committed 2 months later by a student whose class had not had the meeting |

*Note.* [sp] = secondary publications.

recent SI or prior lifetime SA, or three or more emotional items rated as medium, bad, or very bad; (3) algorithm C – only SI or lifetime SA; (4) algorithm D – asking for help. The Diagnostic Interview Schedule for Children (DISC) reference criteria were used to calculate sensitivity, specificity, and positive predictive value. They found that, when the goal was to identify high suicide risk, the high-threshold algorithm was most effective. However, when the goal was to identify clinical conditions and not suicide risk, the low-threshold algorithm performed best. All four performed similarly well when identifying people with suicide risk plus mental disorder.

Shaffer et al. (2004) also assessed the sensitivity and specificity of the CSS using four risk algorithms. The CSS algorithm that gave the best balance of sensitivity (0.75) and specificity (0.83) was algorithm VI – SI or previous SA as well as a score of more than three for unhappy or withdrawal or irritability and anxiety. They also report a positive predictive value of 16% and negative predictive value of 99% (for every 16 people correctly identified 84 nonsuicidal teens would be identified).

The SRS used by Thompson and Eggert (1999) had a sensitivity rate of 100%, while specificity was 57%; all 78 youths identified by the SIQ-JR as being at risk for suicide were also correctly classified by the SRS. There were no false negatives. However, 36.9% were "false positives" and were identified as at-risk by the SRS but not the SIQ-JR. If a less conservative cutoff score of 31 on the SIQ-JR was applied, sensitivity remained at 100% and specificity decreased to 54%. Cross-tabulations with the DSR interviewer ratings revealed sensitivity estimates at 91% and specificity at 60%. 1.7% of youths were false negatives, and 34.2% were false positives. Cross-tabulations with the CRA showed that sensitivity was 87% and specificity was 60%. 2.8% of youths were classified by the CRA as being at moderate to high risk, but not identified in the SRS. Based on the CRS, 31% were false positives.

## Indicated Interventions

A total of three trials, with five publications, reporting on indicated interventions were eligible for inclusion in the review (see Table 4). Two secondary publications reporting data obtained from the same participant pool were also identified (Eggert, Thompson, Randell, & Pike, 2002; Randell, Eggert, & Pike, 2001). The primary paper (Thompson, Eggert, Randell, & Pike, 2001) contains the full data set, while the secondary publications report on the preliminary data set (Eggert et al., 2002; Randell et al., 2001).

While all three trials reported a reduction in suicide-related behavior over time, the effect of the intervention was less clear. Eggert, Thomson, Herting, and Nicholas (1995) found a significant decline in suicide risk behavior over time for all three groups, albeit no differences between groups. This is consistent with the preliminary analysis of the C-CARE/CAST trial (Eggert et al., 2002), which reported a significant decline in the suicide-related behaviors of each group, but no effect for intervention. However, results from the final data set (Thompson et al., 2001) indicated that, while all groups showed declines in suicide-related behaviors between $T_1$ and $T_4$, CAST and C-CARE had faster rates of decline than usual care for SI and attitude toward suicide. Participants in the IPT-A-IN group had also lower levels of SI than usual care at postintervention (Tang, Jou, Ko, Huang, & Yen, 2009).

## Postvention

Two studies with one secondary publication were eligible for inclusion (see Table 5). Hazell and Lewin (1993) investigated the effectiveness of one component of a pilot postvention project program conducted in two Australian schools following student suicide. They reported no difference in student well-being following postvention, with uncounselled students reporting the similar levels of risk to those in the treatment group.

Poijula and colleagues investigated the effects of postvention programs in response to suicide clusters in three schools over 4 years. The primary publication presents data on the impact of suicides on victims close to the deceased (Poijula, Dyregrov, Wahlberg, & Jokelainen, 2001), while the secondary publication (Poijula, Wahlberg, & Dyregrov, 2001) provides evidence that a suicide cluster occurred within the investigated schools. These publications are discussed together under Poijula, Dyregrov et al. (2001).

