National Institute for Health and Care Excellence

Guideline version (Final)

Preventing suicide in community and custodial settings

Evidence report 4 for information, advice, education and training

NICE guideline NG105

Evidence reviews

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Final

These evidence reviews were developed by Public Health – Internal Guideline Development team

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Contents

Information, advice, education and training

Introduction

The aim of this review is to determine the effectiveness and cost-effectiveness of non-clinical interventions to help staff and members of the public recognise and respond to signs of distress or crisis that may indicate someone is contemplating suicide, and to determine the effectiveness of non-clinical interventions to support people who are at risk of suicidal acts.

Review questions

Are information, advice, education, or training interventions effective and cost effective at increasing the ability of staff and the public to recognise and respond to someone who may be contemplating suicide?

- What are the core components of information, advice, education and training that make them more likely to be effective and how does effectiveness vary for different components and different audiences?

What are the most effective and cost effective non-clinical interventions to support people who are at risk of suicidal acts?

- What impact do the following have on the effectiveness, cost effectiveness of different interventions: deliverer, setting, timing?

PICO tables

The protocol for this review focused on summarised studies in the following PICO tables (see Table 1 and Table 2). For full details of review, protocols see Appendix A:

Table 1: PICO for the review question of information, advice, education or training intervention.

Population	Staff and practitioners. For example: • health and social care practitioners • police, ambulance and fire service staff • people who provide a paid or voluntary service to the public, such as debt and housing support • railway and underground station staff • school/college staff • staff in education institutions • staff in prisons and young offender institutions • Members of the public • families, friends, colleagues and peers
Interventions	Any interventions that provide information, advice, education for staff or public Training interventions designed for relevant populations will be considered, for example: • Connect with people (CWP) • Applied suicide intervention skills training (ASIST) • Understanding suicide intervention (USI) • Samaritans training • Safe Talk

Comparator	• Other intervention • Status quo/control • Time (before and after) or area (i.e. matched city a vs b) comparisons
Outcomes	• Suicide rates amongst target population • Suicide attempts • Reporting of suicide ideation The outcomes that will be considered when assessing help-seeking behaviour: • Service uptake (such as mental health services, helplines). The outcomes that will be considered when assessing skills and behaviour of practitioner, peer or public: • Changes in knowledge, attitude, beliefs, skills and behaviour of practitioners, public and peers. • Staff/public training completed/refreshed

Table 2: PICO for review question of non-clinical intervention to support people at risk of suicide

Population	People who are risk of suicidal acts in the community or custodial settings. People recently discharged from custody or about to enter prison
Interventions	Any interventions that provide information, advice, and arrange support from local non-clinical services, such as listening, befriending schemes and other community services.
Comparator	• Other intervention • Status quo/control • Time (before and after) or area (i.e. matched city a vs b) comparisons
Outcomes	• Suicide rates amongst target population • Suicide attempts • Reporting of suicide ideation The outcomes that will be considered when assessing help-seeking behaviour: • Service uptake (such as mental health services, helplines). The outcomes that will be considered when assessing skills and behaviour of practitioners, peers or the public: • Changes in knowledge, attitude, beliefs, skills and behaviour of practitioners, public and peers.

Public Health evidence

Evidence review

In total, 19,228 references were identified through the systematic searches. References were screened on their titles and abstracts and 240 references that were potentially relevant to this

question were requested. From these full-text papers, 34 RCTs that form the basis of this review were identified. We then identified an additional 7 RCTs from citation checking and specific searches for named interventions as identified by the committee so 41 RCTs in total were identified. 18 of these met the inclusion criteria and were included and the remaining 23 RCTs were excluded.

Of the 199 non-RCTs, the committee agreed to prioritise, for this review, those studies that reported on suicide rates as the RCTs did not provide much data on this outcome. They also agreed to prioritise specific named interventions that were not covered by the RCTs as follows:

- Connect
- Listener
- Mental Health First Aid
- Samaritans Training
- Skills-based training on risk management (STORM)
- SafeTALK

A total of 18 non-RCT studies (17 quantitative studies and 1 qualitative study) and 7 economic studies met pre-defined criteria for this review.

In all, 43 studies (18 RCTs, 18 non-RCTs and 7 economic studies) were included in the review: 35 quantitative studies (18 RCTs, 17 non-RCTs); 1 qualitative study; and 7 health economic studies (full details are found in Appendix D: for the evidence tables) and 197 studies were excluded. For the list of excluded studies and reasons for exclusion, see Appendix D:.

Findings

Summary of included studies in the review

Randomised controlled trial (RCT)

Eighteen RCTs provided evidence for this review. Table 3-11 summarise included RCT studies by types of interventions.

Table 3: Air force suicide prevention programme (AFSPP)

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Bryman et al (2009) [USA]	Active-duty airmen	Standard Air Force Suicide Prevention Programme (AFSPP) community awareness briefing.	Training on suicide warning signs	Standard Air Force Suicide Prevention Programme community awareness	Suicide beliefs	The additional slide added to the standard AFSPP did not have any differential impact on beliefs about suicide as compared to the standard AFSPP.

Table 4: Applied Suicide Intervention Skill Training (ASIST)

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Gould et al (2013) [USA]	National Suicide Prevention Lifeline counsellors	ASIST	Training (1) Understand the ways attitudes affect views on suicide and interventions; (2) Provide guidance and suicide first-aid to a person at risk in ways that meet their individual needs; (3) Identify the key elements of an effective suicide safety plan and the actions required to implement it;	Wait-list control	Caller's behavioural changes	If suicidal callers spoke with ASIST-trained counsellors rather than non-ASIST-trained counsellors, the odds that callers would be less suicidal was increased by 74%.
Sareen et al (2013) [Canada]	All members of the Swampu Cree tribal communities	ASIST		Resilience Retreat, including small group discussion and storytelling. As the RR did not focus on suicide risk factors, it was not expected to	Skills Reported preparedness to intervene with suicidal behaviour Suicidal ideation	There was a trend toward increased suicidal ideation amongst the ASIST participants. There were no suicide deaths or suicide attempts amongst participants at follow-up.

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
			(4) Appreciate the value of improving and integrating suicide prevention resources in the community at large; (5) Recognize other important aspects of suicide prevention including life-promotion and self-care;	result in improvement in primary outcome.	Suicide attempt	There was no significant difference on skills, perceived preparedness to help someone who is suicidal between two groups.

Table 5: Mental health first aid

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Kitchener B and Jorm A F (2004) [Australia]	Employees of 2 Australian government departments	Mental Health First Aid course	Training on (1) Skills in how to recognise the signs and symptoms of mental health problems (2) Knowledge of the possible causes or risk factors for these mental health problems (3) Awareness of the evidenced based medical, psychological and alternative treatments available (4) Skills in how to give appropriate initial help and support someone experiencing a mental health problem (5) Skills in how to take appropriate action if a crisis situation arises involving suicidal behaviour, panic attack, stress reaction to trauma, overdose or threatening psychotic behaviour.	Wait-list control group	Perception of mental health problem in self or family; Recognition of disorder in vignette; Benefits about treatments; Social distance Help provided to others Participants' mental health	The study found a number of benefits from this training course, including greater confidence in providing help to others, greater likelihood of advising people to seek professional help, improved concordance with health professionals about treatments, and decreased stigmatizing attitudes. An additional unexpected finding was an improvement in the

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
						mental health of the participants themselves
Jorm A et al (2010) [Australia]	High school teachers	A modified version of the Youth Mental Health First Aid course	Part 1 was designed for all education staff and covered departmental policy on mental health issues, common mental disorders in adolescents (suicidal thoughts and behaviours, and non-suicidal self-injury) and how to apply the mental health action plan to help a student with such a problem; Part 2 was for teachers who had a particular role for student welfare. It provided information about first aid approaches for crises that require a more comprehensive response and information about responses for less common mental health problems.	Wait-list control group	Knowledge Recognition of depression Stigma Beliefs Confidence in providing help; Help provided to students;	The training increased teachers' knowledge, changed beliefs about treatment to be more like those of mental health professionals, reduced some aspects of stigma, and increased confidence in providing help to students and colleagues. There was an indirect effect on students, who reported receiving more mental health information from school staff.

Table 6: Question, Persuade, Refer (QPR)

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Cross et al (2011) [USA]	School personnel including mental health professionals, teachers and bus drivers;	QPR plus behavioural rehearsal.	Training on (1) Provide an overview on the epidemiology of suicide and current statistics, myths and misconceptions about suicide	Question, Persuade, Refer training	Knowledge Skills	At 3-months following, participants in intervention groups had 77.52% correct response about suicide-related facts compared with

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
	Parents		and suicide prevention, general warning signs for suicide, and three gatekeeper skills. (2) A 10-minute introductory video includes interviews with people who have been faced with the risk of suicide in their lives, families that have lost a loved one to suicide and others that serve in a clinical capacity. (3)An overview of the gatekeeper role. (4) Provide referral Information. For each specific type of referral information regarding local resources by name and phone number was provided. Additionally, referral information to the national crisis hotline was provided.			75.79% by participants in control group. There was no difference on total observed skills for two groups.
Jacobson et al (2012) [USA]	Master of social work students	QPR training		No training	Knowledge Attitudes Perceived preparedness Behaviours	Students in the QPR training scored 77.4% correct response compared to 72% correct response for students in control group at 4 months follow-up (p=0.01). Mean score for attitudes to suicide prevention for participants receiving the training was 25.50 points (SD=0.83) compared to 27.42 (SD=0.76) for participants who did not receive the training. Mean score for perceived preparedness for participants receiving the training was 4.36 points (SD=1.23) compared to 3.76 (SD=1.32) for participants who did not receive the training.
McLean et al (2017) [USA]	University resident assistant	Resident assistant gatekeeper training	Training model is similar to QPR to educate RA about risk factors and warning signs of suicide and to increase their ability to intervene and to refer suicidal students to professional help.	Stress and time management training	Self-reported intervention behaviours;	The training did not significantly impact RA intervention behaviour.

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Wasserman et al (2015) [10 European Union countries]	School teachers and students	Three interventions were included in the study: Question, Persuade and Refer (QPR); YAM The Screening by professional programme, was an indicated intervention screening pupils for suicide risk and referring clinical service if needed	QPR same as above The Youth Aware of Mental Health Programme (YAM) is (1) to raise mental health awareness about risk and protective factors associated with suicide, including knowledge about depression and anxiety; (2) to enhance the skills needed to deal with adverse life events, stress, and suicidal behaviours.	The control group was exposed to 6 educational posters displayed in the classroom as those were used in the youth aware of mental health programmer	Self-reported suicidal ideation and suicide attempt	YAM was associated with significant reduction of incident suicide attempts and severe suicidal ideation compared to control group at 12-months follow-up.
Wyman et al (2008) [USA]	School staffs	QPR training	Training on (1) Rates of youth suicide; (2) Warning signs and risk factors for suicide, (3) Procedures for asking a student about suicide, persuading a student to get help, and	No training	Knowledge Skills Behaviours Communication with students	The study found a positive effect on knowledge and perceived preparedness (skills). No overall training effect for suicide identification behaviours was found.

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
			(4) Referring a student for help.			Training increased the number of staff queries of students about suicide but QPF did not change staff communication with students about emotional distress.

Table 7: Signs of Suicide (SOS)

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Aseltine et al (2007) [USA]	High school students	SOS is a school-based prevention.	Training on (1) The signs of suicidality and depression, recommended ways to react to someone who is depressed and suicidal, as well as interviews with real people whose lives have been touched by suicide. (2) A screening instrument that is used to assess the potential risk of depression and suicidality.	Wait-list control	Self-reported suicide attempts	The youths in the intervention groups were appropriately 40% less likely to reported suicide attempt in the past 3 months compared with youths in the control group.
Schilling et al (2014) [USA]	School students	Middle school SOS programme	Training on (1) Sensitize youth to the symptoms of depression and signs of suicide, (2) Educate them that depression is a very treatable condition, (3) Emphasize the importance of obtaining help for themselves and their friends, and	No training	Self-reported suicidal ideation and suicide attempt; Knowledge and attitude about suicide; Help-seeking	The SOS programme was associated with significantly less risk of suicidal behaviours (ideation, attempts). Participation in the SOS programme resulted in greater knowledge of suicide, and there was no difference in attitudes between 2 groups.

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Schilling et al (2016) [USA]	School students	SOS, a school-based prevention,	(4) Provide youth with information about whom they should approach for help.	Wait-list control	Self-reported suicidal ideation and suicide attempt; Knowledge and attitude about suicide;	The rate of self-reported suicide attempts amongst students in the control group was 5.05%, compared with only 1.7% amongst students in the intervention group. The rate of self-reported suicidal ideation amongst students in the control group was 9%, compared with only 6.9% amongst students in the intervention group. The SOS programme resulted in greater knowledge of suicide and more adaptive attitudes towards suicidal behaviours.

Table 8: Sources of Strength

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Wyman et al (2010) [USA]	School students	Sources of Strength suicide prevention program	Training on (1) School and community preparation included training staff members as adult advisors who would guide the peer leaders to conduct safe suicide prevention messaging; (2) Peer leader training, focuses on protective ‘‘sources of strength’’ and skills for increasing those resources for themselves and other students., and also focuses on engaging ‘‘trusted	Wait-list control	Peer leader behaviours; Students’ perception about help-seeking	Concerning peer leader’s behaviour, training increased support to peers and the intervention impact was positive on connecting distressed peers to adults. The odds for making a referral in the intervention group was 4.12 times as great as in the untrained schools. There were positive and significant population-level intervention effects on

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
			adults'' to help distressed and suicidal peers; (3)Peer leaders carried out specific messaging steps with adult advisor mentoring.			perceptions of adult help for suicidal peers and on norms for help-seeking from adults.
Petrova et al (2015) [USA]	School students	Positive-themed suicide prevention communication (messaging delivered by adolescent peer models through following the principle of Sources of Strength on students' attitudes and perceptions.	Student peer leaders trained in Sources of Strength delivered two positive-oriented communications to high school classrooms. Both presentations had peer leaders share narratives about their own use of healthy coping resources and engaging trusted adults.	Participants in the control group received presentations with peer leader modelling and an interactive activity	Help-seeking from adults	The programme had greater impact for suicidal students than for non-suicidal students on enhancing help-seeking acceptability.

Table 9: Youth suicide intervention training

Study [country]	Population	Intervention	Component	Comparator	Outcomes	Study findings
Chagnon et al (2007) [Canada]	People working with youths from educational establishments and community or institutional organisations	Youth suicide intervention training	Training on (1) Risk and protective factors, distress cues, and signs of mental disorder; (2) Persons to contact and professionals for referrals; and	No training	Attitudes Knowledge Skills	Participants improved their level of knowledge, attitudes and skills compared with those in the control group.

Study [country]	Population	Intervention	Component	Comparator	Outcomes	Study findings
			(3) Actions to take in a suicidal crisis situation and following an attempted or completed suicide.			

Table 10: Web-based intervention

Study [country]	Population	Intervention	Components	Comparator	Outcomes	Study findings
Ghonchen et al (2016) [Netherlands]	People working with adolescents	Mental Health Online, a web-based suicide prevention training aimed to improve the knowledge and self-confidence of people who worked with adolescents (12-20 years).	Training on (1) Suicidality among adolescent; risk factors; ethnicity; recognition of suicidality; conversation with the suicidal adolescent and the parents; suicide first aid; care and aftercare; (2) Additional information regarding adolescent suicide prevention.	Wait-list control	Knowledge Skills dealing with adolescents suicide prevention	The programme had a positive effect on knowledge and perceived confidence in skills dealing with suicide prevention amongst participants attended the training compared to those in the control group.
King et al (2015) [USA]	Students at elevated risk for suicide (history of suicide attempt, current suicidal ideation, depression and alcohol use)	Electronic Bridge to Mental Health Services	E-Bridge provides personalised feedback and optional online counselling aimed to support students at risk for suicide. Participants also received information regarding mental health resources with contact information.	Participants received personalised feedback only	Perceived need for help; Accessing professional help-seeking and treatment	Students in the e-Bridge group was more likely to have received mental health treatment.

Non-RCT

Seventeen non-RCT studies including observational and experimental studies provided evidence for this review. Table 11-23 summarise included studies by types of interventions

Table 11: Alliance against depression

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Hegerl U et al (2010) [Germany]	Quasi-experimental	Residents in Nuremberg	Nuremberg alliance against depression	The programme took place at four levels. (1) Primary care physicians were sensitized and trained to improve knowledge and care standards; (2) Media and public: a professional public relation campaign was implemented; (3) Training for community facilitators; (4) Support for depressed persons, suicide attempters and their families.	Before and after the implementation of the programme	Suicide rate	In the follow-up (year 2003), there was a reduction in the number of suicide compared with the baseline year (2000).
Hubner and Hegerl (2010) [Germany]	Quasi-experimental	Residents in Regensburg			Before and after the implementation of the programme	Suicide rate	The suicide rate in Regensburg fell significantly during the intervention period.
Szekely et al (2013) [Hungary]	Quasi-experimental	Residents in Szolnok, Hungary	European alliance against depression		Before and after the implementation of the programme	Suicide rate	For the duration of the programme and the follow-up year, suicide rates in Szolnok were significantly lower than the average of the previous three years.

Table 12: Connect suicide prevention

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Bean G and Baber K M (2011) [USA]	Experimental (before-after)	Adults in two communities, included police officers, first responders, primary care providers, educators, guidance counsellors, social service	Connect suicide prevention programme	(1) common gatekeeper training for all participants; (2) discipline-specific training for professionals; (3) evidence-supported protocol that provide an integrated approach to guide the response of individuals who recognise a youth as being at risk for suicide.	Before and after the intervention	Knowledge Beliefs and attitudes Seeking adult assistance	Results revealed significant changes in knowledge and attitudes about suicide, increased belief in the usefulness of mental health care, and reduction of stigma associated with seeking help.

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
		workers and mental health providers School students (Connect youth training)					Adults' preparedness to help also increased significantly as did the likelihood that youth participants would seek adult assistance if they were concerned about a peer.

Table 13: Counselling on access to Lethal Means

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Pope N D et al (2016) [USA]	Experimental (before-after)	Geriatric case managers	QPR and CALM	Training on (1) Understanding suicide risk among older adults; (2) Assessing for suicide risk using QPR (Question, Persuade, Refer); (3) CALM is "designed to help provides implement counselling strategies to help clients at risk for suicide and their families reduce access to lethal means,	Before and after the training	Knowledge Gatekeeper preparedness Gatekeeper efficacy Knowledge and attitude of firearm of assessment and safety counselling	Results indicated that training increased participants' perceived knowledge, preparedness, and efficacy regarding suicide assessment. Training also positively impacted knowledge and attitudes of firearm assessment and safety counselling amongst participants.

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
				particularly firearm.			

Table 14: Garrett Lee Smith Memorial Suicide prevention programme (GLS)

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Walrath C et al (2015) [USA]	Experimental study	Residents in counties where GLSM implemented	Garrett Lee Smith Youth Suicide Prevention.	Training on (1) Screening programme; (2) Life skills development and wellness activities; (3) Hotlines and helplines (4) Gatekeeper training provides suicide risk identification training, improved identification of suicidal risk factors; increased timely referral; (5) Direct services and traditional healing practice (6) Policies and protocols for intervention and postvention;	Counties with or with no Garrett Lee Smith Youth Suicide Prevention programme implemented.	Suicide rate	The study observed a reduction in the rate of suicides amongst youths in counties implementing GLS suicide prevention programmer compared with counties that were not targeted by GLS programmes.
Garraza L G; et al (2015) [USA]	Experimental study	Residents in counties where GLSM implemented			Counties with or with no Garrett Lee Smith Youth Suicide Prevention programme implemented.	Suicide attempts	The study indicated a reduction in the rate of suicide attempts amongst youths aged 16-23 years in counties implementing GLS suicide prevention programmer compared with counties that

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
				(7) Assessment and referral training; (8) Outreach & awareness (9) Means restriction			were not targeted by GLS programmes.

Table 15: Listener scheme

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Dhaliwal Rani ; Harrower Julia ; (2009) [UK]	Qualitative (semi-structured interviews)	Prisoners	The Listener Scheme. The scheme involved joint working between the Prison Service and the Samaritans.	Prisoners are selected and trained by Samaritans to be a Listener to provide confidential listening support to fellow prisoners who are in distress or who may be at risk of suicide.	NA	Listener's own experiences and the impact on them as individuals	The findings indicate that Listeners experience significant personal growth alongside changing attitudes to self and others.

Table 16: Military-based suicide prevention

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Air Force Suicide Prevention Programme (AFSPP)							
Knox K L et al (2010, 2003)[USA]	Experimental	Active-duty airmen	Air Force Suicide Prevention Programme (AFSPP) community	(1) Leadership involvement; (2) Professional military education dealing with suicide thoughts;	Before and after the implementation of AFSPP in 1997	Suicide rate	Suicide rates in the air force were significantly lower after the AFSPP was introduced.

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
			awareness programme	(3) Guideline for commanders on the use of mental health service; (4) Community preventative services; (5) Community education and training; (6) Investigation interview policy; (7) Critical incident stress management; (8) Integrated delivery system for human services prevention; (9) Limited patient privilege; (10) Behavioural health survey; (11) Suicide event surveillance system			
Israeli Defence Force suicide prevention programme							
Shelef L et al (2-16) [Israeli]	Experimental	Active duty mandatory service IDF soldiers	The IDF Suicide Prevention Program is a population-based program,	Training on (1) Reducing weapon availability,	Before and after the programme implemented in 2006	Suicide rate	There were 344 suicides reported during the 14 years prior to the intervention

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
				(2) Destigmatizing help-seeking behaviour, (3) Integrating mental health officers into service units, (4) Training commanders and soldiers to recognize suicide risk factors and warning signs.			(1992–2005: 24.6 suicides per year).Eighty-nine suicides were reported during the seven years after the intervention commenced (2006–2012: 12.7 suicides per year).

Table 17: Multimodal community intervention programme

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Ono et al (2013) [Japan]	Experimental	Residents in the area where the programme implemented	Community intervention	(1) Leadership involvement; (2) Education and awareness programme; (3) Gatekeeper training and (4) Supporting individuals at high risk	Before and after the implementation of the programme	Suicide rate	The incidence of suicide decreased in the areas where the programme was implemented.

Table 18: Samaritans training

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Clark T R et al (2010) [USA]	Experimental (before-after)	School staffs	Samaritans training is a public education	Training on	Before and after the training	Perceived knowledge of suicide and	Staff's self-efficacy increased after

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
			suicide awareness and prevention programme	(1) The skills, tools and techniques associated with active listening, an approach to communication that puts the focus on the person being 'helped', what he/she thinks, feels and is going through; (2) Sensitivity which addresses the fears, beliefs assumptions, presumptions, biases, judgments and personal values that impact and, often, impede how lay and professional care-givers approach and respond to those at risk		suicide prevention and their ability to intervene with someone at risk for suicide.	suicide prevention training.
Matthieu M et al (2006) [USA]	Experimental (before-after)	Employee of city department of human resources ''helpline''			Before and after the training	Knowledge and efficacy to manage a caller in distress or a caller in need of assistance due to a suicidal crisis	The training program increased the abilities, awareness, and confidence levels of people whose jobs it is on a daily basis to provide care, comfort, and support for those who are in crisis and at risk for suicide.

Table 19: SafeTALK

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Eynan Rahel (2011) [Canada]	Mixed method	Toronto subway staff	SafeTALK Gatekeeper Program. Safe is an acronym for Suicide Alertness For Everyone while TALK refers to Tell Ask Listen Keep safe	Training on (1) Attitudes: to reduce attitudinal barriers that may interfere with the acquisition of knowledge necessary for identification of suicidal behaviour and intervention skills. (2) Knowledge: the importance of intervention and to enhance knowledge about warning signs of suicide, also to promote ability to communicate this information to others, and identify behaviours that require intervention. (3) Skill: to enhance participants' intervention skills.	Quantitative information on intervention knowledge, attitude, skills before and after the training.	Quantitative information on change in intervention knowledge, attitude, skills before and after the training. The qualitative component was to identify a number of key themes that were likely to have affected participants' who took part in the safeTALK training.	SafeTALK had positive immediate and long-term effects on participants' knowledge of suicide and suicide prevention, attitudes, and intervention skills. While sustainability of such is unknown.

Table 20: Skill-based training on risk management

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Gask L et al (2008) [Scotland]	Mixed method	Community mental health professionals	STORM (Skills-based Training On Risk Management) Skills-Based Training on Risk Management (STORM) is a suicide prevention training package developed for front-line National Health Service staff. For the adaption of STORM to prison settings, the overall structure was retained.	STORM is primarily concerned with developing complex clinical communication skills.	Quantitative information on change in attitudes before and after the training	Quantitative outcome measures were change in attitude to suicide prevention and confidence in the management of suicidal patients/clients. Qualitative outcome reported individuals' accounts on attitude, confidence and overall satisfaction with the training.	There were significant improvements in participants' attitudes and of participants. Key factors in the diffusion, dissemination and implementation process were the presence of a champion or local opinion leader who supported and directed the intervention, local adaptation of the materials, commissioning of a group of facilitators who were provided with financial and administrative support, dedicated time to provide the training and regular peer-support.
Haynes A J et al (2008) [UK]	Experimental (before-after)	Prison staff		Training on	Before and after the training	Attitude was measured using	Training significantly

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
				(1) Suicide and suicide risk in custody setting; various avenues of support available in prison (2) Skills to respond situation of prisoners.		the Attitude to Suicide prevention Scale (ASPS); A measure of knowledge about suicide risk was developed for the study. This measure was labelled Awareness of Suicide Risk Issues (ASRI);	improved attitudes, knowledge and confidence and improvement were maintained at follow up.

Table 21: The SAMS in the Pen

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Hall Barry ; Gabor Peter (2004) [Canada]	Mixed method	Stakeholder included: active SAMS in the Pen volunteer, general inmates, correctional offices, professional staff	SAMS in the Pen, a suicide prevention service in a Southern Alberta Penal Institution, was established in 1996, and was the first of its kind in Canada.	Prison befriending programme.	Quantitative information on completed suicide before and after the implementation of the service	Perception of stakeholders about the SAMS in the Pen.	The SAMS in the Pen was perceived to be a worthwhile service to both inmates and staff of the prison.

Table 22: Together for life

Study [country]	Study Design	Population	Intervention	Components	Comparison	Outcomes	Study findings
Mishara Brian L; Martin Normand (2012) [Canada]	Experimental (before-after)	Police force	Police suicide prevention, Together for life The programme is to develop the abilities of officers to deal with suicide, develop mutual support and solidarity among members of the Force in suicide prevention, provide help for related problems, and develop competencies in using existing resources.	(1) Training for all units on the nature of suicide, identification of suicide risk and how to help a colleague in difficulty. (2) A new telephone helpline for police officers Hay (3)Training of supervisors and union representatives: psychologists focused upon improving supervisors' abilities to identify officers at risk of suicide and how to provide help. (4) Publicity campaign "Together for Life" to inform police officers about suicide prevention.	Before and after the intervention	Suicide rate	A 79% reduction in the number of suicide amongst Montreal police force.

Narrative summary of the economic studies

Doran et al (2016) examined the economic cost of suicide and self-harm among construction workers and evaluated the economic impact of workplace suicide prevention (Mates in Construction, MIC) New South Wales, Australia. MIC is a multifaceted programme with three main components: general awareness training, connector training and applied suicide intervention skills training (ASIST). The analysis showed that MIC could potentially avert 0.4 suicides, 1.01 suicide attempts resulting in full incapacity, and 4.92 suicide attempts resulting in a short absence from work. The potential economic impact of implementing MIC in the construction is an estimated saving of AU $3.66 million each year.

Garraza et al (2016) examined the cost-effectiveness of comprehensive community-based suicide prevention programme (the Garrett Lee Smith Memorial Suicide Prevention Programme). The analysis showed that GLS programme had 79,379 suicide attempts averted between 2005 and 2009; of these averted suicide attempts, 19,448 could have resulted in hospitalisation and 11,424 could require an emergency care. This was equivalent to savings of $187.8 million from averted hospitalisation and $34.1 million from averted emergency care. Given programme cost of $49.4 million, the estimated benefit-cost ratio was $4.5. The GLS programme returned $4.5 in medical cost saving s for each dollar invested in its implementation.

Kinchin and Doran (2017) evaluated the economic cost of suicide and non-fatal suicide behaviour in the Australian workforce in 2014 and the impact to the society of introducing a working suicide prevention (Mates in Construction). In 2014, a total of 2,419 Australian died from suicide, including 903 being employed at the time of death. Additionally, 13,545 non-fatal suicide attempts with 2,303 resulting in full incapacity and 11,242 resulting in a short absent from work. The estimated total cost associated with suicide and non-fatal suicidal behaviour was $6.73 billon. The implementation of the workplace suicide prevention (MIC) across Australia saved estimated £61.26 million a year. The benefit cost ratio was 1.5:1.

Knapp et al (2011) reported an economic analysis of population-level suicide awareness training and intervention (GP suicide prevention education). The model indicated that 603, 706 or 669 suicides would be avoided over the 1-, 5- and 10-year following the training, and this yielded a highly effective cost to the NHS per QALY saved of £1,573, £2,044, and £2,924 over 1, 5 and 10 years respectively.

Pil et al (2013) evaluated the cost-effectiveness and economic impact of a suicide helpline consisting a telephone-and a chat service in Belgium. The analysis showed that the telephone- and the chat service could avoid about 36% of suicides and suicide attempts amongst a high-risk population over 10 years; at the population level, an investment of €218,899 saved €1,452,022 for the public health service.

Sari et al (2008) evaluated the potential impact of two prevention programmes (general suicide education and peer support programmes) on college students in Florida. General suicide education, typically used in middle and high schools, is a curriculum based suicide prevention program. Peer support group program was designed to foster peer relationships, competency development, and social skills as a method to prevent suicide among high-risk individuals. The general suicide education programme showed a positive net benefit with benefit–cost ratio of US$2.03 for each dollar invested, and the benefit cost ratio for the peer support programme was 3.71.

Vasiliadis et al (2015) based on data from the European Nuremberg Alliance against Depression (NAD) evaluated the cost-effectiveness of community-based suicide prevention strategies in a Canadian context. The analysis indicated that the Incremental cost-

effectiveness ratios (ICER) associated with the implementation of the programmes were on average $3,979 per life year saved.

Evidence statements

Evidence statement 4.1 – suicide rate

Evidence from 2 experimental studies found a statistically significant reduction in the suicide rate amongst active duty force soldiers by 46%, from 20.9 per 100,000 to 9.8 per 100,000 following the implementation of military-based suicide prevention programmes at up to 20 years study period (relative risk=0.54, [95%CI 0.32 to 0.92]; absolute difference=11.1 fewer per 100,000). The committee's confidence in the evidence was moderate.

Evidence from an experimental study found a statistically significant reduction in the suicide rate among police officers by 77%, from 30.5 per 100,000 to 6.4 per 100,000 following the implementation of police suicide prevention programme over a 22 year study period (relative risk=0.21, [95%CI 0.07 to 0.66]; absolute difference=24.1fewer per 100,000). The committee's confidence in the evidence was moderate.

Evidence from an experimental study found a 50% reduction in the suicide rate amongst prison inmates from 131.1 per 100,000 to 65.5 per 100,000 following the implementation of peer suicide prevention programme during the 10 year study period, although this change is not statistically significant (relative risk=0.50, [95%CI 0.09 to 2.72]; absolute difference=65.6 fewer per 100,000). The committee's confidence in the evidence was low.

Evidence from an experimental study found a statistically significant reduction in the suicide rate amongst children and young people (aged 10-24 years) after the implementation of the Garrett Lee Smith Youth Suicide prevention programme during the 3 years study period (mean difference=1.33 fewer per 100,000, [95%CI 2.29 fewer to 0.37 fewer]). The committee's confidence in the evidence was moderate.

Evidence from an experimental study found a 15% reduction in suicide rate after the introduction of a community intervention programme. The suicide rate was reduced from 22.5 per 100,000 to 19.1 per 100,000 during 7 years study period**,** although this change is not statistically significant (relative risk=0.85, [95%CI 0.66 to 1.10]; absolute difference= 3.4 per fewer 100,000). The committee's confidence in the evidence was low.

Evidence from 3 experimental studies found a statistically significant reduction in suicide rate after the implementation of the alliance against depression programme. The suicide rate was reduced by 25%, (from 21.7 per 100,000 to 16.3 per 100,000) during the 10 years study period (relative risk=0.75, [95% CICI 0.59 to 0.95]; absolute difference=5.4 per fewer 100,000). The committee's confidence in the evidence was moderate.

Evidence statement 4.2 – suicide attempt

Evidence from one RCT found Question, Persuade, Refer training for teachers across 10 European Union countries resulted in fewer suicide attempts reported by school students whose teachers being trained (1.1%) compared with students whose teachers not being trained (1.5%) at 12-months follow-up (risk ratio=0.74 [95% CI 0.43 to 1.26]; absolute difference=0.4% lower [95% CI 0.9% lower to 0.4% higher]), although the reduction was not statistically significant. The committee's confidence in the evidence was moderate.

Evidence from 3 RCTs found a statistically significant reduction in suicide attempts reported among students who received Signs of Suicide educational programme (2.6%) compared with those in control groups (4.5%) at 3-months follow-up (pooled risk ratio=0.60 [95% CI 0.45 to 0.80]; pooled absolute difference=1.8% lower, [95% CI 2.5% lower to 0.9% lower]). The committee's confidence in the evidence was low.

Evidence from one RCT found a statistically significant reduction in suicide attempts reported among students who received the Youth Aware of Mental Health training Programme across 10 European Union countries (0.7%) compared with those in control groups (1.5%) at 12-months follow-up (risk ratio=0.47 [95% CI 0.25 to 0.87]; absolute difference=0.8% lower [95% CI 1.1% lower to 0.2% lower]). The committee's confidence certainty in the evidence was moderate.

Evidence from an experimental study found a statistically significant reduction in suicide attempts amongst children and young people (aged 10-24 years) after the implementation of the Garrett Lee Smith Youth Suicide prevention programme compared with those were from counties not implementing the programme during 3 years study period (mean difference=4.91 fewer per 100,000, [95%CI 7.99 fewer to 1.83 fewer]). The committee's confidence in the evidence was very low.

Evidence statement 4.3 – suicide ideation

Evidence from one RCT found Applied suicide intervention skills training for First Nations community members did not reduce suicidal ideation among community members who received the training (25.0%) compared with those in control group (4.5%) at 6-months follow-up ((risk ratio=5.50 [95% CI 0.73 to 41.44]; absolute difference=20.5 % lower [95% CI 1.2% lower to 100% higher]). The level of certainty in the evidence was very low.

Evidence from one RCT found a statistically significant reduction in the number of suicidal ideations reported among suicidal callers to the National Suicide Prevention Lifeline following telephone counsellors receiving Applied suicide intervention skills training (14.1%) compared to caller to non-ASIST trained counsellors (18.8%) at 12-months follow-up (risk ratio=0.75 [95% CI 0.59 to 0.95]; absolute difference=4.7% lower [95% CI 7.7% lower to 0.9% lower]). The committee's confidence in the evidence was moderate.

Evidence from one RCT found Question, Persuade, Refer training for teachers across 10 European Union countries had little effect on suicidal ideation as reported by school students at 12-months follow-up (risk ratio=1.07 [95% CI 0.65 to 1.77]; absolute difference=1.0% higher [95% CI 0.5% lower to 1.1% higher]). The committee's confidence in the evidence was moderate.

Evidence from 2 RCTs found that the Signs of Suicide educational programme for students resulted in less suicidal ideation (5.9%) compared with those in control group (9.3%) at 3-months follow-up (risk ratio=0.57 [95% CI 0.28 to 1.18]; absolute difference=4.0% lower [95% CI 6.7% lower to 1.7% higher]), although the reduction was not statistically significant. The committee's confidence in the evidence was low.

Evidence from one RCT found that Source of Strength for students resulted in less suicidal ideation (4.4%) compared with those in control group (5.2%) at 4-months follow-up (risk ratio=0.85 [95% CI 0.63 to 1.14]; absolute difference=0.8% lower [95% CI 1.9% lower to 0.7% higher]), although the reduction was not statistically significant. The committee's confidence in the evidence was low.

Evidence from one RCT found a statistically significant reduction in suicidal ideation reported among students who received the Youth Aware of Mental Health training Programme across 10 European Union countries (0.7%) compared with those in control groups (1.4%) at 12-months follow-up (risk ratio=0.51 [95% CI 0.27 to 0.96]; absolute difference=0.7% lower [95% CI 1.0% lower to 0.1% lower]). The committee's confidence in the evidence was moderate.

Evidence statement 4.4 – service uptake

Evidence from one RCT found students who received Electronic Bridge to Mental Health Services (29%) were more likely to see a mental health professional compared with those in control group (0%) at 2-months follow-up (risk ratio=17.81 [95% CI 1.08 to 292.88]; absolute difference=29% lower). The committee's confidence in the evidence was low.

Evidence from 2 RCTs found there was a non-significant difference in seeking treatment between students who received Signs of Suicide educational programme or Electronic Bridge to Mental Health Services (9.7%) and students in control group (11.2%) (pooled risk ratio=2.18 [95%CI 0.07 to 68.67]; pooled absolute difference=1.1% lower). The committee's confidence in the evidence was very low.

Evidence from one RCT found there was a non-significant difference in students' help-seeking via a telephone hotline among students who received Signs of Suicide educational programme (0.3%) and students in control group (1.1%) at 3-month follow-up (risk ratio=0.29 [95%CI 0.02 to 4.60]; absolute difference=0.8% lower [95%CI 1.1% lower to 4.1% higher]). The committee's confidence in the evidence was low.

Evidence from one RCT found a statistically significant increase in the number of students receiving teachers' help among students whose teachers received mental health first aid training (6.7%) compared with those whose teachers were in control group (4.2%) at 6-months follow-up (risk ratio=1.62 [95% CI 1.05 to 2.51]; absolute difference=2.6% higher [95% CI 0.2% higher to 6.3% higher]). The committee's confidence in the evidence was moderate.

Evidence from an experimental study found a statistically significant increase in the percentage of children and young people (aged 10 – 24 years) seeking adult assistance from 40% before the Connect suicide prevention training to 56% after the training (risk ratio=1.39 [95% CI 1.13 to 1.71]; absolute difference=15.7% higher [95% CI 5.2% higher to 28.5% higher]). The committee's confidence in the evidence was very low.

Evidence statement 4.5 – change in knowledge

Evidence from one RCT found community members who received applied suicide intervention skills (ASIST) training improved mean scores on knowledge about suicide from 2.16 at baseline to 2.50 at 6-months follow-up, and participants in control group improved from 2.19 to 2.23. The mean difference between intervention and control group at the end of follow-up was not statistically significant (mean difference= 0.27 higher [95% CI 0.18 lower to 0.72 higher]). The committee's confidence in the evidence was very low.

Evidnece from one RCT found people who received Mental Health Online training improved their knowledge about suicide from a mean of 10.59 at baseline to 13.82 at 3-months follow-up, while those in the control group improved their knowledge form a mean of 11.05 to 12.05. The mean difference between intervention and control groups at the end of follow-up was statistically significant (mean difference=1.77 higher [95% CI 0.83 higher to 2.71 higher]). The committee's confidence in the evidence was moderate.

Evidence from 3 RCTs found people who received Question, Persuade, Refer training improved their knowledge about suicide compared to the control groups. This was statistically different for social work students and school staff the end of 12 month follow-up (respectively mean difference=5.40 higher [95% CI 1.44 higher to 9.36 higher]; mean difference=4.52 higher [95% CI 1.51 higher to 7.53 higher]). The committee's confidence in the evidence was moderate.

Evidence from 2 RCTs found students who received signs of suicide training improved their knowledge about suicide from baseline to 3-months follow-up compared to the control

groups. This was statistically significant in one study (mean difference=0.56 higher [95% CI 0.37 higher to 0.75 higher]); but in the other study (mean difference=0.03 higher [95% CI 0.28 lower to 0.34 higher]).) .The committee's confidence in the evidence was low to moderate.

Evidence from one RCT found people who worked with the children and young people received Youth Suicide Prevention training improved their knowledge about suicide from a mean of 6.47 at baseline to 8.25 after the training, and the corresponding improvement in the control group was from a mean of 5.38 to 5.57. The mean difference between intervention and control groups after the training was statistically significant (mean difference=2.68 higher [95% CI 2.00 higher to 3.36 higher]).The committee's confidence in the evidence was moderate.

Evidence from one RCT found school teachers who received mental health first aid training improved their knowledge from a mean of 11.14 at baseline to 12.68 at the 6-months follow-up, while the corresponding change in the control group was 11.26 to 10.76. The mean difference between intervention and control groups at the end of follow-up was statistically significant (mean difference=1.92 higher [95% CI 1.05 higher to 2.79 higher]).The committee's confidence in the evidence was moderate.

Evidence from an experimental study found a statistically significant improvement in knowledge about suicide amongst adults and youths. Amongst adults, 51.5% gave the correct responses before the Connect suicide prevention training and the improved to 86.8% after the training (risk ratio=1.39 [95% CI 1.13 to 1.71]). The corresponding change for young people was 72.6% to 92.6% (risk ratio=1.28, [95% CI 1.16 to 1.40]). The committee's confidence in the evidence was very low.

Evidence from an experimental study found geriatric case managers who received following the Counselling on access to lethal means (CALM) training improved their knowledge about firearm assessment and safety, from a mean of 50.20 pre-training to 53.34 post-training. The mean change was statistically significant (mean difference= 3.14 higher [95%CI 0.59 higher to 5.69 higher]). The committee's confidence in the evidence was very low.

Evidence from an experimental study found school staff who received Samaritans training improved their knowledge about suicide, from 3.00 pre-training to 3.70 post-training. The change training was statistically significant (mean difference= 0.70 higher [95%CI 0.58 higher to 0.82 higher]). The committee's confidence in the evidence was very low

Evidence from an experimental study found prison staffs who received the Skill-based training on risk management training improved their knowledge about suicide risk, from 7.15 pre-training to 8.22 post-training. The change was statistically significant (mean difference=1.07 higher [95% CI 0.69 higher to 1.45 higher]). The committee's confidence in the evidence was very low.

Evidence from a mixed method study found subway staffs who received SafeTALK training improved their knowledge about suicide interventions, from 6.90 pre-training to 8.60 post-training. The change training was statistically significant (mean difference=1.70 higher [95% CI 1.15 higher to 2.25 higher]). The level of certainty in the evidence was very low.

Evidence statement 4.6 – change in attitudes

Evidence from one RCT found that social work students who received Question, Persuade, Refer training had more positive attitudes. The mean score changed from 27.21 at baseline to 25.50 at 4-month follow-up, and the corresponding change in control group was 27.77 to 27.42. The mean difference between intervention and control groups at the end of follow-up was statistically significant (mean difference=1.92 lower, [95% CI 2.31 lower to 1.53 lower]). The committee's confidence in the evidence was moderate.

Evidence from 2 RCTs found that students who received signs of suicide training had a more positive attitude towards suicide from baseline to 3-months follow-up. The mean difference between intervention and control groups among students were statistically significant in one study (mean difference=0.13 higher [95% CI 0.04 higher to 0.22 higher]) but not statistically significant in the other study (mean difference=0.04 lower [95% CI 0.18 lower to 0.10 higher]).The committee's confidence in the evidence was very low to moderate.

Evidence from one RCT found that people who worked with the youth received Youth Suicide Prevention training had a more positive attitude towards suicide. The mean score changed from 15.30 at baseline to 16.41 after the training, and the corresponding change in control group was 15.68 to 15.55. The mean difference was statistically significant (mean difference=0.86 higher [95% CI 0.31 higher to 1.41higher]).The committee's confidence in the evidence was moderate.

Evidence from an experimental study found that community-based mental health professionals who received the Skill-based training on risk management had more positive attitudes towards suicide prevention. The mean scores changed from 31.81 pre-training to 29.43 post-training. The mean change was statistically significant (mean difference= 2.38 lower [95% CI 4.10 lower to 0.66 lower]). The committee's confidence in the evidence was low.

Evidence from an experimental study found that prison staff who received the Skill-based training on risk management had more positive attitudes towards suicide prevention. Mean score changed from 28.51 pre-training to 26.44 post-training. The mean change was statistically significant (mean difference= 2.07 lower [95% CI 3.31 lower to 0.83 lower]). The level of certainty in the evidence was very low.

Evidence statement 4.7 – change in behaviours

Evidence from 2 RCTs found that university social worker students or school personnel who received Question, Persuade, Refer (QPR) training improved their questioning behaviour (asking individuals about suicide). The mean differences between intervention and control groups for social work students and for school personnel at the end of follow-up were not statistically significant (respectively, mean difference=0.11 higher [95% CI -0.60 to +0.82] and mean difference=0.15 higher [95% confident interval 0.12 lower to 0.42 higher]). There was also no significant difference in behaviours relating to safety protocols for the two groups (respectively, mean difference=0.04 lower [95% CI 0.84 lower to 0.77 higher]; mean difference=0.14 higher [95% confident interval 0.24 lower to 0.52 higher]). The committee's confidence in the evidence was low.

Evidence from one RCT found that QPR training did not improve university resident assistants' behaviour, providing support to university student. The differences in mean number of interventions performed by resident assistants received intervention and those in control groups were not statistically significant at 4-months follow-up (mean different=0.30 fewer, [95%CI 2.19 fewer to 1.59 higher]). The committee's confidence in the evidence was low.

Evidence from one RCT found that students who received source of strength training had improved scores on behaviours (referring distressed peer) compared to students in control group This difference at the12-month follow-up was statistically significant (mean difference=0.11 higher, [95% CI 0.01 higher to 0.21 higher]).The committee's confidence in the evidence was moderate.

Evidence from one RCT found that students who received source of strength training improved their score for behaviour (giving support to peers) than students in control group. The difference at 12-month follow-up was statistically significant (mean difference= 0.32

higher, [95% CI 0.07 higher to 0.57 higher]).The committee's confidence in the evidence was moderate.

Evidence from an experimental study found that school staff who received the Samaritans training improved their ability to ask someone about suicide, from 3.30 pre-training to 3.70 post-training. The mean change was statistically significant (mean difference = 0.40 higher [95% CI 0.27 higher to 0.53 higher]). The committee's confidence in the evidence was very low.

Evidence from an experimental study found that employees who received Samaritans training at workplace improved their self-efficacy to intervene with a person thought to be at risk for suicide, from 15.00 pre-training to 25.70 post-training. The mean change was statistically significant (mean difference= 10.7 higher [95% CI 8.5 higher to 12.9 higher]). The committee's confidence in the evidence was very low.

Evidence statement 4.8 – change in belief

Evidence from one RCT found that active duty airmen who received Air Force Suicide Prevention Programme awareness training with an additional slide to help remember suicide warning signs had lower mean scores on beliefs about suicide risk (ability to recognise suicide risk) than those in the control group. The difference was not statistically significant (mean difference= 0.08 lower, 95% CI 0.45 lower to 0.29 higher]). The committee's confidence in the evidence was low.

Evidence from one RCT found that students who received source of strength training had higher mean scores on belief (supporting suicidal peers) than students in control group. The difference at 12-month follow-up was statistically significant (mean difference=0.26 higher, [95% CI 0.23 higher to 0.29 higher].The committee's confidence in the evidence was moderate

Evidence from one RCT found that students who received source of strength training had higher mean scores on belief (seeking help from adults) than students in control group. The difference at 12-month follow-up was statistically significant (mean difference=0.25 higher, [95% CI 0.22 higher to 0.28 higher].The committee's confidence in the evidence was moderate.

Evidence from one RCT found that employees at workplaces who received mental health first aid improved their mean score on beliefs about depression treatment from a mean of 82.10 at baseline to 86.29 at the end of follow-up, and the corresponding change in the control group was 83.0 to 83.42. The mean difference at 6-months follow-up was not statistically significant (mean difference= 2.87 higher, [95%CI 1.29 lower to 7.03 higher]). The committee's confidence in the evidence was low.