Poijula, Dyregov et al. (2001) report that, although postvention practices differed across the schools, there were no significant differences in PTSD or high-intensity grief scores. Friendship with the deceased, however, was a significant predictor of PTSD and high-intensity grief. Longitudinal follow-up of the three schools indicated that only one further suicide occurred in the next 4 years, by a student in a class that did not receive postvention support following the initial student suicide (Poijula, Wahlberg et al., 2001).

# Discussion

This review sought to identify and describe all school-based programs aimed at the prevention, early intervention, and postvention of suicide-related behaviors. While many reviews look at individual types of school-based interventions, (Cusimano & Sameem, 2011; Peña & Caine, 2006), to our knowledge this is the first review to examine all types of school-based programs. A comprehensive search strategy was employed and, as no restrictions were placed on study design, we were able to include and describe a variety of suicide-prevention trials that have been undertaken in this area. However, our including non-RCTs meant that it was not possible to conduct a meta-analysis or a full quality appraisal on the included studies. The search was



 

also restricted to programs specifically targeting suicide-prevention activities. Although more general mental health awareness or prevention programs may also have an impact on suicide-related behavior among young people, these do not measure suicide-related outcomes and a full examination of the mental health literature was beyond the scope of the current review.

A final limitation is with regard to the quality of the studies retrieved. Overall they were of mixed quality, and the evidence derived from them is limited and equivocal, making hard to provide clear and specific recommendations for future work.



## Key Findings

### Universal Approaches

Universal suicide-prevention programs generally fell into the category of curriculum-based education programs, which aimed to deliver interventions to whole school populations via the school curriculum. In terms of increased levels of knowledge of the risk factors and warning signs for suicide, all trials that measured knowledge as a study outcome reported positive effects. Some benefits regarding self-reported likelihood of help-seeking and improved attitudes toward suicide-related behavior and suicidal peers were also reported. There was also some reduction in suicide-related outcomes, including self-reported risk of suicide, SI and SA. These results support those reported in a review of curriculum-based suicide-prevention programs (Cusimano & Sameem, 2011). However, historically concerns have existed surrounding the potentially negative effects of such programs. Talking with young people about suicide is complex and has led some to argue that there is the potential for some, already vulnerable students to be adversely affected by the content of the program (Shaffer & Gould, 2000). None of the included studies in our review examined the potentially *negative* effects of such interventions. Future research could incorporate a measure of distress before and after the implementation of suicide related curricula, in order to investigate the potential negative effects of such programs.

## Selective Approaches

### Gatekeeper Education

Overall, gatekeeper training was shown to be effective in terms of increasing knowledge, improving attitudes, and furthering confidence among participants, and some programs led to self-reported improvements in practice. Only a small number of the identified studies employed a controlled design, and fewer still were RCTs. Training in suicide prevention has been shown to be effective when conducted with other professional groups, e.g., general practitioners and mental health workers (Appleby et al., 2000; Rutz, von Knorring, & Walinder, 1989, 1992), and the results from this review extend this finding to school staff. Future studies should measure changes in practice (e.g., improved risk assessment skills), student-level outcomes, and improved health and social outcomes for those who receive help from trained staff. Although the rates of help-seeking following gatekeeper training has been investigated one study that did not meet inclusion criteria for this review (e.g., Kataoka, Stein, Nadeem, & Wong, 2007), these data are not routinely collected in studies, and such information would further inform the evidence base for gatekeeper interventions.

### Screening Programs

Overall, screening programs successfully identified students at risk who otherwise would not have come forward for help, with studies reporting that between 4% and 45% of students screened were identified as needing further support, many of whom were subsequently successfully linked with either school or community-based services. One study identified by the current review and another subsequently published paper report that screening students for suicide risk does not appear to cause undue distress among participants (Gould et al., 2005; Robinson, Yuen et al., 2011).