Evidence from an experimental study found that participants who received Connect suicide prevention training improved their preparedness to help individuals at risk for suicide, from a mean of 24.83 pre-training to 42.79 post-training for adults and from 51.82 pre-training to 82.52 post-training for children and young people. The mean change was statistically significant for both the adult and the children and young people group (respectively mean difference= 17.96 higher [95% CI 16.93 higher to 18.99 higher]; mean difference=30.70 higher, [95% CI 25.10 higher to 36.30 higher]). The committee's confidence in the evidence was very low.

Evidence from an experimental study found that geriatric case managers who received Counselling on access to lethal means (CALM) training improved their preparedness to be a gatekeeper, from a mean of 32.24 pre-training to 40.35 post-training. The mean change was statistically significant (mean difference= 8.11 higher [95% CI 5.23 higher to 10.99 higher]). The committee's confidence in the evidence was very low.

Evidence statement 4.9 – change in skills

Preparedness

Evidence from one RCT found that those who received applied suicide intervention skills training improved their mean scores on their preparedness for suicide prevention from 2.19 at baseline to 2.43 at the 6-month follow-up, and the corresponding changes in participants in control group were 2.33 to 2.45. The mean difference at the end of follow-up was not statistically significant (mean difference= 0.02 lower [95% CI 0.05 lower to 0.46 higher]). The committee's confidence in the evidence was very low.

Evidence from one RCT found that people who worked with adolescents and who received Mental Health Online improved their mean score on their preparedness for suicide prevention from 18.21 at baseline to 25.93 at the 3-month follow-up, and the corresponding change in control group were 16.78 to 17.52. The mean difference was statistically significant (mean difference=8.41 higher [95% CI 6.52 higher to 10.30 higher]). The committee's confidence in the evidence was moderate.

Evidence from 2 RCTs found that social worker students and school personnel who received Question, Persuade, Refer training improved their mean scores on preparedness for suicide prevention. The mean difference between intervention and control groups among social work students (mean difference=0.92 higher [95% CI 0.31 higher to 1.53 higher) and school personnel (mean difference=1.26 higher [95% confident interval 0.92 higher to 1.60 higher]) at the end of follow-up were not statistically significant. The committee's confidence in the evidence was moderate.

Performing prevention activities

Evidence from one RCT found that those who received applied suicide intervention skills training improved their mean scores on skills to perform prevention activities from 12.90 at baseline to 13.52 at the 6-month follow-up, and the corresponding change in control group were from 14.17 to 15.05. The mean difference was not statistically significant (mean difference=1.53 lower [95% CI 3.47 lower to 0.41 higher]). The committee's confidence in the evidence was very low.

Evidence from 2 RCTs found that people who received Question, Persuade, Refer training improved their mean scores on skills to perform preventative activities from baseline to the end of follow-up (up to 12-months). The mean differences between intervention and control groups among social work students (mean difference=0.53 higher [95% CI 0.17 higher to 0.89 higher]) and school personnel (mean difference=1.12 higher [95% CI 0.84 higher to 1.40 higher]) were statistically significant. The committee's confidence in the evidence was moderate.

Evidence from one RCT found that people who worked with the children and young people received Youth Suicide Prevention training improved their mean score on skill to perform preventive activities from 14.64 at baseline to 18.75 after the training, and the corresponding change in control group was 13.47 to 14.07. The mean difference was statistically significant (mean difference=4.69 higher [95% CI 3.55 higher to 5.83 higher]).The committee's confidence in the evidence was moderate.

Evidence from a mixed method study found subway staff who received the SafeTALK training improved their suicide intervening skills, from 6.40 pre-training to 8.60 post-training. The mean change was statistically significant (mean difference= 2.20 higher [95% CI 1.58 higher to 2.82 higher]). The committee's confidence in the evidence was very low.

Narrative summary of finding from a study not included in the meta-analysis

Petrova et al (2016) evaluated the impact of positive-themed suicide prevention communication on high school students' attitudes and perceptions. They found that the intervention had greater impact for suicidal students than for non-suicidal students on enhancing help-seeking acceptability.

Qualitative evidence

Evidence statement 4.10 – the impact of a Listener Scheme on the Listeners

There is evidence from one qualitative study (Dhaliwal and Harrower 2009, [+]) which examined the views and experiences of a group of prison inmates who had been a Listener in a Listener scheme. A range of benefits was identified included: the development of empathy, patience, social skills and problem solving. The scheme also enhanced participants' self-efficacy, self-esteem and confidence.

Economic evidence

Evidence from 7 economic studies found that non-clinical interventions including GP training, helpline, construction worker training, school-based awareness and peer support programmer were are generally cost-effective when a societal perspective is taken – given the relatively small cost of interventions compared to the large productivity savings from a prevented suicide.

Expert Testimony

Connecting with People Training, Change in suicide ideation; change in knowledge and skills

One expert witness presented 'Connecting with People" (CwP) training programme, which is designed to tackle unconscious barriers to identify and intervene stigma and fear around suicide. CwP promotes the paradigm shift of suicide mitigation, which starts with suicidal thoughts being taken seriously and met with compassion and understanding on every occasion. The programme aimed to improve the knowledge, skills, and confidence of people who are in contact with individuals at risk of suicide. CwP includes a suite of clinical frameworks for mental health care professionals, some of which have been adapted for other settings such as primary care, education institutes and the police. The training is provided by licensed trainers who undergo an annual reaccreditation.

Numerous in-house audits and evaluation of CwP have been undertaken. For example, the University of Wolverhampton introduced the training in 2015, which was provided to a range of university staffs including academics, counsellors, security staff, catering, housekeeping and cleaners. Based on information from an internal audit by the University, there was a reduction in the number of referrals of students with suicidal ideation, from 25 in 2015 to 5 in 2016 and to 0 in 2017. Feedbacks from participants who took the programme were positive, majority felt they improved their understanding and knowledge about suicide and felt more confidence in their skills when talking to individuals with suicidal ideation.

Non-clinical intervention: The Listening Place

One expert witness presented "The Listening Place" (TLP), which is a non-clinical intervention, provides face-to-fact sustained support for people who are suicidal. Identified a gap in the support available across UK health services for those with serious suicidal through, TLP was established in 2016 by a group of volunteers with extensive experience of supporting the suicidal. TLP promotes continuity of approach offering referred individuals

with the same counsellor, same phone or text contact in between and not giving up if individuals find it difficult to be reliable in attendance and contact. To ensure sustainability, TLP offers open-ended support, from the time being referred individuals are informed that there will be a review after 3 months and every 3 months thereafter to discuss and appraise whether it is appropriate for support to continue.

Since its establishment, TLP has been visited by a wide range of people who are suicidal and lacking supporting including those suffering from depression, anxiety, drug, alcohol addiction and/or personality disorders. Majorities of those were referred through organisations including NHS (59% of referrals) and charities (35%), with a small percentage of people were self-referred (6%). Having been operating for just over a year, TLP gathered initial data showing a positive impact on reducing suicidal feeling, and data collection is on-going enabling to conduct robust analysis to evaluate the effectiveness of TLP.

Listener scheme: the impact of Samaritans' prison Listener scheme on service-users

One expert witness presented evidence on the impact of Listener scheme on prisoners. The scheme is a peer-support service coordinated by Samaritans within the prisons in the UK. Some preliminary findings from a systematic review of existing evidence, showed that this peer support services has a positive impact on prisoners:

- The Listener support allowed prisoner to opportunity to vent and calm down, get things off their chest, relieve stress, and prevents them from reaching mental tipping points;
- Prisoners were motived to join the scheme because of effective support they had received through the scheme in the past;
- The Listeners were helpful in reducing suicide and self-harm; and the scheme could help to create calmer prisoners, which also led to a reduction in staffs' workload
- Problems between prisoners were thought to be less likely to escalate as prisoners were able to talk to Listeners.

However, findings from service-users also suggest the perceived positive impact of Listener support was not universal. Service users had different experiences, and their views could vary depending on their perception and experience of both the scheme and individual Listeners. The expert indicated a large-scale evaluation of the scheme is on-going, aiming to provide robust evidence of the effectiveness of the scheme to reduce the risk of suicide among prisoners.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee agreed that suicide rate was the most important outcome for this review. Rates of either suicide attempts or suicidal ideation were regarded as important as proxy measure of suicidality. The committee emphasised that any reduction in suicide, suicide attempt or suicidal ideation would make an important difference in practice and agreed that absolute differences between comparison groups should be used to measure the effectiveness of interventions.

Other outcomes such as service uptake and changes in knowledge attitude, behaviour, belief and skills were reported in the included studies. The committee considered these outcomes to be less important as there was no transparent link between changes in these outcomes and the rate of suicide events.

The quality of the evidence

47 studies including 5 economic evaluation study met the inclusion criteria for this review. 17 studies were randomised controlled trials and 18 non-randomised controlled studies used a quasi-experimental design to examine the effectiveness of study interventions.

Among the 35 included effectiveness studies, 21 different types of interventions were identified. The committee indicated that most of these interventions focused on training or educational programmes, and agreed target population of interventions were representative to general population in the communities, covering school personnel, teachers, students and parents, prison inmates and staff, community members, military and police force, and employees at workplaces (i.e. subway staff).

Evidence from both RCT and non-RCT studies (observational and experimental studies) reported on the effectiveness of included interventions. However, the committee suggested a lack of RCT evidence on suicide rates. 9 non-RCT studies which reported suicide rates, had a low to moderate certainty in results as random fluctuations of suicide events and the nature of study design (non-controlled study)with confounding factors and regression to the mean after study selection due to initial high rates might have an impact on the estimated effect. The committee also indicated that none of these studies were based on UK populations, and populations in some studies were unique (e.g. having access to firearms) such as US Air Force, Israeli army force, and Montreal police. Therefore, the findings might not be generalisable to UK populations or communities.

Evidence on the effectiveness of interventions on suicide attempts and suicidal ideation were largely from RCT studies. The committee noted that the certainty in results ranged from very low to moderate due to risk of bias including self-selected participants (Gould et al 2013), interventions not being masked (Schilling et al 2014, Schilling et al 2016, Wyman et al 2010), and no true control (Sareen et al 2013, Wasserman et al 2015). In addition, the committee discussed that data on both outcomes were collected through surveys, and as such should be treated with caution when interpreting the results, because self-reported data may not reflect the true effect of the intervention. The committee also raised a question regarding how suicide attempt and suicidal ideation were defined in included studies, and this could affect the accuracy of outcomes reported.

Results of changes in knowledge, attitudes, behaviours, beliefs and skills were reported in 12 RCT studies and 8 non-RCT studies. The committee noted that the overall certainty in the evidence from RCT studies ranged from very low to moderate, and results of the impact of training or education on self-reported changes were mixed across studies. Of non-RCT studies, the certainty in the results were very low but all interventions showed a positive effect on changes in these outcomes. The committee suggested that, similar to suicide attempts and suicidal ideation, these outcomes were measured based on self-reported data, which did not provide a strong evidence based for making strong recommendations.

Benefits and harms

The committee agreed that all interventions had a beneficent effect on suicide rates, showing a reduction in suicide events after the implementation of suicide prevention interventions. However the impact of interventions on suicide attempts and suicidal ideation were not consistent. The committee noted that awareness training specifically targeted at students or youths and ASIST training for staff working telephone crisis centres were associated with a reduction in the number of suicide attempts and suicidal ideation reported.

The committee noted evidence showing a positive effect of training/education on improving knowledge about suicide, suicide risk and suicide prevention among different study populations including community members, school teachers and students, and people at

workplaces (i.e. prisons). The committee expected such an improvement based on their experience. However, the committee raised concerns over a lack of evidence how improved knowledge would potentially be linked with a change in study participants' practice for suicide prevention.

In terms of change in attitudes to suicide, training was associated with an improvement in participants' positive attitudes. However, the committee found it difficult to evaluate the impact of interventions on attitudes as there was a lack of clarity of what these attitudes were in the included studies. Committee members suggested that positive attitudes was a common outcome measure in the field of public health, and in the context of suicide prevention, certain commonly held attitudes, such as that suicide is not preventable, need to change before any preventable measure could be enacted in practice.

The effect of interventions on change in behaviours or belief was mixed with three (Samaritans suicide awareness training, Connect suicide prevention and Counselling on Access to Lethal Means) showing a beneficial effect and one (Question, Persuade, Refer training) having no positive effect.

Peer support training resulted in improvement in both student's behaviour and belief of help-seeking. The committee suggested that evidence on a positive effect of behavioural or belief change was not expected given relatively short study follow-ups (up to 12 months) used, and agreed that it could be difficult to evaluate change of people's behaviour or belief in a relatively short period of time. The committee also indicated that any changes in behaviour or beliefs could be likely to be embedded with cultural changes in communities and workplaces.

The committee noted a positive effect of QPR, youth prevention and mental health online on improved participants' skills to perform suicide prevention activities and their preparedness to engage with individuals with suicidal thoughts. Subway personnel also improved their skills (ability) to recognise and respond to facilitative intervention in suicide intervention situations after attending Safe TALK training. The committee raised concerns over an overlap among changes in behaviours and skills, as all data on these outcomes were subjective measures based on self-reported data. It was unclear whether an objective measure was used in included studies to measure change in individuals' skills at preventing suicide.

The committee discussed qualitative evidence on the impact of the 'Listener Scheme' on prisoners. Although there were benefits of being a Listener who provided support for inmates and peers, there was little evidence on whether the Listener Scheme had any benefit for individuals who were at suicide risk in the prison. The committee also agreed that this study was based on 7 interviews with prisoners in one single prison, and this provided little evidence for the generalisability of the intervention.

None of the included studies provided evidence on potential harms of training or educational interventions within suicide prevention.

Cost effectiveness and resource use

The committee discussed evidence from 5 studies which evaluated cost-effectiveness of training or education programmes. Of the included studies, one (Knapp et al 2011) was a UK cost-utility analysis which found that suicide awareness training for GPs is cost-effective, both from the perspective of the NHS and from a societal perspective. The remaining 4 studies were cost-effectiveness and costing analyses of a range of non-clinical interventions (including general awareness training, suicide helplines, and peer-support programs), conducted in a variety of non-UK settings. While the majority of these analyses did not use QALYs as an outcome measure, all evaluations found that non-clinical interventions were both cost-saving from a societal perspective and produced a reduction in the number of suicides, and therefore dominated no intervention. Based on this evidence, the committee

agreed that gatekeeper training and support interventions are likely to be cost-effective from a societal perspective.

Other factors the committee took into account

The committee noted that evidence in this review largely focused on the impact of training or education programmes and no evidence for information or advice was identified. In addition, the committee acknowledged variations in the length of study follow-up, given the fact that suicide was a rare event, the impact of an intervention on suicide rate would require a long-term follow-up to monitor changes in the number of suicide events over time.

The committee suggested that the training/education programmes were multi-component interventions and there was no clear evidence of what component was driving the effectiveness of these interventions.

Of the included 35 effectiveness studies, the committee noted a wide range of interventions included, and suggested the impact of different interventions on outcomes may be associated with the differing context in terms of study population and components of the intervention. Therefore, care should be taken when making recommendations based on the effectiveness of included interventions. The committee agreed that a good first step would be to consider:

- What are interventions aiming at? (reducing stigma talking about suicide, raising awareness about suicide, encouraging help-seeking, or changing cultural norms)
- What are components of the intervention?
- Who will benefit from different components?
- Who will be trained? (people in contact with people at risk for suicide; people with high suicide risk)

As noted, the components of an individual intervention were a key consideration when evaluating the impact of an intervention. Key components of included interventions were as follows:

- Improve knowledge of suicide rates; recognising possible causes for suicide (such as mental health problems); warning signs; risk and protective factors associated with suicide; distress cues for suicide;
- Improve knowledge and/or awareness of gatekeeper roles; the importance of obtaining help and support; procedures asking about suicide; service and/or treatment availability; aspects of suicide prevention such as self-care;
- Raise awareness of attitudes toward suicide to create an understanding of the impact of attitude on suicide intervention; and the impact of fear, belief, assumption, judgement about personal values on help-seeking;
- Develop/improve skills in how to identify a person at risk for suicide (i.e. asking, listening);
- Develop/improve skills to intervene including initial help and support; establishing a safe plan; actions needed to be taken if a crisis situation such as trauma, overdose; applying action plan or safety protocol when responding to suicide events;

Provide information about resources in the local communities such as available resources for help-seeking; and persons or services to contact.

It was noted that it is difficult to assess risk for individuals. This is even more difficult when an individual is part of a group at high risk of suicide. The committee were mindful of the need for training to cover how to ask people in order to encourage them to disclose suicidal behaviours. The committee were also aware of the need to have a tiered approach to training

as different groups of people (for example, prison staff or GPs) may need skills and competencies in recognising risk factors. Whereas, other groups may not need these.

The Committee recognised that primary care is an important area for awareness raising and skills training given that GPs (and practice nurses and other staff) are a recognised point of contact for some people who go on to take their own lives. While suicide is a rare event in any given practice, suicidal thoughts are a far more common presentation. Groups at elevated risk of suicide (e.g. middle-aged men experiencing loss or other problems) may present with physical rather than mental health issues and be perceived as at low risk. It was understood that such factors mean that GPs are a key group of professionals among the 'gatekeepers' for suicide prevention training. With this in mind the committee were inclined to seek expert testimony to facilitate their understanding of the evidence base and the interventions used in the UK.

The committee also drafted a number of research recommendations to address gaps in the evidence, for example, the effectiveness and cost-effectiveness of gatekeeper training, the impact of long-term physical health conditions or transition between different institutions/settings as risk factors for suicide, as these would inform gatekeeper training. The committee also noted that as the RCT evidence reviewed were not of sufficient duration to capture rare events such as suicide, they agreed that studies should be of sufficient duration, for example a minimum of 36 months, to capture all relevant outcomes.

Appendices

Appendix A: Review protocols

A.1 Review question 4

	Interventions to change or reduce access to the means of suicide
Component of protocol	**Description**
Review question 4	Are information, advice, education or training interventions effective and cost effective at increasing the ability of staff and the public to recognise and respond to someone who may be contemplating suicide? • What are the core components of information, advice, education and training that make them more likely to be effective and how does effectiveness vary for different components and different audiences?
Context and objectives	To determine what information, advice, education or training is effective and cost effective at increasing the skills and ability of staff and the public to recognise and respond to someone who may be contemplating suicide and lead to help seeking behaviour. The main aim will be to identify the core components of information, advice, education and training that make them more likely to be effective
Participants/population	Staff and practitioners. For example: • health and social care practitioners • police, ambulance and fire service staff • people who provide a paid or voluntary service to the public, such as debt and housing support • railway and underground station staff • school/college staff • staff in education institutions • staff in prisons and young offender institutions Members of the public • families, friends, colleagues and peers
Intervention(s)	Any interventions that provide information, advice, education for staff or public. Interventions for Clinical staff with a responsibility for clinical or therapeutic interventions to treat or manage risk factors for suicide would not be included
Comparator(s)/control	Comparators that will be considered are: Other intervention Status quo Time (before and after) or area (i.e. matched city a vs b) comparisons
Outcome(s)	The outcomes that will be considered when assessing the impact on the health of the recipient are: Suicide rates / suicide rates among target communities

	Interventions to change or reduce access to the means of suicide
Component of protocol	**Description**
	Suicide attempts Reporting of suicide ideation The outcomes that will be considered when assessing help-seeking behaviour among target communities: Service uptake (such as mental health services, helplines) The outcomes that will be considered when assessing skills and behavior of practitioner, peer or public: Changes in knowledge, attitude, beliefs, skills and behavior of practitioners, public and peers. Staff/public training completed/refreshed
Types of studies to be included	Comparative studies including: • Randomised or non-randomised controlled trials Before and after studies • Cohort studies Qualitative studies • Interviews • Focus groups Economic studies • Economic studies: • Economic evaluations • Cost-utility (cost per QALY) • Cost benefit (i.e. Net benefit) • Cost-effectiveness (Cost per unit of effect) • Cost minimization • Cost-consequence Systematic reviews will only be included if they have a high level of external validity to our research questions. They will also be used as a source for primary evidence. Only full economic analyses will be included – papers reporting costs only will be excluded. Qualitative studies which are linked to included comparative studies will be prioritised, if the volume of studies is high

A.2 Review question 5

	Interventions to change or reduce access to the means of suicide
Component of protocol	**Description**
Review question 5	What are the most effective and cost effective non-clinical interventions to support people who are at risk of suicidal acts? • What impact do the following have on the effectiveness, cost effectiveness of different interventions: deliverer, setting, timing?
Context and objectives	Interventions will focus on people identified as at risk of suicide, including people who have contacted local services for support. People at all stages within the CJS, including people on remand and recently discharged from custody, are at high risk of suicide. To determine whether interventions to support people in community or custodial settings, or when transferring between a prison or custodial setting and the community are effective at reducing suicide.
Participants/population	People in the community or custodial settings. People recently discharged from custody or about to enter prison.
Intervention(s)	Any interventions that provide information, advice, education for staff or public. Interventions for Clinical staff with a responsibility for clinical or therapeutic interventions to treat or manage risk factors for suicide would not be included. Note: transfer from inpatient, clinical settings is addressed by clinical guidelines for high-risk people on a care pathway
Comparator(s)/control	Comparators that will be considered are: Other intervention Status quo Time (before and after) or area (i.e. matched city a vs b) comparisons
Outcome(s)	The outcomes that will be considered when assessing the impact on the health of the recipient are: Suicide rates / suicide rates among target communities Suicide attempts Reporting of suicide ideation The outcomes that will be considered when assessing help-seeking behaviour among target communities: Service uptake (such as mental health services, helplines) The outcomes that will be considered when assessing skills and behavior of practitioner, peer or public: Changes in knowledge, attitude, beliefs, skills and behavior of practitioners, public and peers. Staff/public training completed/refreshed
Types of studies to be included	Comparative studies including: • Randomised or non-randomised controlled trials

	Interventions to change or reduce access to the means of suicide
Component of protocol	**Description**
	• Before and after studies • Cohort studies Qualitative studies • Interviews • Focus groups Economic studies • Economic studies: • Economic evaluations • Cost-utility (cost per QALY) • Cost benefit (i.e. Net benefit) • Cost-effectiveness (Cost per unit of effect) • Cost minimization • Cost-consequence Systematic reviews will only be included if they have a high level of external validity to our research questions. They will also be used as a source for primary evidence. Only full economic analyses will be included – papers reporting costs only will be excluded. Qualitative studies which are linked to included comparative studies will be prioritised, if the volume of studies is high

For the full protocol see the attached version on the guideline consultation page

Appendix B: Literature search strategies

See separate appendix document attached on the guideline consultation page.

Appendix C: References

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Appendix D: Excluded studies

	Study	Reason for exclusion
1.	Aakre Jennifer M, et al Ann (2016) Evaluation of Youth Mental Health First Aid USA: A Program to Assist Young People in Psychological Distress. Psychological Services 13(2), 121-126	Intervention is not suicide prevention and study outcome is not interest of the review
2.	Appleby L, et al (2000) An educational intervention for front-line health professionals in the assessment and management of suicidal patients (The STORM Project). Psychological Medicine 30(4), 805-812	61% of study population were from secondary care setting
3.	Arensman Ella; Coffey Claire ; Griffin Eve ; 2016 Effectiveness of Depression-Suicidal Behaviour Gatekeeper Training among police officers in three European regions: Outcomes of the Optimising Suicide Prevention Programmes and Their Implementation in Europe (OSPI-Europe) study. International Journal of Social Psychiatry 62 (7): 651-60	Non-RCT study did not report suicide rate as study outcome.
4.	Assing Hvidt, Elisabeth , Ploug Thomas, and Holm Søren (2016) The impact of telephone crisis services on suicidal users: a systematic review of the past 45 years. The Mental Health Review 21(2), 141-160	Systematic review, included studies checked against review protocol
5.	Auzoult Laurent, and Abdellaoui Sid (2013) Perceptions of a peer suicide prevention program by inmates and professionals working in prisons: Underestimation of risk, the modification of the field, and the role of self-consciousness. Crisis: The Journal of Crisis Intervention and Suicide Prevention 34(4), 289-292	Qualitative study - quantitative analysis of an intervention we have not identified;
6.	Bagley (2010) A systematic review of suicide prevention programs for military or veterans. Suicide & life-threatening behaviour 40(3), 257-65	Systematic review, included studies checked against review protocol
7.	Balaguru (2013) Understanding the effectiveness of school-based interventions to prevent suicide: A realist review. Child and Adolescent Mental Health 18(3), 131-139.	Not a systematic review
8.	Bartgis Jami ; Albright Glenn 2016 Online role-play simulations with emotionally responsive avatars for the early detection of Native youth psychological distress, including depression and suicidal ideation. American Indian and Alaska native mental health research (Online) 23(2): 1-27	Non-RCT study did not report suicide rate as study outcome.
9.	Bartlett H, Travers C, and Cartwright C (2008) Evaluation of a project to raise community awareness of suicide risk among older men. Journal of Mental Health 17(4), 388-397	Non-RCT study did not report suicide rate as study outcome.
10.	Borrill (2005) Learning from 'near misses': interviews with women who survived an incident of severe self-harm in prison. Howard Journal of Criminal Justice 44(1), 57-69	No intervention
11.	Bossarte Robert M, et al (2014) Associations between the Department of Veterans Affairs' suicide prevention campaign and calls to related crisis lines. Public health reports (Washington, and D.C. : 1974) 129(6), 516-25	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
12.	Bryan (2009) Emotional impact of a video-based suicide prevention program on suicidal viewers and suicide survivors. Suicide & life-threatening behaviour 39(6), 623-32.	Study outcome was not interest of the review.
13.	Byrne (2015) Delivering Mental Health First Aid: An exploration of instructors' views. International Journal of Mental Health Promotion 17(1), 3-21	Study outcome was not interest of the review.
14.	Calear Alison L, Christensen Helen, Freeman Alexander, Fenton Katherine, Busby Grant, Janie , van Spijker , Bregje , and Donker Tara. 2016. "A systematic review of psychosocial suicide prevention interventions for youth". European child & adolescent psychiatry 25(5):467-82.	Systematic review, included studies checked against review protocol
15.	Capp K, Deane F P, and Lambert G (2001) Suicide prevention in Aboriginal communities: application of community gatekeeper training. Australian and New Zealand journal of public health 25(4), 315-21	Non-RCT study did not report suicide rate as study outcome
16.	Cerel Julie, Padgett Jason H, Robbins Vestena, and Kaminer Barbara (2012) A state's approach to suicide prevention awareness: gatekeeper training in Kentucky. Journal of evidence-based social work 9(3), 283-92	Non-RCT study did not report suicide rate as study outcome
17.	Chauliac N, et al (2016) How does gatekeeper training improve suicide prevention for elderly people in nursing homes? A controlled study in 24 centre. European Psychiatry 37, 56-62	Non-RCT study did not report suicide rate as study outcome
18.	Ciffone (2007) Suicide prevention: an analysis and replication of a curriculum-based high school program. Social work 52(1), 41-9	Study outcome was not interest of the review.
19.	Cigularov Konstantin, et al (2008) Investigation of the effectiveness of a school-based suicide education program using three methodological approaches. Psychological Services 5(3), 262-274	Non-RCT study did not report suicide rate as study outcome
20.	Cigularov (2008)What prevents adolescents from seeking help after a suicide education program? Suicide & life-threatening behavior 38(1), 74-86	Qualitative study - quantitative analysis of an intervention we have not identified;
21.	Cimini Dolores M, et al (2014) Implementing an Audience-Specific Small-Group Gatekeeper Training Program to Respond to Suicide Risk among College Students: A Case Study. Journal of American College Health 62(2), 92-100	Non-RCT study did not report suicide rate as study outcome
22.	Clifford (2013) A systematic review of suicide prevention interventions targeting indigenous peoples in Australia, United States, Canada and New Zealand. BMC Public Health 13(1), 463	Systematic review, included studies checked against review protocol
23.	Coleman Daniel, Del Quest and Aisling (2015) Science from evaluation: testing hypotheses about differential effects of three youth-focused suicide prevention trainings. Social work in public health 30(2), 117-28	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
24.	Coppens Evelien, et al (2014) Effectiveness of community facilitator training in improving knowledge, attitudes, and confidence in relation to depression and suicidal behaviour: results of the OSPI-Europe intervention in four European countries. Journal of affective disorders 165, 142-50	Non-RCT study did not report suicide rate as study outcome
25.	Corcoran (2011) A systematic review of psychosocial interventions for suicidal adolescents. Children and Youth Services Review 33(11), 2112-2118	Systematic review, included studies checked against review protocol
26.	Cox (2013) Interventions to reduce suicides at suicide hotspots: a systematic review. BMC public health 13, 214	Intervention is for restriction access to means
27.	Crawford M J, Sharpe D, Rutter D, and Weaver T (2009) Prevention of suicidal behaviour among army personnel: a qualitative study. Journal of the Royal Army Medical Corps 155(3), 203-7.	No intervention
28.	Cross Wendi, Matthieu Monica M, Cerel Julie, and Knox Kerry L (2007) Proximate outcomes of gatekeeper training for suicide prevention in the workplace. Suicide & life-threatening behavior 37(6), 659-70	Non-RCT study did not report suicide rate as study outcome
29.	Cross Wendi F et al (2011) Does practice make perfect? A randomized control trial of behavioural rehearsal on suicide prevention gatekeeper skills. The journal of primary prevention 32(3-4), 195-211	Non-RCT study did not report suicide rate as study outcome
30.	Cross Wendi F, et al (2014) Measuring trainer fidelity in the transfer of suicide prevention training. Crisis 35(3), 202-12	Study outcome was not interest of the review.
31.	Cusimano Michael D, and Sameem Mojib. 2011. "The effectiveness of middle and high school-based suicide prevention programmes for adolescents: a systematic review". Injury prevention : journal of the International Society for Child and Adolescent Injury Prevention 17(1):43-9.	Systematic review, included studies checked against review protocol
32.	Curtis Cate (2010) Youth perceptions of suicide and help-seeking: 'They'd think I was weak or "mental"'. Journal of Youth Studies 13(6), 699-715	No intervention
33.	Whitney D Stephen, and et al (2011) Principals' perceptions of benefits and barriers to school-based suicide prevention programs. Children and Youth Services Review 33(6), 869-877	Qualitative study - quantitative analysis of an intervention we have not identified;
34.	Daigle (2006) Reaching suicidal people with media campaigns: new challenges for a new century. Crisis 27(4), 172-80	Intervention is media campaign (RQ8)
35.	Dawn (2008)The use and impact of Applied Suicide Intervention Skills Training (ASIST) in Scotland: an evaluation	Study outcome was not interest of the review.
36.	de Groot , Marieke , Neeleman Jan, van der Meer , Klaas , and Burger Huibert. 2010. "The effectiveness of family-based cognitive-behavior grief therapy to prevent complicated grief in relatives of suicide victims: the mediating role of suicide ideation". Suicide & life-threatening behavior 40(5):425-37.	Intervention is postvention

	Study	Reason for exclusion
37.	De Leo (2002)Suicide among the elderly: the long-term impact of a telephone support and assessment intervention in northern Italy. The British journal of psychiatry : the journal of mental science 181, 226-9	No comparison data
38.	Donald Maria, Dower Jo, and Bush Robert (2013) Evaluation of a suicide prevention training program for mental health services staff. Community mental health journal 49(1), 86-94	Non-RCT study did not report suicide rate as study outcome
39.	Dumesnil (2009)Public awareness campaigns about depression and suicide: A review. Psychiatric Services 60(9), 1203-1213	Not a systematic review
40.	Durkee (2011) Internet pathways in suicidality: a review of the evidence. International journal of environmental research and public health 8(10), 3938-52	Not a systematic review
41.	Eggert Leona L, Thompson Elaine A, Randell Brooke P, and Pike Kenneth C. 2002. "Preliminary effects of brief school-based prevention approaches for reducing youth suicide--risk behaviors, depression, and drug involvement". Journal of child and adolescent psychiatric nursing : official publication of the Association of Child and Adolescent Psychiatric Nurses, and Inc 15(2):48-64.	This is secondary data analysis of a primary study
42.	Evans R E; Price S (2013) Exploring organisational influences on the implementation of gatekeeper training: A qualitative study of the Applied Suicide Intervention Skills Training (ASIST) programme in Wales. Critical Public Health 23(2): 213-224	Study outcome (implementation of ASIST) is not the interest of the review
43.	Evans (2016)The role of schools in children and young people's self-harm and suicide: systematic review and meta-ethnography of qualitative research. BMC public health 16, 401	Systematic review, included studies checked against review protocol
44.	Eylem O, Straten A, Bhui K, and Kerkhof Ajfm. 2015. "Protocol: Reducing suicidal ideation among Turkish migrants in the Netherlands and in the UK: Effectiveness of an online intervention". International review of psychiatry 27(1 // 2013/330 - 460 (EC) *European Commission*):72-81.	This is a study protocol
45.	Ewell (2016)Identification, Response, and Referral of Suicidal Youth Following Applied Suicide Intervention Skills Training	Non-RCT study did not report suicide rate as study outcome
46.	Flynn A, et al (2016) Student evaluation of the yellow ribbon suicide prevention program in Midwest schools. Primary Care Companion to the Journal of Clinical Psychiatry 18(3)	Non-RCT study did not report suicide rate as study outcome
47.	Ford-Paz (2015)Training Community Opinion Leaders to Raise Awareness and Promote Early Intervention for Depressed Latino Adolescents. Progress in community health partnerships : research, education, and action 9(2), 191-201	Intervention is not suicide prevention

	Study	Reason for exclusion
48.	Franklin Joseph C, Fox Kathryn R, Franklin Christopher R, Kleiman Evan M, Ribeiro Jessica D, Jaroszewski Adam C, Hooley Jill M, and Nock Matthew K. 2016. "A brief mobile app reduces nonsuicidal and suicidal self-injury: Evidence from three randomized controlled trials". *Journal of Consulting and Clinical Psychology* 84(6):544-557.	Participants had a history of self-harm(2 or more self-cutting in past month)
49.	Freedenthal Stacey (2010) Adolescent help-seeking and the Yellow Ribbon Suicide Prevention Program: an evaluation. Suicide & life-threatening behaviour 40(6), 628-39	Non-RCT study did not report suicide rate as study outcome
50.	Gask (2006)Evaluating STORM skills training for managing people at risk of suicide. Journal of advanced nursing 54(6), 739-50	63% study population were working inpatient care setting
51.	Gewirtz et al 2016 Effects of a military parenting programm on parental distress and suicidal ideation: after deployment adaptive parenting tools. Suicide and life-threatening behaviour 46 (Suppl 1)	Intervention is not about suicide prevention.
52.	Ghoncheh Rezvan, Koot Hans M, and Kerkhof Ad J. F. M. 2014. "Suicide prevention e-learning modules designed for gatekeepers: A descriptive review". Crisis: The Journal of Crisis Intervention and Suicide Prevention 35(3):176-185.	Not a systematic review
53.	Gilat (2012)Responses to suicidal messages in an online support group: comparison between trained volunteers and lay individuals. Social psychiatry and psychiatric epidemiology 47(12), 1929-35	Study outcome was not interest of the review.
54.	Gilchrist (2006)Barriers to help-seeking in young people: Community beliefs about youth suicide. Australian Social Work 59(1), 73-85	no intervention
55.	Gould Madelyn S, et al (2007) An evaluation of crisis hotline outcomes. Part 2: Suicidal callers. Suicide & life-threatening behavior 37(3), 338-52	Non-RCT study did not report suicide rate as study outcome
56.	Gryglewicz Kim, Chen Jason I, Romero Gabriela D, Karver Marc S, and Witmeier Melissa (2017) Online Suicide Risk Assessment and Management Training. Crisis 38(3), 186-194	Non-RCT study did not report suicide rate as study outcome
57.	Gullestrup Jorgen, et al (2011) MATES in construction: impact of a multimodal, community-based program for suicide prevention in the construction industry. International journal of environmental research and public health 8(11), 4180-96	Non-RCT study did not report suicide rate as study outcome
58.	Hadlaczky (2014)Mental Health First Aid is an effective public health intervention for improving knowledge, attitudes, and behaviour: a meta-analysis. International review of psychiatry (Abingdon, and England) 26(4), 467-75.	Systematic review, included studies checked against review protocol
59.	Harlow Alyssa F, Bohanna India, and Clough Alan. 2014. "A systematic review of evaluated suicide prevention programs targeting indigenous youth". Crisis 35(5):310-21.	Systematic review, included studies checked against review protocol

	Study	Reason for exclusion
60.	Harris (2013)Developing social capital in implementing a complex intervention: a process evaluation of the early implementation of a suicide prevention intervention in four European countries. BMC public health 13, 158	Study outcome was not interest of the review.
61.	Harris (2016)Exploring synergistic interactions and catalysts in complex interventions: longitudinal, mixed methods case studies of an optimised multi-level suicide prevention intervention in four european countries (Ospi-Europe) BMC public health 16, 268	Study outcome was not interest of the review.
62.	Harrod Curtis S, Goss Cynthia W, Stallones Lorann, and DiGuiseppi Carolyn. 2014. "Interventions for primary prevention of suicide in university and other post-secondary educational settings". The Cochrane database of systematic reviews 10:CD009439.	Systematic review, included studies checked against review protocol
63.	Herron (2016)Evidence-based gatekeeper suicide prevention in a small community context. Journal of Human Behavior in the Social Environment 26(1), 25-36	Not a systematic review
64.	Hashimoto Naoki, et al (2016) Effectiveness of suicide prevention gatekeeper-training for university administrative staff in Japan. Psychiatry and clinical neurosciences 70(1), 62-70	Non-RCT study did not report suicide rate as study outcome
65.	Heyman (2015)Curriculum development through understanding the student nurse experience of suicide intervention education A phenomenographic study. Nurse Education in Practice 15(6), 498-506	Qualitative study - quantitative analysis of an intervention we have not identified;
66.	Hoven (2009) Awareness in nine countries: a public health approach to suicide prevention. Legal medicine 11: 513-7.	Non-RCT study did not report suicide rate as study outcome
67.	Hooven (2010)Long-term outcomes for the promoting CARE suicide prevention program. Family & community health 35(3), 225-35	Intervention delivered by clinicians
68.	Hooven (2012)Promoting CARE: including parents in youth suicide prevention. Family & community health 35(3), 225-35.	Intervention delivered by clinicians
69.	Hooven (2013)Parents-CARE: a suicide prevention program for parents of at-risk youth. Journal of child and adolescent psychiatric nursing : official publication of the Association of Child and Adolescent Psychiatric Nurses, and Inc 26(1), 85-95	Intervention delivered by clinicians
70.	House Lisa A, Lynch Joseph F, and Bane Mary (2013) An Evaluation of a Unique Gatekeeper Training for Suicide Prevention of College Students: Demonstrating Effective Partnering within Student Affairs. Michigan Journal of Counseling: Research, Theory, and Practice 40(1), 27-46	Non-RCT study did not report suicide rate as study outcome
71.	Howard (2016)Preventing prison suicide: perspectives from the inside. Legal medicine (Tokyo, and Japan) 11 Suppl 1, S13-7	No intervention

	Study	Reason for exclusion
72.	Hudson Meghan M (2017) Outcomes of a school-based suicide prevention program for middle school students. Dissertation Abstracts International Section A: Humanities and Social Sciences 78(3-A(E)), No-Specified	Non-RCT study did not report suicide rate as study outcome
73.	Inagaki M, Yamada M, Yonemoto N, and Takahashi K. 2012. "NOCOMIT-J: A community intervention trial of multi-modal suicide prevention program in Japan". European psychiatry 27	Abstract
74.	Indelicate Natalie Aree, Mirsu-Paun Anca, and Griffin Wayne D (2011) Outcomes of a suicide prevention gatekeeper training on a university campus. Journal of College Student Development 52(3), 350-361	Non-RCT study did not report suicide rate as study outcome
75.	Isaac Michael, Elias Brenda, Katz Laurence Y, Belik Shay-Lee, Deane Frank P, Enns Murray W, Sareen Jitender, Swampy Cree Suicide Prevention, and Team . 2009. "Gatekeeper training as a preventative intervention for suicide: a systematic review". Canadian journal of psychiatry. Revue canadienne de psychiatrie 54(4):260-8.	Systematic review, included studies checked against review protocol
76.	Jacki (2007)Choose Life: early experiences of implementing Scotland's suicide prevention strategy. Journal of Public Mental Health 6(1), 20-24	Qualitative study - quantitative analysis of an intervention we have not identified;
77.	J Levitt Aaron et a l(2011) Suicide awareness and prevention workshop for social workers and paraprofessionals. Journal of Social Work Education 47 (3): 607-613	Non-RCT study did not report suicide rate as study outcome
78.	Johnson (2011)Training mental healthcare providers to reduce at-risk patients' access to lethal means of suicide: evaluation of the CALM Project. Archives of suicide research : official journal of the International Academy for Suicide Research 15(3), 259-64	No baseline data
79.	Johnson Lisa A, and Parsons Mary E (2012) Adolescent suicide prevention in a school setting: use of a gatekeeper program. NASN school nurse (Print) 27(6), 312-7	Non-RCT study did not report suicide rate as study outcome
80.	Jones Sharon, et al (2015) A rural, community-based suicide awareness and intervention program. Rural and remote health 15(1), 2972	Non-RCT study did not report suicide rate as study outcome
81.	Kaniwa Isao, et al (2012) Effects of educating local government officers and healthcare and welfare professionals in suicide prevention. International journal of environmental research and public health 9(3), 712-21	Non-RCT study did not report suicide rate as study outcome
82.	Katz C, Bolton S L, Katz L Y, Isaak C, Tilston-Jones T, and Sareen J. 2013. "A systematic review of school-based suicide prevention programs". Depression and Anxiety 30(10):1030-1045.	Systematic review, included studies checked against review protocol
83.	Keller Dustin P, et al (2009) Tennessee Lives Count: Statewide gatekeeper training for youth suicide prevention. Professional Psychology: Research and Practice 40(2), 126-133	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
84.	Kim (2013)Discussion of late-life suicide: How social workers perceive and intervene in elderly suicide. Educational Gerontology 39(7), 491-500	No intervention
85.	Klimes-Dougan (2013)The impact of universal suicide-prevention programs on the help-seeking attitudes and behaviors of youths. The Journal of Crisis Intervention and Suicide Prevention 34(2), 82-97	Not a systematic review
86.	King Keith A, Strunk Catherine M, and Sorter Michael T (2011) Preliminary effectiveness of surviving the teens suicide prevention and depression awareness program on adolescents' suicidality and self-efficacy in performing help-seeking behaviours. The Journal of school health 81(9), 581-90	Non-RCT study did not report suicide rate as study outcome
87.	Kong Jung Won, and Kim Jung Woo (2016) A review of school-based suicide prevention interventions in South Korea, 1995-2015. Children and Youth Services Review 69, 193-200	Non-RCT study did not report suicide rate as study outcome
88.	Kreuze (2016)Technology-enhanced suicide prevention interventions: A systematic review of the current state of the science. Journal of telemedicine and telecare	Systematic review, included studies checked against review protocol
89.	Kuhlman Shane T. W, Walch Susan E, Bauer Kristina N, and Glenn April D (2017) Intention to Enact and Enactment of Gatekeeper Behaviors for Suicide Prevention: an Application of the Theory of Planned Behavior. Prevention science : the official journal of the Society for Prevention Research 18(6), 704-715	Non-RCT study did not report suicide rate as study outcome
90.	Kumagai (2005)Community-based suicide prevention through group activity for the elderly successfully reduced the high suicide rate for females. Psychiatry and Clinical Neurosciences 59(3), 337-344	Intervention is education or training
91.	Kutcher (2016) School- and Community-Based Youth Suicide Prevention Interventions: Hot Idea, Hot Air, or Sham? Revue canadienne de psychiatrie	Systematic review, included studies checked against review protocol
92.	Labouliere Christa D, et al (2015) Revisiting the concept of knowledge: how much is learned by students participating in suicide prevention gatekeeper training?. Crisis 36(4), 274-80	Non-RCT study did not report suicide rate as study outcome
93.	Lamis Dorian A, Underwood Maureen, and D'Amore Nicole (2017) Outcomes of a Suicide Prevention Gatekeeper Training Program Among School Personnel. Crisis 38(2), 89-99	Non-RCT study did not report suicide rate as study outcome
94.	Lancaster Paige G, et al (2014) Feasibility of a web-based gatekeeper training: implications for suicide prevention. Suicide & life-threatening behaviour 44(5), 510-23	Non-RCT study did not report suicide rate as study outcome
95.	Lancaster Paige G, et al (2014) Feasibility of a web-based gatekeeper training: implications for suicide prevention. 44(5), 510-23	Non-RCT study did not report suicide rate as study outcome
96.	Levitt Aaron J, Lorenzo Julie, Yu Van, Wean Caren, and Miller-Solarino Sophie (2011) Suicide Awareness and Prevention Workshop for Social Workers and Paraprofessionals. Journal of Social Work Education 47(3), 607-613	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
97.	Litteken Clay, and Sale Elizabeth (2017) Long-Term Effectiveness of the Question, Persuade, Refer (QPR) Suicide Prevention Gatekeeper Training Program: Lessons from Missouri. Community mental health journal ,	Non-RCT study did not report suicide rate as study outcome
98.	Lopes (2012)Cross cultural education in suicide prevention: Development of a training resource for use in Central Australian Indigenous communities. Advances in Mental Health 10(3), 224-234	Study outcome was not interest of the review.
99.	Lygnugaryte-Griksiene Aidana, Leskauskas Darius, Jasinskas Nedas, and Masiukiene Agne (2017) Factors influencing the suicide intervention skills of emergency medical services providers. Medical education online 22(1), 1291869	Non-RCT study did not report suicide rate as study outcome
100.	Manister Nancy N, Murray Stephanie, Burke John Martin, Finegan Madeline, and McKiernan Mary E (2017) Effectiveness of Nursing Education to Prevent Inpatient Suicide. Journal of continuing education in nursing 48(9), 413-419	Non-RCT study did not report suicide rate as study outcome
101.	Mann J J, Apter A, Bertolote J, Beautrais A, Currier D, Haas A, Hegerl U, Lonnqvist J, Malone K, Marusic A, Mehlum L, Patton G, Phillips M, Rutz W, Rihmer Z, Schmidtke A, Shaffer D, Silverman M, Takahashi Y, Varnik A, Wasserman D, Yip P, and Hendin H. 2005. "Suicide prevention strategies - A systematic review". Jama-Journal of the American Medical Association 294(16):2064-2074.	Systematic review, included studies checked against review protocol
102.	M Matthieu Monica, and B Swensen Angela (2014) Suicide prevention training program for gatekeepers working in community hospice settings. Journal of Social Work in End-of-Life and Palliative Care 10(1), 95-105	Non-RCT study did not report suicide rate as study outcome
103.	Maine S, Shute R, and Martin G (2001) Educating parents about youth suicide: knowledge, response to suicidal statements, attitudes, and intention to help. Suicide & life-threatening behaviour 31(3), 320-32	Non-RCT study did not report suicide rate as study outcome
104.	Maria (2008) Effectiveness of interventions to prevent suicide and suicidal behaviour: a systematic review	Systematic review, included studies checked against review protocol
105.	Marzano Lisa, et al (2016) Police and Suicide Prevention. Crisis 37(3), 194-204	Non-RCT study did not report suicide rate as study outcome
106.	Matthieu (2008)Evaluation of gatekeeper training for suicide prevention in veterans Research 12(2), 148-154	50% of participants were mental health professionals
107.	Matthieu (2009)Educational preferences and outcomes from suicide prevention training in the Veterans Health Administration: one-year follow-up with healthcare employees in Upstate New York. Military medicine 174(11), 1123-31	71% participants were clinicians

	Study	Reason for exclusion
108.	Matthieu (2013)Gatekeeper training outcomes: Enhancing the capacity of staff in substance abuse treatment programs to prevent suicide in a high risk population. Mental Health and Substance Use 6(4), 274-286	50% participants were clinicians
109.	McFaul Mimi B, Mohatt Nathaniel V, and DeHay Tamara L (2014) Development, evaluation, and refinement of the Suicide Prevention Toolkit for Rural Primary Care Practices. Special Issue: Rural Suicide 38(2), 116-127	Non-RCT study did not report suicide rate as study outcome
110.	McLaughlin (2016)The unmet support needs of family members caring for a suicidal person. Journal of mental health (Abingdon, and England) 25(3), 212-6	No intervention
111.	Michail (2016)Exploring general practitioners' views and experiences on suicide risk assessment and management of young people in primary care: a qualitative study in the UK. BMJ open 6(1), e009654	Intervention is not suicide prevention (postvention)
112.	Miller (2009)Suicide prevention programs in the schools: A review and public health perspective. School Psychology Review 38(2), 168-188	Not a systematic review
113.	Milner (2015)Workplace suicide prevention: a systematic review of published and unpublished activities. Health promotion international 30(1), 29-37	Systematic review, included studies checked against review protocol
114.	Mishara Brian L, Houle Janie, and Lavoie Brigitte (2005) Comparison of the effects of four suicide prevention programs for family and friends of high-risk suicidal men who do not seek help themselves. Suicide & life-threatening behaviour 35(3), 329-42	Non-RCT study did not report suicide rate as study outcome
115.	Mitchell Sharon L, Kader Mahrin, Darrow Sherri A, Haggerty Melinda Z, and Keating Niki L (2013) Evaluating Question, Persuade, Refer (QPR) suicide prevention training in a college setting. Journal of College Student Psychotherapy 27(2), 138-148	Non-RCT study did not report suicide rate as study outcome
116.	Motohashi (2007)A Decrease in Suicide Rates in Japanese Rural Towns after Community-Based Intervention by the Health Promotion Approach. Suicide and Life-Threatening Behavior 37(5), 593-599	Intervention is not education or training
117.	Nadeem (2011)The Role of Teachers in School-Based Suicide Prevention: A Qualitative Study of School Staff Perspectives. School mental health 3(4), 209-221	No intervention
118.	Nadeem (2016)School Personnel Experiences in Notifying Parents About Their Child's Risk for Suicide: Lessons Learned. The Journal of school health 86(1), 3-10	Study outcome was not interest of the review.