The advantages of screening include the ability to offer a full mental health screen or a check-up as opposed to simply checking for suicide risk (Nemeroff et al., 2008) in all students regardless of risk. This has the potential to combat poor help-seeking. Concerns exist, however, about the potential stigma and inconvenience of identifying high rates of false positives. The sensitivity and specificity of any screening instrument are central to the success of such programs (Hallfors et al., 2006; Peña & Caine, 2006). Similarly, a requirement of screening is the ability to offer effective treatment to those identified as being at risk or in need of further support, the evidence being that early treatment leads to better outcomes (Gilbody, Sheldon, & Wessely, 2006). It is widely acknowledged that mental health services are overstretched, and that identifying people to be in need of support, yet not being able to provide that support, is clearly problematic. Thus, further studies are required that follow students up in order to measure longer term health-related outcomes.

## Indicated Interventions

Three RCTs were included, and all reported a reduction in suicide risk behavior over time in both the treatment and comparison groups, albeit limited effects of intervention. Intervention studies in the field of suicide prevention are lacking, even in clinical settings (Robinson, Hetrick & Martin, 2011), and it could be argued that schools are not necessarily the most appropriate setting for delivering and testing indicated interventions to at-risk youth. However,

one study is currently underway testing an internet-based program with at-risk school students (Robinson, Hetrick, Yeun et al., 2011; http://www.anzctr.org.au/trial_view.aspx?ID=343043) which would be appropriate for delivery in a school environment. This is only in its early stages; no other studies of school-based targeted interventions were identified by the current search.

## Postvention

School-based suicide postvention programs aim to respond to and manage the crisis of the suicide death, in order to minimize distress, the development of psychiatric disorders among students, and the chance of a suicide cluster occurring (Beautrais, 2004; Cox et al., in press). However, the current review identified only two studies reporting on school-based postvention programs, offering limited evidence to guide what models of postvention may be most effective. Our search identified a number of case studies that described the processes employed following a school suicide, but we were unable to include them as they did not contain any suitable suicide-related outcomes. However, common practices considered to be helpful included the provision of information and/or support sessions for students, staff and parents, the provision of individual (as opposed to group) support or counseling, scheduled counseling appointments either with school staff or external professionals, consultation with immediate family of the deceased student, and media liaison. Because no rigorous evaluation was conducted, the potential effects of these responses, either positive or negative, remain unknown.

The lack of evidence for suicide postvention in schools was previously noted (Goldney & Berman, 1996), and while these authors acknowledge the ethical and methodological challenges of conducting this type of research – given the rates of youth suicide, the risk of suicide clusters in school settings, and the availability of robust program evaluation methodologies – this continued lack of evidence pertaining to suicide postvention is disappointing. In the absence of empirical data, published toolkits (American Foundation for Suicide Prevention and Suicide Prevention Resource Center, 2011) may be the best bet in terms of guiding postvention activities in schools for the time being.

# Conclusion

Overall the evidence is limited. Research is hampered by methodological concerns including a lack of RCTs and the inability to accurately measure suicide-related outcomes. That said, the evidence does suggest some best bets, which if conducted and evaluated rigorously could not only build capacity in the field of suicide prevention, but also add to the evidence base. These are summarized below.

– *Universal approaches:* Despite some positive findings, in the absence of robust evidence indicating that universal suicide programs cause no harm, it is recommended that universal approaches to suicide prevention remain grounded within mental health promotion activities. Future research into such programs could assess possible iatrogenic effects.
– *Selective approaches:* Reasonable evidence exists to support the implementation of gatekeeper training to school staff and the use of routine mental health screening or check-ups for high-school students. These should be done sensitively and include a suicide screen.
– *Indicated approaches:* There is limited evidence regarding indicated approaches to school-based suicide prevention, and indeed questions exist regarding the appropriateness of such interventions. In the absence of appropriate interventions, schools could continue to offer guidance and support to students at-risk, but individual therapeutic interventions should be delivered in a clinical setting.
– *Postvention:* There is to date no evidence regarding the efficacy of postvention activities in schools. In the absence of research evidence schools could look to published toolkits to guide postvention activity.

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