	Study	Reason for exclusion
119.	Nakagami Yukako, Kubo Hiroaki, Katsuki Ryoko, Sakai Tomomichi, Sugihara Genichi, Naito Chisako, Oda Hiroyuki, Hayakawa Kohei, Suzuki Yuriko, Fujisawa Daisuke, Hashimoto Naoki, Kobara Keiji, Cho Tetsuji, Kuga Hironori, Takao Kiyoshi, Kawahara Yoko, Matsumura Yumi, Murai Toshiya, Akashi Koichi, Kanba Shigenobu, Otsuka Kotaro, and Kato Takahiro A ( ) Development of a 2-h suicide prevention program for medical staff including nurses and medical residents: A two-center pilot trial. Journal of affective disorders 225, 569-576	Non-RCT study did not report suicide rate as study outcome
120.	Nasir Bushra Farah, Hides Leanne, Kisely Steve, Ranmuthugala Geetha, Nicholson Geoffrey C, Black Emma, Gill Neeraj, Kondalsamy-Chennakesavan Srinivas, and Toombs Maree. 2016. "The need for a culturally-tailored gatekeeper training intervention program in preventing suicide among Indigenous peoples: a systematic review". *Bmc Psychiatry* 16:.	Systematic review, included studies checked against review protocol
121.	Nasir Bushra, Kisely Steve, Hides Leanne, Ranmuthugala Geetha, Brennan-Olsen Sharon, Nicholson Geoffrey C, Gill Neeraj S, Hayman Noel, Kondalsamy-Chennakesavan Srinivas, and Toombs Maree (2017) An Australian Indigenous community-led suicide intervention skills training program: community consultation findings. BMC psychiatry 17(1), 219	Non-RCT study did not report suicide rate as study outcome
122.	Newcomer et al 2016 Higher childhood peer reports of social preference mediates the impact of the Good Behaviour Game on suicide attempt. Prev Sci 17(2): 145.	Intervention is not about suicide prevention.
123.	Nosek (2008)Managing a depressed and suicidal loved one at home: impact on the family. Journal of psychosocial nursing and mental health services 46(5), 36-44	Qualitative study - quantitative analysis of an intervention we have not identified;
124.	Osteen Philip J, Jacobson Jodi M, and Sharpe Tanya L. 2014. "Suicide prevention in social work education: How prepared are social work students?". Journal of Social Work Education 50(2):349-364.	This is secondary data analysis of a primary study
125.	Osteen Philip, Frey Jodi M, Woods MaKenna N, Ko Jungyai, and Shipe Stacey (2017) Modeling the Longitudinal Direct and Indirect Effects of Attitudes, Self-Efficacy, and Behavioral Intentions on Practice Behavior Outcomes of Suicide Intervention Training. Suicide & life-threatening behavior 47(4), 410-420	Non-RCT study did not report suicide rate as study outcome
126.	Owens (2005) A qualitative study of help seeking and primary care consultation prior to suicide. he journal of the Royal College of General Practitioners 55(516), 503-9	Qualitative study - quantitative analysis of an intervention we have not identified;
127.	Owens (2009)Public involvement in suicide prevention: understanding and strengthening lay responses to distress. BMC public health 9, 308	No intervention
128.	Owens (2011)Recognising and responding to suicidal crisis within family and social networks: qualitative study. BMJ (Clinical research ed.) 343, d5801	No intervention

	Study	Reason for exclusion
129.	Owens Christabel, and Charles Nigel (2017) Development and evaluation of a leaflet for concerned family members and friends: 'It's safe to talk about suicide'. Health education journal 76(5), 582-594	Non-RCT study did not report suicide rate as study outcome
130.	Oyama (2006)Local community intervention through depression screening and group activity for elderly suicide prevention. Psychiatry and clinical neurosciences 60(1), 110-4	Intervention is depression screening
131.	Oyama, (2004)Community-Based Prevention for Suicide in Elderly by Depression Screening and Follow-Up. Community mental health journal 40(3), 249-263	Intervention is depression screening
132.	Pasco Susan, Wallack Cory, Sartin Robert M, and Dayton Rebecca (2012) The impact of experiential exercises on communication and relational skills in a suicide prevention gatekeeper-training program for college resident advisors. Journal of American college health : J of ACH 60(2), 134-40	Non-RCT study did not report suicide rate as study outcome
133.	Paxton R, MacDonald F, et al (2001) Improving general practitioners' assessment and management of suicide risk. International journal of health care quality assurance incorporating Leadership in health services 14(2-3), 133-8	Non-RCT study did not report suicide rate as study outcome
134.	Perry (2016)Web-Based and Mobile Suicide Prevention Interventions for Young People: A Systematic Review. Journal of the Canadian Academy of Child and Adolescent Psychiatry 25(2): 79.	Study outcome was not interest of the review
135.	Pfaff (2001)Training general practitioners to recognise and respond to psychological distress and suicidal ideation in young people. The Medical journal of Australia 174(5), 222-6	Study outcome was not interest of the review
136.	Player (2015)What Interrupts Suicide Attempts in Men: A Qualitative Study. PloS one 10(6), e0128180	No intervention
137.	Portzky G, and Heeringen K (2006) Suicide prevention in adolescents: a controlled study of the effectiveness of a school-based psycho-educational program. Journal of child psychology and psychiatry, and allied disciplines 47(9), 910-8	Non-RCT study did not report suicide rate as study outcome
138.	Pullen Linda, and Gow Kathryn (2000) University students elaborate on what young persons "at risk of suicide" need from listeners. Journal of Applied Health Behaviour 2(1), 32-39	Qualitative study - quantitative analysis of an intervention we have not identified;
139.	Rallis Bethany A (2017) A brief peer gatekeeper suicide prevention training: Preliminary examination and individual factors that influence outcomes. Dissertation Abstracts International: Section B: The Sciences and Engineering 78(1-B(E)), No-Specified	Non-RCT study did not report suicide rate as study outcome
140.	Randell (2001)Immediate post intervention effects of two brief youth suicide prevention interventions. Suicide & life-threatening behavior 31(1), 41-61	Intervention (CARE) was delivered by clinicians
141.	Reis Carli, and Cornell Dewey (2008) An evaluation of suicide gatekeeper training for school counsellors and teachers. Professional School Counselling 11(6), 386-394	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
142.	Robinson (2013)A systematic review of school-based interventions aimed at preventing, treating, and responding to suicide-related behaviour in young people. Crisis: The Journal of Crisis Intervention and Suicide Prevention 34(3), 164-182	Systematic review, included studies checked against review protocol
143.	Robinson (2014)Social media and suicide prevention: Findings from a stakeholder survey. Shanghai Archives of Psychiatry 27(1), 27-35	Study outcome was not interest of the review
144.	Robinson Jo, Hetrick Sarah, Cox Georgina, Bendall Sarah, Yung Alison, and Pirkis Jane (2015) The safety and acceptability of delivering an online intervention to secondary students at risk of suicide: findings from a pilot study. Early intervention in psychiatry 9(6), 498-506	Non-RCT study did not report suicide rate as study outcome
145.	Robinson Jo, et al (2016) Can an Internet-based intervention reduce suicidal ideation, depression and hopelessness among secondary school students: results from a pilot study. Early intervention in psychiatry 10(1), 28-35	Non-RCT study did not report suicide rate as study outcome
146.	Robinson (2016)Social media and suicide prevention: a systematic review. Early intervention in psychiatry 10(2), 103-21	Systematic review, included studies checked against review protocol
147.	Romeo Monica L (2016) A review of the experience of campus professionals' use of the Question, Persuade, and Refer (QPR) gatekeeper training program in a small university setting. Dissertation Abstracts International: Section B: The Sciences and Engineering 76(12-B(E)), No-Specified	Non-RCT study did not report suicide rate as study outcome
148.	Rona (2008)The use and impact of Applied Suicide Intervention Skills Training (ASIST) in Scotland: an evaluation: annex: a review of the international literature	Not a systematic review
149.	Saini (2016)General practitioners' perspectives on primary care consultations for suicidal patients. Health & social care in the community 24(3), 260-9	No intervention
150.	Sandler Irwin, Tein Jenn-Yun, Wolchik Sharlene, and Ayers Tim S. 2016. "The Effects of the Family Bereavement Program to Reduce Suicide Ideation and/or Attempts of Parentally Bereaved Children Six and Fifteen Years Later". Suicide & life-threatening behavior 46 Suppl 1:S32-8.	Intervention is postvention
151.	Santos (2014)Impact of "+Contigo" training on the knowledge and attitudes of health care professionals about suicide. Revista 22(4): 679-84.	Non-RCT study did not report suicide rate as study outcome
152.	Schmidt Robert, et al (2015) Integrating a suicide prevention program into a school mental health system: a case example from a rural school district. Children and Schools 37(1), 18-26	Non-RCT study did not report suicide rate as study outcome
153.	Shelef Leah, Laur Lucian, Raviv Gil, and Fruchter Eyal (2015) A military suicide prevention program in the Israeli Defense Force: a review of an important military medical procedure. Disaster and military medicine 1, 16	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
154.	Sharpe Tanya L, Frey Jodi Jacobson, Osteen Philip J, and Bernes Sarah (2014) Perspectives and appropriateness of suicide prevention gatekeeper training for MSW students. Social Work in Mental Health 12(2), 117-131	Non-RCT study did not report suicide rate as study outcome
155.	Shim (2010) Pilot testing and preliminary evaluation of a suicide prevention education program for emergency department personnel. Community mental health journal 46(6), 585-90	Target population is staff in hospital settings
156.	Shtivelband (2015)Sustaining the effects of gatekeeper suicide prevention training: A qualitative study. Crisis: The Journal of Crisis Intervention and Suicide Prevention 36(2), 102-109	Qualitative study - quantitative analysis of an intervention we have not identified;
157.	Silverman (2013)Coming together in pain and joy: A multicultural and arts-based suicide awareness project. The Arts in Psychotherapy 40(2), 216-223	Qualitative study - quantitative analysis of an intervention we have not identified;
158.	Slade (2015)Shifting the paradigm of prison suicide prevention through enhanced multi-agency integration and cultural change. Journal of Forensic Psychiatry and Psychology 26(6), 737-758	Intervention is not training or education.
159.	Slaven Janine, and Kisely Stephen (2002) The Esperance primary prevention of suicide project. The Australian and New Zealand journal of psychiatry 36(5), 617-21	Non-RCT study did not report suicide rate as study outcome
160.	Smith (2014) An assessment of suicide-related knowledge and skills among health professionals Health Psychology 33(2): 110-119	Non-RCT study did not report suicide rate as study outcome
161.	Smith-Osborne Alexa, Maleku Arati, and Morgan Sarolyn (2017) Impact of applied suicide intervention skills training on resilience and suicide risk in army reserve units. Special Issue: Resilience and Trauma: Expanding Definitions, Uses, and and Contexts 23(1), 49-55	Non-RCT study did not report suicide rate as study outcome
162.	Stack (2015)Crisis phones-Suicide prevention versus suggestion/contagion effects: Skyway Bridge, 1954-2012. Crisis: The Journal of Crisis Intervention and Suicide Prevention 36(3), 220-224	Intervention is restriction on access to means
163.	Stanley (2010)Suicidal students' use of and attitudes to primary care support services. Primary Health Care Research and Development 11(4), 315-325	No intervention
164.	Stein (2010)School personnel perspectives on their school's implementation of a school-based suicide prevention program. The journal of behavioral health services & research 37(3), 338-49	Qualitative study - quantitative analysis of an intervention we have not identified;
165.	Stephen (2006)Evaluation of the first phase of Choose Life: the national strategy and action plan to prevent suicide in Scotland	Intervention is not education or training
166.	Strunk Catherine, M, King Keith, A , Vidourek Rebecca, A , Sorter Michael, and T (2014) Effectiveness of the surviving the teens suicide prevention and depression awareness program: An impact evaluation utilizing a comparison group. Health Education & Behaviour 41, 605-613	Non-RCT study did not report suicide rate as study outcome

	Study	Reason for exclusion
167.	Stuart Carol, Waalen Judith Kelly, and Haelstromm Echo (2003) Many helping hearts: an evaluation of peer gatekeeper training in suicide risk assessment. Death studies 27(4), 321-33	Non-RCT study did not report suicide rate as study outcome
168.	Sueki Hajime, and Ito Jiro (2015) Suicide prevention through online gatekeeping using search advertising techniques: a feasibility study. Crisis 36(4), 267-73	Non-RCT study did not report suicide rate as study outcome
169.	Sun F K, Chiang C Y, Yu P J, and Lin C H. 2013. "A suicide education programme for nurses to educate the family caregivers of suicidal individuals: a longitudinal study". Nurse education today 33(10):1192-200.	Intervention delivered by psychiatric nurses and outcomes were for caring ability of family caregivers of suicidal individuals.
170.	Swanke Jayme Rae (2010) Gatekeeper Training for Caregivers and Professionals: A Variation on Suicide Prevention. Advances in Mental Health 9(1), 98-104	Non-RCT study did not report suicide rate as study outcome
171.	Taub Deborah J, et al (2013) The impact of gatekeeper training for suicide prevention on university resident assistants. Journal of College Counseling 16(1), 64-78	Non-RCT study did not report suicide rate as study outcome
172.	Teo Alan R, et al (2016) Brief gatekeeper training for suicide prevention in an ethnic minority population: a controlled intervention. BMC psychiatry 16(1), 211	Non-RCT study did not report suicide rate as study outcome
173.	Till Benedikt, et al (2013) Reasons to love life. Effects of a suicide-awareness campaign on the utilization of a telephone emergency line in Austria. Crisis 34(6), 382-9	Non-RCT study did not report suicide rate as study outcome
174.	Tina (2015)Probation staff experiences of managing suicidal and self-harming service users. Probation Journal 62(2), 111-127	Qualitative study - quantitative analysis of an intervention we have not identified;
175.	Tompkins Tanya L, and Witt Jody (2009) The short-term effectiveness of a suicide prevention gatekeeper training program in a college setting with residence life advisers. The journal of primary prevention 30(2), 131-49	Non-RCT study did not report suicide rate as study outcome
176.	Tompkins Tanya L, et al (2009) Does a gatekeeper suicide prevention program work in a school setting? Evaluating training outcome and moderators of effectiveness. Suicide & life-threatening behaviour 39(6), 671-81	Non-RCT study did not report suicide rate as study outcome
177.	Toumbourou John W and Gregg M Elizabeth (2002) Impact of an empowerment-based parent education program on the reduction of youth suicide risk factors. The Journal of adolescent health : official publication of the Society for Adolescent Medicine 31(3), 277-85	Non-RCT study did not report suicide rate as study outcome
178.	Tsai Wen-Pei et al (2010) The effects of the suicide awareness program in enhancing community volunteers' awareness of suicide warning signs. Archives of psychiatric nursing 24(1), 63-8	Non-RCT study did not report suicide rate as study outcome
179.	Tyson Philip, et al (2016) Preventing Suicide and Self-Harm. Crisis , 1-8	Non-RCT study did not report suicide rate as study outcome
180.	van der Feltz-Cornelis (2011)Best practice elements of multilevel suicide prevention strategies: a review of systematic reviews. Crisis 32(6), 319-33	Systematic review, included studies checked against review protocol

	Study	Reason for exclusion
181.	Van-Orden (2006)A test of the effectiveness of a list of suicide warning signs for the public. Suicide and Life-Threatening Behavior 36(3), 272 - 287	No intervention
182.	VanSickle (2016)Perceived Barriers to Seeking Mental Health Care Among United States Marine Corps Noncommissioned Officers Serving as Gatekeepers for Suicide Prevention. Psychological assessment ,	Study outcome is not interest of the review
183.	Wachter Morris, et al (2015) Expanding capacity for suicide prevention: The ALIVE @ Purdue train-the-trainers program. Journal of College Student Development 56(8), 861-866	Non-RCT study did not report suicide rate as study outcome
184.	Walker Bonnie L, and Osgood Nancy J (2000) Preventing suicide and depression: A training program for long-term care staff. Special Issue: Elderly Suicide 42(1), 55-69	Non-RCT study did not report suicide rate as study outcome
185.	Walker Rheeda L, Ashby Judy, Hoskins Olivia D, and Greene Farrah N (2009) Peer-support suicide prevention in a non-metropolitan U.S. community. Adolescence 44(174), 335-46	Non-RCT study did not report suicide rate as study outcome
186.	Walsh Elaine, Hooven Carole, and Kronick Barbara (2013) School-wide staff and faculty training in suicide risk awareness: successes and challenges. Journal of child and adolescent psychiatric nursing : official publication of the Association of Child and Adolescent Psychiatric Nurses, and Inc 26(1), 53-61	Non-RCT study did not report suicide rate as study outcome
187.	Warner (2011)Suicide prevention in a deployed military unit. Psychiatry 74(2), 127-41	No baseline data
188.	Wasserman D, Carli V, Wasserman C, Apter A, Balazs J, Bobes J, Bracale R, Brunner R, Bursztein-Lipsicas C, Corcoran P, Cosman D, Durkee T, Feldman D, Gadoros J, Guillemin F, Haring C, Kahn J P, Kaess M, Keeley H, Marusic D, Nemes B, Postuvan V, Reiter-Theil S, Resch F, Sáiz P, Sarchiapone M, Sisask M, Varnik A, and Hoven C W. 2010. "Saving and empowering young lives in Europe (SEYLE): a randomized controlled trial". *BMC public health* 10:192.	It is a study protocol.
189.	Wasserman (2012)Suicide prevention for youth--a mental health awareness program: lessons learned from the Saving and Empowering Young Lives in Europe (SEYLE) intervention study. BMC public health 10, 192	Study outcome is not interest of the review
190.	Wei (2015)Hot idea or hot air: A systematic review of evidence for two widely marketed youth suicide prevention programs and recommendations for implementation. Journal of the Canadian Academy of Child and Adolescent Psychiatry 24(1)	Systematic review, included studies checked against review protocol
191.	White (2010)Precarious spaces: Risk, responsibility and uncertainty in school-based suicide prevention programs. Social Science & Medicine 71(12), 2187-2194	Qualitative study - quantitative analysis of an intervention we have not identified;

	Study	Reason for exclusion
192.	Wilcox et al 2008 The impact of two universal randomised first- and second-grade classroom intervention on young adult suicide ideation and attempt. Drug Alcohol Depressed 95 (Suppl 1): s60-73	Intervention is not suicide prevention.
193.	Wittouck Ciska, Van Autreve , Sara , Portzky Gwendolyn, van Heeringen , and Kees . 2014. "A CBT-based psychoeducational intervention for suicide survivors: a cluster randomized controlled study". *Crisis* 35(3):193-201.	Target population is suicide survivors
194.	Witt Katrina, Milner Allison, Allisey Amanda, Davenport Lauren, and LaMontagne Anthony D (2017) Effectiveness of suicide prevention programs for emergency and protective services employees: A systematic review and meta-analysis. American journal of industrial medicine 60(4), 394-407	Systematic review, included studies checked against review protocol
195.	York (2013)A systematic review process to evaluate suicide prevention programs: A sample case of community-based programs. Journal of Community Psychology 41(1), 35-51	Systematic review, included studies checked against review protocol
196.	Zalsman Gil, Hawton Keith, Wasserman Danuta, van Heeringen , Kees , Arensman Ella, Sarchiapone Marco, Carli Vladimir, Hoschl Cyril, Barzilay Ran, Balazs Judit, Purebl Gyorgy, Kahn Jean Pierre, Saiz Pilar Alejandra, Lipsicas Cendrine Bursztein, Bobes Julio, Cozman Doina, Hegerl Ulrich, and Zohar Joseph. 2016. "Suicide prevention strategies revisited: 10-year systematic review". The lancet. Psychiatry 3(7):646-59.	Systematic review, included studies checked against review protocol
197.	Zenere (2009)The sustained reduction of youth suicidal behaviour in a urban, multicultural school district. School Psychology Review 38(2), 189-199	No intervention

Appendix E: Evidence tables

E.1 Public health review

E.1.1 Quantative studies

E.1.1.1 Aseline et al 2007/2004

Aseltine Jr, RH, James A, Schilling EA, et al. 2007. "Evaluating the SOS suicide prevention program: A replication and extension". BMC Public Health 7.

Aseltine Jr RH and DeMartino R 2004 An outcome evaluation of the SOS Suicide Prevention Programme. American Journal of Public Health 94 (3): 446

Study details	Research Parameters	Population / Intervention	Results
Author/year Aseltine et al 2004 and 2007 **Quality score** **+** **Study type** RCT **Aim of the study** To examine the effectiveness of the Signs of Suicide (SOS) prevention program in reducing suicidal behaviour Primary goal: assess short-term impact of the program on suicidal behaviour, seeking help, and knowledge of and attitudes toward	**Data** **Number of participants** Study 1 N = 2100 Students in the 3 Hartford schools: N=1435 Students in the 2 Columbus schools: N=665 Study 2 N=4133 Students in the Hartford schools N=2707 Students in the Columbus Schools N=6655 Students in the Massachusetts schools N=761 **Participant characteristics** Students in the Hartford schools were primarily	**Intervention / Comparison** **Intervention:** Signs of Suicide (SOS), a school-based prevention program. Incorporates 2 prominent suicide prevention strategies into a single program: Teaching materials which consist of a video and discussion guide. Video features dramatizations that depict the signs of suicidality and depression and the recommended ways to react to someone who is depressed and suicidal. It also includes interviews with real people whose lives have been touched by suicide. Students also are asked to complete the Columbia Depression Scale (CDS), a brief screening instrument for depression. The screening form is scored by the students themselves; a	**Study 1:** *Descriptive characteristics of measures of suicidal behaviour, knowledge and attitudes:*

%	Control (n=1073)	Treatment (n=1027)	Total sample (N=2100)
Treated for depression/suicide ideation	9.9	8.5	9.2
Talked with adult about depression/suicide ideation	18.7	15.9	17.3
Talked with adult about friends problems	13.0	11.9	12.4
Suicide ideation in past 3 months	12.2	10.1	11.2
Suicide attempt in last 3 months	5.4	3.6	4.5
Knowledge of depression/suicide, mean (SD)	6.49 (1.68)	7.18 (1.68)	6.67 (1.97)

depression and suicide in a diverse student population

Location and setting

Study 1:Twenty-one hundred students in 5 high schools in Columbus, Ga, and Hartford, Conn, were randomly assigned to intervention and control groups

Study 2: 4133 students in 9 high schools in Columbus, Georgia, western Massachusetts, and

Hartford, Connecticut were randomly assigned to intervention and control groups

Length of study

Study 1: SOS program conducted during the 2001–2002 school year

Study 2: SOS program conducted during the 2001-2002 and 2002-03 school years

Source of funding

Support for this project was provided by the Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, and by a grant from the Robert Leet and Clara Guthrie Patterson Trust.

Economically disadvantaged youths from diverse racial and ethnic backgrounds

Students in the Columbus schools were predominately from working- or middle-class families

Study 1:

%	Hartford Schools	Columbus Schools
Male	47	52
Female	53	48
Grade 9	35	100
Grade 10	30	0
Grade 11	18	0
Grade 12	18	0

Study 2:

%	Hartford	Columbus	MS
Male	48.7	51.6	52.5
Female	51.3	48.4	57.5
Freshman	45.5	100	65.6
Sophomore	22.6	0	26.3
Junior	15.5	0	5.7
Senior	16.3	0	2.4

Inclusion criteria

score of 16 or higher on the CDS is considered a strong indicator of clinical depression, and the scoring and interpretation sheet that accompanies the screening form encourages students with such scores to seek help immediately

Comparison: Those who did not participate in the program

Attitudes towards depression/suicide, mean (SD)	3.80 (0.658)	4.05 (0.644)	3.93 (0.662)

Role of knowledge and attitudes in mediating the effects of the signs of suicide program on suicide attempts:

	Suicide Attempts	
	Model 1	Model 2
Intercept	-3.447 (.133)	-3.615 (.146)
SOS program	-.467* (.267)	-.264 (.207)
Knowledge		-.195* (.055)
Attitudes		-.605* (.165)

All models controlled for gender, race/ethnicity, grade, and English as a Second Language status.

*$P < .05$.

Study 2: Effects of SOS program

	Attempts	Ideation	Knowledge	Attitudes	Help seeking
Intercept	-3.17	-2.17	4.52	3.80	-2.29
SOS program	-0.47	-0.17	0.59	0.16	-0.01

Co-efficient for the effect of the SOS program on attempts is -.47, when converted to an OR this indicates that youths in the treatment group were 40% less likely to report a suicide attempt in the past 3 months compared with youths in the control group

Author Conclusions

Study 1:

It is clear from these data that the SOS suicide prevention program had a substantively important short-term impact on the attitudes and behaviours of high school–aged youths in high-risk settings. By significantly reducing

	Study included 2100 public school students in 3 high schools in Hartford and 2 high schools in Columbus. **Exclusion criteria** Only ninth-grade classes were eligible to participate in the Columbus sites, because all other grades had received the program during the previous year. **Data collection** Student were randomly assigned to intervention and control groups. Students were randomly assigned to health classes (Hartford and western Massachusetts) and social studies classes (Columbus) by a computerized scheduling program. Because the semester in which students were assigned to these half-year classes was determined randomly, all students who took these classes during the first half of the school year were assigned to the treatment group and participate in the program over a 2-day period from October through November. Students who took these classes during the second half of the school year were assigned to the control group and did not participate in the program until after the evaluation was completed by a computerized scheduling program. Students in both the treatment and the control groups were asked to complete a short questionnaire in a group setting during class time approximately 3 months after implementation of the program. Study 1- Overall response rate = 93%. Study 2 – Overall response rate = 92%		rates of self-reported suicide attempts in the 3 months following exposure to the program, SOS appears to have had a substantial impact on the ultimate target of suicide prevention Study 2: This replication and extension of our 2004 analysis provides confirmation that the *SOS* program is a potent tool for curtailing suicidal behaviour among diverse groups of high school-aged youth in the United States
Limitations identified by author Evaluation should be replicated in more socially and geographically diverse locations. Effects of the SOS program were observed over a very short post intervention period. A longer-term follow-up of youths exposed to the SOS program is necessary to determine whether the observed effects are enduring. Pre-test measures of the outcomes assessed in our study would add confidence that the assignment of classes to experimental conditions resulted in equivalent groups. Study has revealed some of the challenges facing school-based programs designed to foster help-seeking behaviours among students (confidentiality) **Limitations identified by review team** Blinding of study participants was not reported in the study.			

E.1.1.2 Bean and Baber 2011

Bean Gretchen ; Baber Kristine M; 2011 Connect: an effective community-based youth suicide prevention program. Suicide & life-threatening behavior41 (1): 87-97.

Study details	Research Parameters	Population / Intervention	Results
Author/year Bean and Baber 2011 **Quality score** **+** **Study type** Quasi-experimental before and after **Aim of the study** To evaluate a comprehensive, community-based youth suicide prevention on the reduction of stigma associated with youth suicide prevention and the use of mental health care. **Location and setting** Community, USA **Length of study** Not stated **Source of funding** Not reported	**Number of participants** 648 adults in 2 communities **Participants characteristics** Adults in two communities, included police officers, first responders, primary care providers, educators, guidance counsellors, social service workers and mental health providers. 38% reported that they had responded to a youth suicide or an attempt or threat prior to participating in the Connect trainings. **Inclusion criteria** Connect project targeted 2 rural communities in different parts of a state in Northeast. **Exclusion criteria** Not reported	**Intervention / Comparison** **Intervention:** Connect seeks to build community competence for identifying youth at risk for suicide by modifying the social environment and understanding amongst all constituencies in a community. Connect had 3 main components: common gatekeeper training for all participants; discipline-specific training for professionals; and evidence-supported protocol that provide an integrated approach to guide the response of individuals who recognise a youth as being at risk for suicide. The 3-hour gatekeeper training consists of Power-point presentation, role plays and a variety of interactive activities. **Comparison:** Before and after the intervention	**Primary outcomes** Evaluations were conducted using instruments designed specifically to measure the change in knowledge, attitudes, and beliefs that were expected to occur as the results of the Connect training sessions. Percentage of adults had correct responses.

	Before	After	RR/MD(95 %CI)
Knowledge			
adult	51.7%	84.0%	1.62 (1.50, 1.76)
Youth	72.7%	93.0%	1.28 (1.16, 1.40)
Preparedness to help			
adults	24.83 (11.69)	42.79 (6.62)	17.96 (16.93-18.99)
Youth	51.82 (31.51)	82.52 (25.92)	30.70 (25.10. 36.30)
% youth seeking adult assistance	40%	56%	1.39 (1.13, 1.71)

Author's conclusion

			The study evaluated Connect, a community-based youth suicide prevention programme. Analysis of pre and post training questionnaires from 648 adults and 204 high school students revealed significant changes in knowledge and attitudes about suicide, increased belief in the usefulness of mental health care and reduction of stigma associated with seeking help. Adults' preparedness to help also increased significantly as did the likelihood that youth participants would seek adults assistance.
Limitations identified by author Not reported **Limitations identified by review team** Instruments used for outcome measures were designed for the study, not being validated in other studies No follow-up data collected after the intervention.			

E.1.1.3 Bryan 2009

Bryan Craig J et al (2009) Exposure to a Mnemonic Interferes with Recall of Suicide Warning Signs in a Community-Based Suicide Prevention Program. Suicide and Life-Threatening Behaviour 39(2): 194.

Study details	Research Parameters	Population / Intervention	Results
Author/year Bryan C J et al 2009 **Quality score** + **Study type** RCT **Aim of the study** To examine the value of adding a list of warning signs to a pre-existing, empirically	**Number of participants** 265 **Participant characteristics** Active-duty enlisted Air Force airmen stationed at a large air force in the southern United States **Demographics for study sample (no. %)** **Gender**: M 103 (67.8) / 63 (56.3); F 49 (23.2) / 49 (43.8) (Intervention n=153; Control n=112)	**Intervention / Comparison** **Intervention group:** The experimental group received the exact same briefing for the control group with one additional slide inserted into it. The additional slide displayed the AAS mnemonic during which the briefer explained that an easy way to remember suicide warning signs was to use this mnemonic. The briefer then verbally stated each of the warning signs and repeated the mnemonic before continuing on with the reminder of the briefing, which was delivered in a standardised manner that was no different from the control group.	**Primary outcomes** Changes of participants' beliefs about suicide, and knowledge about suicide warning signs, measured by **suicide beliefs questionnaire** and warning signs response form before and after the experimental and control intervention. **12-items on a 7-point Likert scale**. **Changes in beliefs about suicide, mean score (SD)** Not be taken seriously: Mnemonic 1.62 (1.74); Control 1.76 (1.97); Mean difference (95%CI) -0.14 (-0.60, 0.32) Partly to blame: Mnemonic 2.92 (1.64); Control 2.70 (1.67); Mean difference (95%CI) 0.22 (-0.18, 0.62)

supported community prevention programme utilising video media as an educational tool for disseminating suicide warning signs.

Location and setting

A large air force base in the southern United States.

Length of study

Not reported

Source of funding

Not reported

Ethnicity	Caucasian	87 (57.2)	54 (48.6)
	African-American	25 (16.4)	25 (22.5)
	Hispanic/Latino	25(16.4)	16 (14.4)
	Asian	4 (2.6)	4(3.6)
Age group	18-24	142(93.4)	98 (88.3)
	25-34	9 (5.7)	13 (11.7)
No. of previous briefings	0	37 (24.5)	31 (27.9)
	1-3	101 (66.9)	81 (64.0)
	4-5	11 (7.3)	7 (6.3)
	5+	2(1.3)	2 (1.8)

Inclusion criteria

265 active-duty enlisted Air Force airmen stationed at a large air force in the southern United States.

Exclusion criteria

Not reported

Control group:

The control group received the standardised 2005 version of AFSPP community briefing, which is a 30-minute in-person briefing required by all Air Force personnel on a regular recurring basis. The briefing consists of 16 slides and 4 brief videos that highlight several core messages: identification of suicide warning signs, responding to those at risk, the impact of suicide on survivor, and barriers to help-seeking behaviours.

Analysis

Analysis of co-variance were conducted to examine post-briefing differences while controlling for pre-briefing levels.

Student's independent sample t-tests were to examine possible differences between groups.

Hopeless	1.36 (1.19)	1.50 (1.35)	-0.14 (-0.45, 0.17)
Preventable	6.63 (0.94)	6.60 (0.95)	0.03 (-0.20, 0.26)
Treatable	6.50 (1.01)	6.52 (1.01)	-0.02 (-0.27, 0.23)
Would not befriend	2.79 (2.39)	2.35(2.10)	0.44 (-0.10, 0.98)
Contact chain of command	6.28 (1.31)	6.34 (1.22)	-0.06 (-0.37, 0.25)
Contact 911 or mental health	6.20 (1.31)	6.33 (1.26)	-0.13 (-0.44, 0.18)
Able to recognise	5.07 (1.57)	5.15 (1.50)	-0.08 (-0.45, 0.29)
Happens without warning	2.77 (1.80)	2.69 (1.84)	0.08 (-0.36, 0.52)
Person will always be suicidal	2.17 (1.48)	1.92(1.25)	0.25 (-0.08, 0.58)
Not a big problem	1.45 (1.13)	1.30 (0.80)	0.15 (-0.08, 0.38)

Change in beliefs about suicide before and after briefing

	Post	Pre	Mean difference (95%CI)
Not be taken seriously	1.69 (1.86)	1.89 (2.04)	-0.20 (-0.53, 0.13)
Partly to blame	2.81 (1.66)	3.12 (1.58)	-0.31 (-0.59, -0.03)
Hopeless	1.43 (1.19)	1.27 (0.75)	0.16 (-0.01, 0.33)
Preventable	6.62 (1.01)	6.23 (1.21)	0.06 (-0.12, 0.24)
Treatable	6.51 (1.01)	6.23 (1.21)	0.28 (0.09, 0.47)
Would not befriend	2.56 (2.25)	2.74 (2.26)	-0.18 (-0.56, 0.20)
Contact chain of command	6.31 (1.26)	6.48 (1.06)	-0.17 (-0.37, 0.03)
Contact 911 or mental health	6.27 (1.29)	5.80 (1.65)	0.47 (0.22, 0.72)
Able to recognise	5.11 (1.53)	4.11(1.47)	1.00 (0.74, 1.26)
Happens without warning	2.73 (1.82)	3.36 (1.86)	-0.63 (-0.94, -0.32)

Person will always be suicidal	2.04 (1.37)	2.12 (1.30)	-0.08 (-0.31, 0.15)
Not a big problem	1.38 (0.98)	1.44 (0.88)	-0.06 (-0.22, 0.10)

Warning signs response form. This form consists of an open-ended request to list warning signs for suicide.

Change in number of warning signs listed

	Mnemonic (n=153)	**Control (n=112)**	**Mean difference (95%CI)**
Pre-briefing	2.07 (1.32)	2.54 (1.52)	-0.47 (-0.86, -0.08)
Post-briefing	2.26 (1.65)	3.70 (1.79)	-1.44 (-1.86, -1.02)
Mean differences (before-after)	**0.19 (-0.14, 0.52)**	**1.16 (0.73, 1.59)**	

Author's conclusion

The study indicated that participants exposed to the mnemonic did not show any change in recall warning signs post-briefing, whereas participants in the control condition significantly increased recall warning signs.

The study reported small reductions in stigmatising beliefs were noted in both groups, though no differences were found between two groups.

Limitations identified by author
Comparison recall of warning signs, and recall requires the individual to first generate multiple possible warning signs, then correctly recognise which ones are correct. While the aim of most awareness programme is to enhance recognition of risk indicators.
The absence of measures of actual help-seeking behaviours.
The restricted study sample, had limited generalizability to the wider Air Force population.
Limitations identified by review team
Study participants exposed to other suicide preventions prior to their participation.

There was no true control group in the study, both groups were exposed to the intervention.

E.1.1.4 Chagnon 2007

Chagnon Francois et al (2007) Control-group study of an intervention training program for youth suicide prevention. Suicide & life-threatening behaviour 37 (2): 135.

Study details

Author/year

Chagnon Francois et al , 2007

Quality score

+

Study type

RCT

Aim of the study

1. To verify the effects of a specialised youth suicide intervention, training programme on helper knowledge attitudes and intervention skills;
2. To verify whether the effects were maintained 6 months after the training

Location and setting

Educational establishment and community or institutional organisations serving the youth clientele in the metropolitan area, Canada

Research Parameters

Number of participants

71, 43 in intervention group; 28 in control group

Participant characteristics

	Intervention (n=43)	**Control (n=28)**
% of university educated	76.7	71.4
% had an undergraduate degree	87.7	80.6
% having intervened at least once in the past 6 months in a situation involving a suicidal youth	58.1	42.8
% had opportunity for team discussion in the workplace regarding case situations	72.1	88.9

Population / Intervention

Intervention / Comparison

Intervention

The training evaluated in the study has been used for over 10 years and was specifically developed by the Montreal suicide prevention centre for helpers involved with youths.

The training programme is conducted over 3 days(1 day a week for 3 consecutive weeks) by senior staff from the suicide prevention centre and uses a directive, problem-solving approach and commonly used counselling method.

The goal of the training is for helpers to learn to recognise warning signs so that they will be able to intervene rapidly with youths by helping them identify alternative means of solving their problems without recourse to suicide and referring them to appropriate resources.

Control group:

Helpers did not receive training programme.

Analysis

The analysis of covariance (no detailed analysis reported in the study)

Results

Primary outcomes

The effect of the training programme on helper's knowledge, attitudes, and intervention skills.

Attitudes was measured by the Suicide Invention Questionnaire (SIQ). It has 20-items on which the participants rate his level of agreement on a 5-point Likert type scale.

Measures of knowledge was developed by study team, comprised 12 open-ended questions covering 6 areas of knowledge. Participants could obtain a maximum score of 12 point for their knowledge.

Measures of intervention skills comprised of 5 written case descriptions, 2 video case description and 2 multiple choice questions. Participants could obtain a maximum score of 28 point for their skills.

Participants in intervention groups were assessed 3 times:

T1: prior to the training

T2: immediately after training

T3: 6 months after training

Participants in control groups were assessed at their workplace on 2 occasions, 3 weeks apart.

All the participants were evaluated at T1 and T2, and 33 out of 43 participants in intervention group were assessed at T3.

Length of study

19 months from Feb 2002 to September 2003.

Source of funding

The study was funded by the Canadian Institutes of Health Research under the Community Alliances for Health Research Programme.

% had access to clinical supervision	37.2	70.4
% had previous awareness training	41.5	21.4

Inclusion criteria

Helper from educational establishment and community or institutional organisations serving the youth.

Managers at these organisations were invited to register member of their personnel for one of eight training dates proposed by the suicide prevention centre.

Exclusion criteria

Not reported

	Intervention (n=43)	**Control (n=28)**	**Mean difference (95%CI)**
Pre-training (T1)			
Knowledge (scale 0-12)	6.47 (1.38)	5.38 (1.55)	1.09 (0.38, 1.80)
Attitudes (scale 0-20)	15.30 (1.57)	15.68 (1.26)	-0.28 (-0.94, 0.38)
Skills (scale 0-28)	14.64 (2.94)	13.47 (2.64)	1.17 (-0.14, 2.48)
Post training (T2)			
Knowledge (scale 0-12)	8.25 (1.17)	5.57 (1.58)	2.68 (2.00, 3.36)
Attitudes (scale 0-20)	16.41 (1.24)	15.55 (1.09)	0.86 (0.31, 1.41)
Skills (scale 0-28)	18.75 (2.77)	14.07 (2.10)	4.68 (3.54, 5.82)

Measure of knowledge, attitudes and skills at 6th month after the training (participants in training programme)

	Post training (T3) (n=33)	**Pre-training (T1) (n=43)**	
Knowledge (scale 0-12)	7.73 (1.54)	6.47 (1..38)	1.26

			(0.59, 1.93)
Attitudes (scale 0-20)	16.69 (1.18)	15.30 (1.57)	1.39 (0.77, 2.01)
Skills (scale 0-28)	17.36 (2.52)	14.64 (2.94)	2.72 (1.49, 3.95)

Author's conclusion

The results of the study support training gatekeepers can improve competencies for intervening with youth at risk of suicide and that the effects of training may by maintained at least 6 months after the training.

Limitations identified by author
The small number of participants need to take into account when generalising the results.
The high baseline on attitudes, and it is possible that a ceiling effect limited the extent to which participants' attitudes could improve after the intervention.
Validity of instrument used in the study.
Limitations identified by review team
Randomisation and blinding of study participants were not reported in the study.
All participants had previous training.
Short study follow-up time (6 months after the training).

E.1.1.5 Clark et al 2010

Clark Tanisha R; et al 2010 Training outcomes from Samaritans of New York Suicide Awareness and Prevention Programme among community- and school-based staff. British Journal of Social Work 40(7): 2223-2238.

Study details	Research Parameters	Population / Intervention	Results
Author/year Clark Tanisha R; et al 2010 **Quality score** - **Study type** Quasi-experimental before and after **Aim of the study**	**Number of participants** 558 individuals; 365 individuals completed the pre- and post-training surveys **Participants characteristics** The sample was predominately middle-aged females, with over 70 per cent of the sample coming from diverse racial and ethnic backgrounds. In addition, the sample was highly educated and experienced; over half of the sample reported their highest education level was graduate school and nearly half of	**Intervention / Comparison** **Intervention:** the Samaritans of New York developed a three-hour public education suicide awareness and prevention programme to train lay and professional staff on effective suicide prevention practices and how to 'befriend' a person in crisis. This training programme is based on teaching the skills, tools and techniques associated with active listening, an approach to	**Primary outcomes** Participants were asked to respond to their perceived knowledge of suicide and suicide prevention and their ability to intervene with someone at risk for suicide. This measure pf self-efficacy was slightly modified from a measure previously used and tested in a number of suicide prevention training studies. Percentage of adults had correct responses. Pre | Post | Mean difference (95%CI)

The present study aims to examine baseline and post- training differences among participants who attended this training programme regarding their knowledge about suicide and suicide prevention and their ability to intervene with individuals at risk for suicide. In addition, this study will also explore the influence of previous exposure to suicidal individuals as well as other predictors on gains subsequent to training.

Location and setting
Agencies contract directly with the Samaritans of New York, USA

Length of study
Two training sessions were conducted in 2005 for 558 individuals; 365 individuals completed the pre- and post-training surveys for this study

Source of funding
This research was supported by funds from a NIMH COR training grant to Atlanta University Centre, a NIMH-funded P30 to Washington University in St Louis, a NIMH-funded P20 to the University of Rochester and with resources and the use of facilities at the St Louis VA Medical Centre.

the sample had over eleven years of experience in education, mental or public health, or a social service field. Finally, participants were asked about the quality of previous suicide prevention training, with less than a quarter of participants reported having received training that was rated at high or very high quality

	Total (n=365)
Age, mean (SD)	41.5 (11.0)
Males, n (%)	94 (26.5%)
Education	
High school	18 (5.1%)
Trade,/vocational school	1 (0.3%)
1-2 years of college	50 (14.1%)
3-4 years of college	51 (14.4%)
5+ years of college	39 (11.0%)
Graduate school	196 (55.2%)
Years of experience	
0	6 (1.6%)
1-5	77 (21.1%)
6-10	88 (24.1%)
11-15	59 (16.2%)
16-20	52 (14.2%)
21-25	32 (8.8%)
More than 25	39 (10.7%)
Clinical interviewing	128 (38.4%)

Inclusion criteria
Community- and school-based staff

communication that puts the focus on the person being 'helped', what he/she thinks ,feels and is going through. A second component of the training curricular is sensitivity training, which address the fears, beliefs, assumptions, presumptions, biases, judgement and personal values that impact and often impede how lay and professional care-givers approach and respond to those at risk.
The 3-hour training included an overview of the Samaritans befriending model, current research knowledge and statistics about suicide, myths and stigma surrounding suicide, warning signs, intervention and risk assessment techniques as well as the keys to effective active listening, the sensitivity components and developing a site-specific suicide prevention plan.

Comparison:
Before and after the intervention

Knowledge	3.0 (0.9)	3.7 (0.7)	0.70 (0.58, 0.82)
Ability to ask someone about suicide	3.3 (1.0)	3.7 (0.8)	0.40 (0.27, 0.53)
Ability to persuade someone to get help	3.3 (0.8)	3.7 (0.8)	0.40 (0.28, 0.52)
Appropriateness of asking someone who may be at risk about suicide	3.6 (1.1)	3.9 (0.8)	0.30 (0.16, 0.44)
Likelihood you will ask someone who appears to be at risk if they are thinking about suicide	3.7 (1.0)	4.0 (0.9)	0.30 (0.16, 0.44)

Author's conclusion
Findings reveal that the Samaritans of New York's programme had a significant impact on increasing participants' self-efficacy specifically regarding their knowledge about suicide and suicide prevention and their ability to intervene with individuals at risk for suicide.

	In the study, the contracting agencies consisted of a large metropolitan public school systems' division of student support personnel and a cross-section of health and human service community-based organisations serving at-risk populations of every age, background and culture who believed their front line staff could benefit from training. **Exclusion criteria** Not reported		

Limitations identified by author
This sample comprises trainees in New York, with data only obtained from those who self- selected to participate.
Another limitation is that due to the lack of a control group, results cannot be definitively attributed to the training programme.
These data are based on a three-hour education training delivered with a live trainer to employees from diverse community and school-based settings. The generalisability of these findings to other populations, service settings and to other training methods is limited.

Limitations identified by review team
Survey was completed before and after the training, and there is further follow-up data
All information collected for this study was secondary data having been collected by the Samaritans staff as a part of their routine practice

E.1.1.6 Cross et al 2011

Cross Wendi F; et al (2011) Does practice make perfect? A randomized control trial of behavioural rehearsal on suicide prevention gatekeeper skills. The journal of primary prevention 32 (3-4): 195-211.

<table>
<tr><th>Study details</th><th>Research Parameters</th><th>Population / Intervention</th><th>Results</th></tr>
<tr>
<td>Author/year

Cross Wendi F; et al (2011)

Quality score

+

Study type

RCT</td>
<td>Number of participants

170

Participant characteristics
<table>
<tr><th></th><th>School staff (n=91)</th><th>Mental health professionals (n=22)</th><th>Parents (n=56)</th></tr>
<tr><td>Age, mean (SD)</td><td>42.07 (10.4)</td><td>40.64

(11.00)</td><td>43.49 (4.65)</td></tr>
</table>
</td>
<td>Intervention / Comparison

Intervention group: standardised community gatekeeper suicide prevention training for youth (Question, Persuade, Refer) + behavioural rehearsal. After large group training, an additional small group practice was provided to participants.

These participants first observed a brief role play by the trainers who discussed and demonstrated "wrong</td>
<td>Primary outcomes

Declarative Knowledge—Participants completed a 14-item assessment of declarative knowledge about suicide-related facts (Cross et al. 2007; Wyman et al. 2008) provided in the training at pre- and post-assessment as well as at 3-month follow-up. Items include multiple choice and true/false questions. The knowledge score is the percentage of correct responses.

Attitude Measures

Self-perceived knowledge about suicide: Participants were asked to respond to 5 items about their perceived knowledge about suicide (e.g., "Please rate your knowledge of warning signs of suicide") using a 5-point Likert scale, 0 (poor) to 4 (excellent), at all</td>
</tr>
</table>

Aim of the study

To compare two training conditions by testing the impact of adding an active learning strategy (behavioural rehearsal) to standard gatekeeper training on knowledge, attitudes, and skills in a randomized controlled trial To examine participant group differences in training outcomes in a broadly defined school community that includes school personnel and parents.

Location and setting

Community, USA

Length of study

3-month follow-up

Source of funding

This project was supported by an NIMH K23 grant and ARRA supplemental funding as well as P20 Developing Centre for Public Health and Population-based approaches to suicide prevention.

Male, no. (%)	21 (23.1)	2 (9.1)	3 (5.4)
Caucasian, no. (%)	89 (97.8)	19 (86.4)	50 (89.3)
High school or GED	9 (9.9)	0	6 (10.7)
Bachelor degree	8 (8.8)	1 (4.5)	12 (21.4)
Mater degree	69 (75.8)	20 (90.9)	18 (32.1)
Had prior contact with suicidal person	62 (68.1)	22 (100)	31 (55.4)
Had prior suicide training	18 (19.8)	19 (86.4)	11 (19.6)

Inclusion criteria

School personnel (including mental health professionals, teachers, and bus drivers) were offered gatekeeper training for youth as part of professional development in-service and were subsequently invited to participate in the study.

All participants were compensated with a gift card ranging in value from $10 to $50 depending on their level of participations.

Exclusion criteria

way/right way" interactions between a caring adult and suicidal student.

Control group: Consistent with QPR standardized trainings, the 1-h program

consisted of a lecture, a 10-minute introductory video, distribution of booklets and referral cards, and a question-and-answer discussion period.

There were no significant differences between the two training conditions for participant demographic or descriptive variables such as gender, age, education, prior training experience, or contact with a suicidal person.

Analysis

Repeated measures ANOVA were conducted to examine changes in variables over time and by both training condition and participant group.

We used t-tests to examine group differences, impact of previous exposure to suicidal person or training, and differences in natural gatekeeper relationship on referrals at 3-month follow-up. Chi-square analyses were conducted to examine group difference in gatekeeper behaviours and diffusion of gatekeeper training information. We also used t-tests to compare total groups reached in diffusion by training condition and participant group.

three assessment points. In the current study, Cronbach's alpha was .94. Results are presented as an average score.

Self-efficacy for intervening: A 5-item measure of efficacy for intervening with a suicidal individual (e.g., "I feel confident that I can identify signs of emotional distress in students") used previously (Cross et al. 2010; Matthieu et al. 2008) was slightly modified for the current study. Due to an error in administration, this measure was administered to participants recruited in the second year of the study only (N = 67). Baseline demographics and other baseline variables were similar across those who were missing values versus those who completed these items. Cronbach's alpha was .81 for the current sample. Results are presented as an average score.

Observational Rating Scale of Gatekeeper Skills (ORS-GS): Minor contextual revisions were made to the ORS-GS scoring system (Cross et al. 2010) based on the youth and school based scenarios used in the present study. The scale has five items resulting in four domains:

General Communication (two items: active listening, clarifying questions) and three suicide specific skills (asking a direct Question about suicide, Persuasiveness, Referral). Each item is rated on a 4-point scale with specific behavioural descriptions for each item and rating. The lowest rating (0) indicates an absence of skill and the highest rating (3) indicates competent demonstration of the skill. The ORS-GS scores are combined for a Total Gatekeeper Skills score.

Actor Adherence: To examine if participants received equivalent stimuli during the observed skills assessment, actor adherence to the prompts and scripted lines in scenarios was scored dichotomously (yes/no) and rated independently for each observation. Adherence ratings were conducted separately from ORS-GS coding.

Gatekeeper Behaviour and Diffusion: At 3-month follow-up, participants self-reported use of gatekeeper skills since training (i.e., referrals), their experience of being a gatekeeper at work and in the community, and diffusion of the training content and materials to others.

	Standard QPR + behavioural rehearsal (n=72)	**Standard QPR (n=75)**	**Mean difference**

	Not reported		**Pre**				
			Knowledge	70.69 (12.07)	70.44 (12.07)	0.25 (-3.65, 4.15)	
			Attitudes				
			Perceived knowledge	1.22 (1.00)	1.42 (0.99)	-0.20 (-0.52, 0.12)	
			Self-efficacy	3.36 (0.63)	3.32 (0.61)	0.04 (-0.16, 0.24)	
			Post				
			Knowledge	77.94 (11.76)	78.97 (10.78)	-1.03 (-4.68, 2.62)	
			Attitudes				
			Perceived knowledge	2.92 (0.58)	2.94 (0.59)	-0.02 (-0.21, 0.17)	
			Self-efficacy	4.08 (0.50)	3.95 (0.40)	0.13 (-0.02, 0.28)	
			General communication	4.58 (1.01)	3.83 (1.20)	0.75 (0.39, 1.11)	
			Question	2.71	2.43 (0.95)	0.28	

				(0.72)		(-0.17, 0.73)	
			Persuade	2.02 (0.69)	2.14 (0.62)	-0.12 (-0.33, 0.09)	
			Referral	2.61 (1.68)	2.68 (0.56)	-0.07 (-0.28, 0.14)	
			Total skill score	11.91 (1.68)	11.08 (1.95)	0.83 (0.24, 1.42)	
			Follow-up (3-month)				
			Knowledge (% of correct responses)	77.52 (11.85)	75.79 (12.26)	1.73 (-2.17, 5.63)	
			Attitudes				
			Perceived knowledge (1-5 scale)	2.85 (0.56)	2.78 (0.64)	0.07 (-0.12, 0.26)	
			Self-efficacy	4.15 (0.55)	4.07 (0.38)	0.08 (-0.07, 0.23)	
			General communication	4.31 (1.07)	3.81 (1.18)	0.49 (0.13, 0.85)	
			Question	2.21	2.06 (1.08)	0.15	

	(0.95)		(-0.18, 0.48)
Persuade	2.05 (0.59)	2.10 (0.62)	-0.05 (-0.25, 0.15)
Referral	2.42 (0.84)	2.52 (0.72)	-0.10 (-0.35, 0.15)
Total skill score	11.02 (2.02)	10.49 (2.26)	0.53 (-0.16, 1.22)
Referrals	0.76 (1.11)	0.74 (1.77)	0.02 (-0.46, 0.50)

Author's conclusion

Both training groups resulted in enhanced knowledge and attitudes, and almost all participants spread gatekeeper training information to others in their network. Rigorous standardised training and observational methods showed behavioural rehearsal with role play practice resulted in higher total gatekeeper skills scores immediately after training and at follow-up.

Limitations identified by author
The sample size is relative small with limited diversity and may not be generalizable.
The Persuade measure of gatekeeper skills had inadequate inter-rater reliability
The follow-up period was fairly short and not likely to capture use of training.
Limitations identified by review team
Participants in both groups received training, so there was no true "control" in the study.
Financial incentive was given for participants.

E.1.1.7 Eynan 2011

Eynan Rahel 2011 Preventing suicides in the Toronto Subway system: a programme evaluation. A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy. Institute of Medical Science, University of Toronto			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Eynan Rahel 2011

Quality score

+

Study type

a two-phase sequential mixed-method design

Aim of the study

The objective of the quantitative evaluation was to measure the impact the workshops had on participants' factual knowledge about suicide and suicide risk factors, their attitudes toward suicide prevention, risk assessment and intervention skills.

The qualitative evaluation sought to elicit participants' reactions and perspectives on the suicide prevention program and the impact it had on their attitudes towards suicide, and competencies to intervene with distressed suicidal patrons.

Location and setting

Toronto subway, Canada

Length of study

The *safeTALK* and *suicideAWARE* workshops evaluated in this program evaluation were delivered to

Number of participants

307 participants

Participants characteristics

The number of participants completed the questionnaire

	SafeTALK	SafeAWARE	Total
No. of participants	176	184	370
Completed pre-training questionnaire	136/176 (77.3%)	171/184 (92.3%)	307/370 (82.3%)
Completed post-training questionnaire	137/176 (77.8%)	172/184 (93.5%)	309/370 (83.5%)
Completed follow-up questionnaire	107	67	174/307 (56.7%)

The majority of the workshops participants were male (85.6%), over the age of 35 (84.3%), and over half of the sample participants (68.2%) were employed by the TTC for over 10 years, with the majority of the study participants (55.4%) employed as Train Operators. The study sample is representative of the overall TTC employees' demographics in term of gender distribution, age, and years of employment

Characteristics of 305 workshop participants

age	Number (%)
25-34	48 (15.3%)
35-49	161 (52.8%)
50-65	96 (31.5%)

Intervention / Comparison

Intervention:

***safeTALK* Gatekeeper Program**

safeTALK is a general community-oriented program modified to the needs of the TTC's Special Constables and Mobile, Surface and Subway Supervisors. *safeTALK* has been standardized and presented as a full-day program that contains learning modules concerning attitudes, knowledge, intervention skills, and community resources material. The workshop utilizes a mixture of large and small group interactive formats. Safe is an acronym for Suicide Alertness For Everyone while TALK refers to Tell Ask Listen Keep safe.

Each phase of the intervention involves specific tasks: 1) the exploration phase involves identification (invitation and Tell) and engagement (Ask), followed by 2) the understanding phase (Listen) which involves inquiry and assessment tasks, and lastly, 3) the action phase (Keep safe) which includes implementation tasks and referral to appropriate community resources. The full-day interactive workshop includes discussions, didactic teaching, video presentations, and role-playing.

***suicideAWARE* Gatekeeper Program**

suicideAWARE is a general, ommunity-oriented program designed to create a context for exploring issues in suicide prevention.

The standardized program adopts an exploration format and is delivered as a half-day interactive workshop. It invites

Primary outcomes

Quantitative outcomes

The knowledge was assessed using the Suicide-risk Procedures Questionnaire (SPQ). The Suicide-risk Procedures Questionnaire consisted of four multiple-choice questions describing behaviours that may signal distress and alert the observer to potential suicide risk. A participant total score consisted of the number of correct responses. The maximum possible score for the SPQ was four.

Intervention Knowledge Test -R (IKT-R)

The IKT-R questionnaire was only applicable to those participants who attended the *safeTALK* workshop; thus, the questionnaire was not included in the study packets distributed to *suicideAWARE* attendees. The IKT-R measured salient aspects of three of the major modules of the *SafeTALK* training: attitudes, knowledge, and intervention skills. The modified IKT version used in the study consisted of 17 multiple choice questions. Scores on the Intervention Knowledge Test Questionnaire-Revised (IKT-R) were computed by combining the correct responses with a maximum possible total score of 17.

Attitudes

Attitudes were assessed using a modified version of the Suicide Opinion Questionnaire (SOQ). For this study several revisions were made to the original SOQ in order to streamline the measure and to make it relevant for use with TTC employees. 20 items were included. Each item on the SOQ-R was rated on a five-point Likert scale from "Strongly agree" to "Strongly disagree."

Suicide assessment and intervention skills

Participants' suicide assessment and intervention skills were measured by the modified Suicide Intervention Response Inventory (SIRI-R). The SIRI-R measured whether safeTALK participants' ability to recognize facilitative and deleterious intervention responses in suicide intervention situations changed as a result of workshop attendance. Participants were asked to identify which of the helpers' statements were facilitative intervention

TTC employees from September 28th, 2005 to September, 30th, 2006

3-months follow-up

Source of funding

Not reported

Male	261 (85.6%)
Position	
Special constables	22 (7.2%)
Transportation supervisors	58 (19.0%)
Train operators	169 (55.4%)
Other	56 (18.4%)

Characteristics of participants in qualitative study

	TTC special constables	Transportation supervisors	all
No.	17	13	30
Mean age, SD	43.6 (9.5)	48.6 (7.2)	45.8(8.8)
Male, number (%)	16 (94.1%)	12 (92.3%)	28 (93.3%)
Years of employment at TTC	13.2 (8.2)	18.3 (8.0)	15.4(8.4)
Years at the current job	10.8 (6.5)	8 (7)	9.6 (6.7)

Inclusion criteria

Employee of Toronto Transit Commission

Exclusion criteria

Not reported

participants to consider and discuss attitudes, aided by customized video presentations that stimulate interactive involvement appropriate in small groups. The AWARE element in the workshop's name is an acronym for Always Watch And Report Effectively.

suicideAWARE has the following learning modules:

1. Magnitude of the problem
2. Attitudes and knowledge
3. Warning signs
4. Reporting
5. Self care

Comparison:

Before and after interventions

responses and which statements 8.were deleterious intervention responses. Facilitative responses were to be assigned a positive value (+1 to +3) whereas deleterious responses were to be assigned a negative value (-1 to -3). The scoring of the participants' responses was based on the replies identified by the clinicians as facilitative or deleterious. The total score on the SIRI-R represents the number of correct responses the participant identified.

	Pre	Follow-up	Mean differences
Knowledge (SPQ)			
Number	293	177	
Mean (SD)	3.61 (0.66)	3.87 (0.37)	0.26 (0.16, 0.36)
Attitudes (SOQ)			
Number	305	178	
Mean (SD)	10.93 (2.9)	12.01 (2.7)	1.08 (0.57, 1.59)
Intervention Knowledge, (IKT) safeTALK			
Number	125	106	
Mean (SD)	6.9 (2.3)	8.6 (2.0)	1.70 (1.15,2.25)
Intervention skills (SIRI), safeTALK			
Number	115	105	

Mean (SD)	6.4 (2.5)	8.6 (2.2)	2.20 (1.58, 2.82)

Qualitative outcome

The qualitative component was to identify a number of key themes that were likely to have affected participants' who took part in the safeTALK training. The following themes identified:

1.Reaction, participants' overall reactions to the safeTALK training, including *relevance and usefulness aspect of the safeTALK training*; *workshop format, workshop content; experiential learning; video presentation, group discussion, and Trainer's mastery knowledge*.

2.Learning, whether and how safeTALK enhanced study participants' knowledge and skills, and whether the training changed their attitudes toward suicide and suicide prevention., including *warning signs, skill acquisition, engaging in a direct and open communication about suicide; attitude.*

3. Behaviour, whether and how participants' knowledge, attitudes and skills acquired in training to behaviour into the work setting, including *alertness, ability to identify distressed patrons at risk for suicide, competencies; perceived competence to intervene, ability to engage in direct communication, perceived comfort level when intervening with a suicide patron; applying skills to workplace.*

All of the study participants indicated they were competent to intervene and were confident and comfortable interacting with distressed patrons. The training dispelled some of the myths about suicide and assuaged their fears of communicating directly and openly about suicide intent. Subsequently, they were more willing and keen to intervene with patrons in situations of suicide risk. While participants felt the training did not influence their attitudes toward suicide, they vehemently stated the training raised their suicide awareness and increased their vigilance when patrolling the subway. The comments and observations made by several of the Special Constables need consideration when planning future suicide prevention training for Special Constables

			Author's conclusion The findings of this study demonstrated the safeTALK and suicideAWARE programs had positive immediate and long-term effects on participants' knowledge of suicide and suicide prevention, attitudes, and intervention skills; hence, the study hypotheses were confirmed. While gains in knowledge, enhancement of positive attitudes and intervention skills were demonstrated, it is unknown whether the changes are sustainable for the individual participants beyond the three-month follow-up period, or if there will be any long-term impacts of the training on workplace interactions with TTC patrons.

Limitations identified by author
The participant sample was comprised of trainees from the TTC, with data obtained only from those who self-selected to participate.
The lack of a control group in this study is another limitation, suggesting that the results cannot be definitively attributed to the training program.
The further gains observed on the SPQ and SIRI at the 3 months follow-up period could be attributed to sample attrition due to the low response rate of mailed self-administered questionnaires.
Measurements validity is also lacking in this study.
These data are based on a training program designed specifically adapted for the TTC and delivered to a diverse group of TTC employees. The characteristics of the sample limit the generalizability of these findings to other workplace populations, service settings and to other training methods.
Limitations identified by review team
3-month follow-up.
The evaluation was not specific for one safeTALK, and true effect of safeTALK on participants' knowledge, attitude, and skills may be contaminated by the effect of suicideAWARE.

E.1.1.8 Garraza et al 2015

Garraza L G; Walrath C ; Goldston D B; Reid H ; McKeon R 2015. Effect of the garrett lee smith memorial suicide prevention program on suicide attempts among youths. JAMA Psychiatry 72 (11): 1143-9.

Study details	Research Parameters	Population / Intervention	Results
Author/year Garraza Lucas Godoy; et al 2015 **Quality score** - **Study type**	**Number of participants** 320,500 **Characteristics of population** Intervention (n=64,000) Control (n=109, 000)	**Intervention / Comparison** **Intervention:** Garrett Lee Smith Youth Suicide Prevention. The GLS state and tribal grants stipulated that grantees promote or develop early intervention and prevention services	**Primary outcomes** The main outcome was the suicide attempt rate for each country following the implementation of GLS training sessions amongst the population aged 16-23 years between 2007 and 2010. Average effect of GLS training

Quasi-experimental study

Aim of the study

To determine whether a reduction in suicide attempts among youths occurs following the implementation of the Garrett Lee Smith Memorial Suicide Prevention Program (hereafter referred to as the GLS program)

Location and setting

Counties across the USA

Length of study

2006-2009

]

Source of funding

The study was supported through a Substance Abuse and Mental Health Service (SAMHSA) contract to ICF Macro.

Female	51.5%	52.3%
Age group, y		
12-17	11.4%	12.8%
18-25	15.6%	14.5%
≥16	73.0	72.8
Education		
School	18.7	18.8
High school graduate	36.3	38.3
Some college	24.1	24.3
College graduate	21.0	18.7
Has lifetime major depressive episode	15.7%	14.8%
Has major depressive episode in past year	8.6%	8.4%

Inclusion criteria

466 counties exposed to the suicide prevention of the GLS programme at some point between 2006 and 2009.

Exclusion criteria

Not reported

aimed at reducing risk for suicidal behaviours. GLS grantees also have been encouraged to use funds for facilitating timely referrals of youth at risk for suicidal behaviours, and for improving access to services for youth from varied backgrounds.

Comparison

Counties with no Garrett Lee Smith Youth Suicide Prevention programme implemented.

	Estimate (SE)	P values
Youth 16-23y, no. of suicide attempts per 1000 youth		
GLS training session last year	-4.91(1.57)	0.03
GLAS training session ≥2y ago	-1.19 (1.87)	0.53
Adults≥24y, no of attempts per 1000 adults		
GLS training session last year	1.96 (2.66)	0.46
GLAS training session ≥2y ago	-1.96 (2.61)	0.46

Author's conclusion

The study indicated a reduction in the rate of suicide attempts amongst youths aged 16-23 years in counties implementing GLS suicide prevention programmer compared with counties that were not targeted by GLS programmes. These results suggest the existence of an important reduction in youth suicide attempt resulting from the implementation of GLS suicide prevention programme.

Limitations identified by author
The study is non-randomised study, and there could be unaccounted differences between intervention and control counties that are influencing the results.

Information on attempts was only available for a segment of the target population, and therefore, the study did not examine the effect on the younger age group The data on lifetime history and number of suicide attempts were not available, and as such it as not possible to determine whether the GLS programme differentially affected youths with different histories of suicidal behaviours. The findings from current analysis did not shed light on which aspects of the GLS programme may be the most effective. **Limitations identified by review team** None

E.1.1.9 Gask L, Lever-Green and Hays 2008

Gask Linda; Lever-Green Gillian ; Hays Rebecca 2008. Dissemination and implementation of suicide prevention training in one Scottish region. BMC health services research : 246.

Study details	Research Parameters	Population / Intervention	Results
Author/year Gask L et al 2008 **Quality score** **+** **Study type** Mixed method **Aim of the study** To explore not only the outcomes of training, but key factors involved in the processes of diffusion, dissemination and implementation of the educational intervention. **Location and setting** Highland Region, Scotland **Length of study** Training during March 2004 and Feb 2005, 6 month follow-up	**Number of participants** 203 individuals completed a series of questionnaires; 12 participants were interviewed. **Participant characteristics**. Of the total sample, the mean age was 43, 73% were female, 60% were born in Scotland (27% in England) and 98% specified 'White' as their ethnic group. 64% had received no previous training on suicide risk assessment or prevention and for the majority of those who had received previous training (68%) the duration had been of eight hours or less. Nurse (38%) and social worker (20%) were the most common professional groups to receive/take part in training with 50% of those trained working in adult mental health services. However, a wide range of health and social care professionals participated including support workers (19), doctors (16 including 3 psychiatrists), health visitors (5), occupational therapists (4), a housing officer, nursery nurses (2) and a police officer. They managed a full range of client groups including children and young adults	**Intervention / Comparison** **Intervention:** STORM (Skills-based Training On Risk Management) is a package originally developed by the University of Manchester. The content of the intervention reflects established assessment and management methods for patients with suicidal ideation and/or feelings of hopelessness. STORM uses a handbook to provide background knowledge, and to reinforce and remind participants of the skills that are the main focus of the training. STORM is primarily concerned with developing complex clinical communication skills and so utilizes role-play and video-feedback on performance. Attitudes also need to be addressed, which requires interactive self reflection and reflection on the experiences of peers and case material demonstrated on videotape. If participants' current beliefs are challenged and changed in an interactive learning setting, then, with practise, they may also change their practice to reflect the change in belief	**Primary outcomes** Our main quantitative outcome measures were change in attitude to suicide prevention and confidence in the management of suicidal patients/clients. **Attitudes** were rated using the 'Attitudes to Suicide Prevention (ASP) Scale', where lower scores indicate more positive attitudes **Confidence** in the assessment and management of suicidal patients/clients was measured using a 100 mm visual analogue scale developed for the first STORM study. A minimum score of '0' is rated as 'not at all confident', while a maximum score of '100' is rated as 'very confident'. **Satisfaction** with participation in training was assessed using a questionnaire developed for our previous studies, focusing on satisfaction with specific aspects of the training package. Impact on clinical practice was assessed by an open-ended written questionnaire in which we asked participants to provide comments about how each of the training modules had been of use in their everyday work. All of the above areas were also addressed in the semi-structured telephone interviews with a sample of course participants and with a sample of course participants 6 months after they had been trained. A purposive sample of 12 participants was recruited on the basis of confidence and attitude scores (high or low initial scores and no change, high or

Source of funding

Not reported

Inclusion criteria

Participants attending STORM training in Highland Region provided by 12 trained facilitators during the period March 2004 to February 2005 were recruited.

The trainers came from mental health services, and the majority of these were nurses, however others trained included psychologists, social workers, managers and a service user.

Exclusion criteria

Not reported

(otherwise they will encounter cognitive dissonance, usually experienced as anxiety or frustration).

Comparison:

Before and after the intervention

low change scores), gender, age, previous training and profession to obtain a sample with maximum variation but that was also representative of the group as a whole.

Quantitative data

	Pre	6 month following	Mean differences (95%CI)
Attitudes (ASPS)	31.81 (4.49)	29.43 (4.53)	-2.38 (-4.10, -0.66)
Confidence	181.83 (74.59)	261.24 (61.20)	79.41 (54.79, 104.03)

Qualitative data

Attitudes, confidence and overall satisfaction Comments from the qualitative interviews supported the questionnaire findings and showed that participants felt the training addressed both attitudes and knowledge in a non-threatening way:

I think what, what I found very effective in it was that, and again I think this is why its good aimed at professional people, it ran through all the, it gives you some good background again which was, which refreshes you, which refreshes your knowledge base and it also refreshes your value base to a degree as well. So, I found that particularly useful and the fact that it did it in a non-threatening way and it just seemed to bring people on-board with the philosophy without, you know, without having to hammer it home as it were.' (Trainee H193)

In the qualitative interviews, participants also emphasised the positive value of both networking with colleagues and mutual learning:

'I just think that fact that it was a varied group of people, you know they all, they all contributed something either through case histories or just, you know relating their own experiences of management risk, of assessing and managing risk.' (Trainee H110)

Impact on clinical practice

			The responders spontaneous comments also indicated that the assessment module 'improved confidence' (15%) while the management module 'improved knowledge' (18%). The highest number of comments for any one theme related to 'asking more, and more direct questions' during 'risk assessment' (25%). The latter theme was highlighted in one of the qualitative interviews with a participant: *'I had a farmer who was saying that he was suicidal and he had thought about hanging himself from one of the rafters..* *I asked him if he'd actually come to the point of picking exactly where in the barn it was going to happen and was there a particular rafter he'd even chosen, whereas I may not even have asked so specifically ..... the fact that it made me think about asking specific questions into how detailed is his, how close is he in actually formulating this plan, it definitely did help me.'* (Trainee H131) *Diffusion and adoption of the STORM intervention* The study identified the key stages and processes in diffusion and implementation of the intervention from the interview data. The Consultant in Public Health who was the local opinion leader, identified STORM as a possible training intervention from a search of the published literature: *'I went kind of thematically to the published literature which is not necessarily I think the way other folk would have pursued it I suppose, what I had in my head at that time was kind of a multi-level kind of training strategy, so I felt fairly clear about where the different bit of training probably fitted and even although some of them weren't actually available then I was pretty clear where they were going to go, so what we sold to the various committees was a kind of vision of what the overall training package would look like when the bits were available*.' (Consultant in Public Health) What was envisaged encompassed separate suicide prevention training packages for the community level (ASIST) and health workers (STORM), with a Master's level training for specialist mental health staff. Some concerns were expressed about the local applicability of STORM, and so local workers took the opportunity to try out the intervention; providing opportunity for trialability experimentation on a limited basis) and observability (benefits visible to intended adopters)

			'the key things I think were identifying a couple of folk to try the course... because although we were fairly positive about it, it was important that we had local staff that were comfortable with it... and the feedback was positive; the staff liked it, thought it was useful- they'd some concerns about some of the supporting materials which they felt didn't necessarily mesh with (a) Scotland and (b) with the comparatively rural services here. Apart from that they werehappy with the skills part of it.' (Consultant in Public Health) *The dissemination process* From the interviews with the facilitators a number of key factors in dissemination emerged. Financial support was available from the Choose Life initiative to purchase equipment required for training. One of the facilitators was funded to be a central coordinator and trainers were also funded for dedicated training time out of their usual jobs in order to implement the programme. This dedicated time and resources proved to be invaluable: *'The coordinator for 'Choose Life' strategy here has paid for one day of my time on a fairly consistent basis so almost a day a week I've had to be able to prepare and organize and deliver and that's been extremely helpful. In fact I couldn't have done it without that, it would have been impossible.*' (Facilitator 5@T1) *Implementation of the training* A devolved, flexible and supportive managerial and administrative structure, provided both co-ordination and administrative support functions for the implementation process. Furthermore, this structure supported the roll-out of the training by the facilitators with regular peer support and training meetings: *'Getting the trainers together to review their own work, throwing up different issues and problems that might be unique to a particular area*.' (Facilitator 5@T1) The most challenging parts of the training were managing the role-play and video feedback, which professionals were sometimes reluctant to engage in:

			'A psychiatrist would you believe, wouldn't do it, you know the people that you would imagine would be most comfortable with their skills apparently appear to be the most ill at ease in displaying them.' (Facilitator 8@T1) *Routinization* STORM training seemed to be having a wider impact on organisations, aside from changes in individuals' clinical practice. Participants were motivated to review their departmental suicide prevention policies and procedures and, in some cases, attempt to improve them. However, in the later interviews it was evident that it was difficult to maintain the earlier momentum of a new intervention: *'I think we're in their third year now so people are kind of, a little bit running out of steam*.' (Facilitator 5@T2 November 2005) **Author's conclusion** Features that contributed to the success of STORM were related to both the context (the multi-dimensional support provided from the host organisation and the favourable policy environment) and the intervention (openness to local adaptation, clinical relevance and utility), and the dynamic interaction between context and the intervention.
Limitations identified by author The study relied largely on quantitative data collected immediately after the training, by those who had indeed delivered it. Those who responded at six months may well have been biased towards individuals with a more positive view of the intervention. The study did not capture the views of those who did not participate in training at all, and only have the facilitators' views of the challenges in recruiting staff for training. Those whom we were able to contact for interview may also have been favourably biased towards the STORM intervention. We also acknowledge that, given that the dissemination was led by a healthcare agency, the study had not considered the wider implementation of STORM across and within other agencies. **Limitations identified by review team** Short follow-up time for quantitative outcome measures. Participants did not all provide response to questions in the questionnaires.			

E.1.1.10 Ghoncheh et al 2016

Ghoncheh Rezvan ; Gould Madelyn S; Twisk Jos Wr; Kerkhof Ad Jfm; Koot Hans M 2016. Efficacy of Adolescent Suicide Prevention E-Learning Modules for Gatekeepers: A Randomized Controlled Trial. JMIR mental health 3(1).			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year Ghoncheh R. et al 2016 **Quality score** **+** **Study type** RCT **Aim of the study** To investigate the efficacy of a Web-based adolescent suicide prevention program entitled Mental Health Online, which aimed to improve the knowledge and self-confidence of gatekeepers working with adolescents (12-20 years old). **Location and setting** Netherlands **Length of study** 3-month follow-up **Source of funding** This study was supported by ZonMw, the Netherlands Organisation for Health Research and Development (Grant Number 80-82400-98-025).	**Number of participants** 190 completed the baseline assessment and were enrolled. The enrolled participants were randomized to either the experimental group (n=94) or the waitlist control group (n=96). In the experimental group, 4 participants did not follow the e-learning modules and subsequently did not receive the second assessment. The remaining 90 participants received the second assessment and 84 completed the second assessment (response rate 89.4%, 84/94). All participants in the waitlist control group completed the second assessment (response rate 100%). The third assessment was completed by 82 participants in the experimental group (response rate 87.2%, 82/94) and 92 participants in the waitlist control group (response rate 95.8%, 92/96). **Participant characteristics** Gatekeepers in this study were 21 to 62 years of age (mean 43.55, SD 10.96), the majority were female (81.6%, 155/190) and had a higher vocational (55.8%, 106/190) or university (38.4%, 73/190) degree. The majority (67.9%, 129/190) of the gatekeepers worked within a school setting (such as mentors, counsellors, teachers, and social workers) while the rest worked in a (mental) health care related setting or institute (such as psychologists, behavioural scientists, youth health care nurses, and psychiatrists). The participants of this study had 0 to 30 years of experience in their current job (mean 8.28, SD 7.16). Moreover, 78.9% (150/190) of the participants reported knowing at least one adolescent who performed a nonfatal suicide attempt, and 39.5% (75/190) of gatekeepers reported knowing at least one adolescent who died due to suicide. All participants were from the Netherlands, except one gatekeeper who lived in Belgium. No differences were found between the experimental group and waitlist control group in terms of demographics.	**Intervention / Comparison** **Intervention group:** The experimental group received the intervention during the study. **Mental Health Online programme (MHO)** The intervention in this study consisted of 8 e-learning modules alongside additional information regarding adolescent suicide prevention. The base of the modules was a PowerPoint presentation containing features such as voice-over, case descriptions, and quizzes. Both the modules and the additional information were made accessible through the website for study participants. Each of the modules of the program addressed an important aspect of the process of recognition, guidance, and referral of suicidal adolescents (12-20 years old). With an aim to allow participants to customize their training based on their previous knowledge and needs, 8 separate modules were offered. Thus, the number and order of modules were individually determined by each participant. As it was expected that the number of modules each participant followed could influence scores on the three outcome measurements of this study, a user-track system was enabled on the website. With this system, it was possible to collect data regarding how many modules each participant had completed at each assessment point. **Control group:** The waitlist control group received the intervention after completion of the study.	**Primary outcomes** The MHO program was developed specifically for this study as there were no suitable instruments available. Three Web-based self-report questionnaires were developed to measure the outcomes of this study. The outcomes were (1) participants' answers to questions tapping their actual knowledge, and their ratings of (2) perceived knowledge, (3) perceived self-confidence with regard to adolescent suicidality and suicide prevention. The 3 questionnaires were completed by the participants at the 3 assessment points: pretest (baseline assessment, T), posttest (second assessment, T1) and follow-up (third assessment, T2). **Actual Knowledge Questionnaire** The Actual Knowledge Questionnaire consisted of 6 cases each providing several characteristics (name, age, and education) of a fictional adolescent displayed in a photograph. The purpose of the photograph was to help the user visualize the adolescent and his/her situation better. Each case was followed by 2 general questions (yes/no answer), and 8 specific questions (multiple choice, 1 correct answer) each pertaining to the content of one of the e-learning modules of the MHO program. The total number of questions each participant received depended on their answers to the 2 general questions. Scores per case could vary from 0 (wrong answers to all questions) to 10 (correct answers to all questions). Perceived Knowledge Questionnaire **The Perceived Knowledge Questionnaire** consisted of 9 statements to be rated on a 3-point Likert scale (0 = disagree, 1 = partially agree, 2 = agree).

	Inclusion criteria The participants of this study were Dutch-speaking gatekeepers who worked with adolescents. The inclusion criteria were the following: (1) gatekeepers 18 years of age and older, (2) who worked frequently with adolescents from 12 to 20 years of age, (3) whose profession involved responsibilities with regard to the (mental) health care of adolescents, and (4) who had access to the Internet. Although every individual who met the inclusion criteria was eligible to participate in this study, three main target groups were identified for recruitment: members of mental health care teams of schools, youth health care nurses, and (mental) health care employees. **Exclusion criteria** Not reported		The first item of the questionnaire was a general statement regarding knowledge about adolescent suicide prevention ("I have sufficient knowledge about the process of recognition, guidance, and referral of suicidal youth") and the following 8 items each captured the essence of one of the e-learning modules of the MHO program. For instance, the fifth module addressed how to engage in a conversation with a suicidal adolescent and the corresponding statement was "I have sufficient knowledge to engage in a conversation with a suicidal adolescent". The scores could vary from 0 (disagreed with all statements) to 18 (agreed with all statements). **Perceived Self-Confidence Questionnaire** A 16-item questionnaire was developed, which consisted of statements regarding the necessary skills and attitudes when dealing with adolescent suicide prevention. The statements were rated on a 3-point Likert scale (0 = disagree, 1 = partially agree, 2 = agree) and were related to the 8 e-learning modules. "I can adequately provide first aid to a young person who has attempted suicide" and "I can make a distinction between my duties and those of a therapist" are 2 of the statements included in this questionnaire [26]. The scores could vary from 0 (disagreed with all statements) to 32 (agreed with all statements).

	MHO (n=88)	**Control (n=96)**	**Mean differences (95%CI)**
Post-test			
Actual knowledge	15.63 (2.97)	12.79 (2.30)	2.84 (2.07, 3.61)
Perceived knowledge	14.07 (3.66)	7.30 (3.99)	6.77 (5.66, 7.88)

Perceived self-confidence	25.94 (5.81)	16.08 (7.29)	9.86 (7.96, 11.76)
3 month follow-up	n=82	n=92	
Actual knowledge	13.82 (3.00)	12.05 (3.30)	1.77 (0.83, 2.71)
Perceived knowledge	14.22 (2.98)	8.14 (4.02)	6.08 (5.04, 7.12)
Perceived self-confidence	25.93 (5.34)	17.52 (5.81)	8.41 (6.52, 10.30)

Author's conclusion

This RCT investigated the efficacy of a Web-based adolescent suicide prevention gatekeeper training problem (MHO), consisting of 8 e-learning modules and additional information. The results of this study show that the actual knowledge, perceived knowledge, and perceived self-confidence of gatekeepers who enrolled in the MHO program improved significantly compared to gatekeepers who did not have access to the program, and that the effects found immediately after the training remained significant at 3-month follow-up. Moreover, almost half of the participants that accessed the training program reported using the knowledge gained at least once during the 3-month follow-up.

Limitations identified by author
Limitation of this study is that no standardized instruments were available to test the outcome measurements.
Although 45% of the participants mentioned that they had put gained knowledge from the modules into practice during the 3-month follow-up, due to privacy reasons, it was not possible to monitor the gatekeepers who participated in this study or to obtain actual information on referrals they made. As a result, we could not measure changes in actual suicide prevention skills and performance.
Although we included a 3-month follow-up, maintenance of the intervention effects across a longer period was not ascertained
Limitations identified by review team
The intervention was not masked. Waiting list control group received the intervention after the completion of the study.
Study participants mainly targeted at members of mental health care teams of school, youth health care nurses, and mental care employee. Their previous training experience were not reported.

E.1.1.11 Gould 2013

Madelyn S. Gould et al 2013. Impact of Applied Suicide Intervention Skills Training (ASIST) on National Suicide Prevention Lifeline Counselor: interventions and suicide caller outcomes. Suicide life threat behave 43(6)

Study details	Research Parameters	Population / Intervention	Results
Author/year Madelyn S. Gould et al 2013 **Quality score** **+** **Study type** RCT **Aim of the study** To examine whether the ASIST program increased the effectiveness of Lifeline's telephone crisis services. Increased effectiveness should be evidenced by an improvement in the quality of crisis counsellors' interventions and a parallel improvement in outcomes of callers **Location and setting** Crisis centre **Length of study** Data were collected over the course of 19 months (June 2008 to December 2009).	**Number of participants** Seventeen (17) centres participated in the evaluation. 1,410 suicidal individuals **Participant characteristics** Calls were classified as coming from a suicidal caller if the caller acknowledged current thoughts of suicide (including thoughts the day before or earlier in the day of the call), current plans to kill themselves, or actions they had taken to kill themselves right before calling the crisis hotline. **Inclusion criteria** A total of 1,507 calls from 1,410 suicidal individuals to the Lifeline were monitored. We used only the first call from the 97 callers who accessed the telephone line twice or three times. **Exclusion criteria** The following types of ineligible calls (N=3,826) were categorized and noted on the monitoring coding form, but were not completely abstracted: information and referral calls, third party calls, obscene or prank calls, calls from non-English speaking callers, calls from people who lacked cognitive capacity or had communication problems, calls from minors, and calls from individuals whose frequency of calls to a particular center necessitated the implementation of a special protocol by the center staff.	**Intervention / Comparison** **Intervention group:** The study was timed to coincide with Lifeline's roll out of ASIST version X.2 across its network of telephone crisis centers in 2008 and 2009. Lifeline conducted ASIST "training for trainers" (T4T) sessions in January and July of each of these two years. Two staff members from each center participated in the T4T training. These two trained staff members, in turn, provided the standard 2-day ASIST training to other crisis counselors upon their return to the centers. The research design randomized 18 centers to three training sessions (N= 6 centers per training) in the first two years of the grant, employing a dynamic wait-listed or "roll- out" design for randomized trials. The ASIST Suicide Intervention Model (SIM) has three phases of caregiving: connecting, understanding and Assisting. During the "**Connecting"** phase the counselor's task is to explore the caller's "invitations" (e.g., presenting problems, stressful life events, feelings such as anger, loneliness, sadness etc.). Counselors are instructed to explore the meaning of such events to a caller and any connection they may have to suicidal thoughts.	**Primary outcomes** **Global Counselor Behaviors**. Counselor behaviors during the calls were rated on a 4-point scale. Positive counselor behaviors included allowing the caller to talk about his/her feelings/situation, reflecting back the caller's feelings, reflecting back the caller's situation, connecting/establishing rapport with the caller, empowering the caller, being sensitive/receptive to caller's problems, and showing empathy/validating caller. Negative counselor behaviors included challenging the caller in a negative way, being condescending, disempowering the caller, engaging in inappropriate behavior (i.e., falling asleep, laughing at caller), being judgmental, preaching or forcing opinions on caller, being rude. Total positive and total negative scale scores were constructed by adding up the individual items. The scale scores could range from 0 to 24 and 0 to 21 for the positive and negative scales, respectively. **ASIST Suicide Intervention Model (SIM) Counselor Behaviors**. With the consultation of the LivingWork's developers we operationalized which counselor interventions would reflect each of the three SIM components - connecting, understanding and assisting. The number of invitations revealed by callers was considered an indication of the success of the connection between counselor and caller. Collaboratively reviewing current risk status (including suicidal thoughts and behaviors), identifying reasons for dying, reasons for living, and exploring the caller's ambivalence about dying were considered components of understanding the needs and risk of the caller. Indications of successfully assisting the caller were: disabling a suicide plan (e.g., removing access to lethal means), linking callers to interpersonal resources,

Source of funding

This project was funded by the National Institute of Mental Health (NIMH) and Substance Abuse and Mental Health Services Administration (SAMHSA) through a

subcontract from Macro international.

The "**Understanding"** phase focuses on callers' reasons for dying and for living and the counselor's task is to "listen to/listen for" these reasons. Counselors are instructed to spend sufficient time listening to an at risk person's reasons for dying with the assumption that doing so can help uncover potential reasons for living.

The last phase of SIM is "**Assisting**." The counselor's task in this phase is to establish a "Safeplan" that specifically addresses each element of risk identified in the previous phases of the intervention.

Control group:

Wait-listed group, a randomly selected half of the units receives an intervention in the early portion of the study, and the other half receives the intervention later.

linking callers to mental health/health services, and identifying emergency contacts.

Caller Behavioral Changes. The caller behavioral changes assessed during the course of the call were feeling less agitated, less alone, less depressed, less overwhelmed, less suicidal, more confident and in control, and more hopeful. The monitors rated the changes in the callers based on the caller's affect and statements during the call.

Ratings were based on direct observation, and did not take into account the effect of counselor behavior in eliciting affect or statements.

	With ASIST training (n=764)	Without ASIST training (n=646)	Mean differences
Global counsellor Behaviours			
Positive behaviours	16.9 (4.9)	17/8 (5.3)	
Negative behaviours	0.5 (1.5)	0.4 (1.3)	
ASIST model			
No. of calls, Counsellor tried to link caller's invitations to suicidal thoughts	621	461	
No. of calls, counsellor asked/explore caller's current	703	604	

			suicide thoughts			
			No. of calls, safe plan offered/explored by counsellor, formal resources	486	397	
			Caller behaviours change during the call			
			No. of caller Less suicidal	211	139	1.27 (1.05, 1.53)

Limitations identified by author
The study recruited centers with interest and motivation to participate, rather than a random sample of all Lifeline crisis centers
The study did not include a rating of the caller's level of hopelessness, depression, and suicide risk at the beginning and end of the call. Thus, comparisons could not be made between callers grouped into higher -or lower-risk categories, and the strength of the ASIST program for various levels of risk could not be explored.

Limitations identified by review team
none

E.1.1.12 Hall and Gabor 2004

Hall Barry ; Gabor Peter 2004. Peer Suicide Prevention in a Prison. Crisis 25 (1): 19-26

Study details	Research Parameters	Population / Intervention	Results
Author/year Hall Barry ; Gabor Peter 2004 **Quality score** - **Study type** Mixed method	**Number of participants completed interview or survey** Sam volunteers: Interview 17 General inmate: Survey 126	**Intervention / Comparison** **Intervention:** **SAMS in the Pen**, a suicide prevention service in a Southern Alberta Penal Institution, was established in 1996, and is the first of its kind in Canada. It is modelled after the Befrienders international programmes in the UK where	**Primary outcomes** The perceptions of the SAMS in the Pen volunteers were obtained through in-depth interviews which consisted of a number of rating scales and open-ended questions on personal growth, knowledge of suicide, self-esteem, communication skills and sense of purpose. Other questions focused on issues of support and general programme operation. *Active SAMS in the Pen volunteers*

Aim of the study

To evaluate the SAMS in the Pen programme

Location and setting

Prison, Alberta, Canada

Length of study

Not stated

Source of funding

Not reported

Correctional officers		27
Parole officers	14	
Others (mental health staff, psychologist, chaplains, unit managers)	12	

Inclusion criteria

The goal of the sampling of the study was to ensure a representative sample from each of the study population groups. Given the nature of the penitentiary it was not practical to carry out normal randomisation for data collection. The approach used to consider the sampling frame to be all those persons who were available in the Institution, qualified and accessible during data collection periods.

Exclusion criteria

Not reported

similar service, known as prison befriending programmer.

It is responsibility of the local Samaritan branch to be involved in the recruitment and training inmate volunteers wishing to become a member of the SAMS in the Pen. The institution is actively involved through canvassing information from parole officers, psychology and internal preventive security, to determine the personal suitability of candidates.

The format of the training is a combination of lectures, discussion, and role playing. Topics covered during the training provided by the Samaritans of Southern Alberta include: the concept of befriending; effective and active listening; specific mental condition; suicide prevention, suicide intervention; and policies and procedures of SAMS.

Comparison: completed suicide before and after the programme

SAMS volunteer felt their experience was valuable not only in providing a benefit to the Institution and their fellow inmates but also to themselves.

They saw a development of their own skills, attitudes and confidence and valued the opportunity to be involved in something that they viewed as constructive.

General inmate population

The general inmate population was survey to obtain their perceptions of the SAMS service. In general, inmate view the SAM services as being helpful and as being highly accessible. However, general population inmates rated their knowledge of the service as relative low, and many general population respondents were doubtful that they themselves would use the service.

"*I believe it is a good service for people who are having a hard time.*"

Correctional officers

Correctional officers were asked to completed a questionnaire. Correctional officers generally rated the service was helpful. Those who had been employed more than 3 years expressed more favourable attitudes towards the service.

A number of correctional officers were concerned about the selection process. In their view, some of the volunteers had abused their role to enhance their position in the prison and some of the inmates misused the programme for purposes of social visiting, illegal activities, or transferring information.

Professional staff

This groups included parole officers, unit manager, nurses, psychologists, mental health specialists, and chaplains. They highly rated the service's accessibility. Many acknowledge that the concept of the service is valuable and several commented that a peer services may be the only way to reach some inmates who did not want to go to "the system". Main concerns of this group were about how things were unfolding at the operation level, particularly in the selection

and recruitment of inmates and in communication between the service and institutional staff.

The prevention of suicide

Number of completed suicides

	Number	Rate/100,000 person years	Rate/100,00 person years (reviewer calculated based on an average institutional population of 610)
1st April 1990 -31st March 1995	4	131.0 (reported in the paper)	131.1
1st April 1995 -31st March 2000	2	65.5	65.6

Author's conclusion

Overall the SAMS in the Pen Peer suicide prevention service has achieved many operational goa. An entire service model has been designed, developed, and implemented.

However, it is important to recognise that this study was carried out in only one programme, in one penitentiary.

Limitations identified by author
The study was conducted only one penal institution in which a relative low suicide rate may not be representative of all such things.
Limitations identified by review team
Selection bias as the selection of participants' availability in the Institution.
52% of general inmates completed the survey and 45% of correctional officers.
Data analysis approach was not described in the study

E.1.1.13 Hayes, Shaw and Lever-Green 2008

Hayes Adrian J; Shaw Jenny J; Lever-Green Gillian ; Parker Dianne ; Gask Linda 2008. Improvements to suicide prevention training for prison staff in England and Wales. Suicide & life-threatening behaviour 38 (6):708-13.

Study details

Author/year

Haynes A J et al 2008

Quality score

+

Study type

Quasi-experimental before and after

Aim of the study

This study examines the outcomes of the implementation of STORM training in HM prison.

Location and setting

Prison, UK

Length of study

6-8 month follow-up

Source of funding

This research was funded by Her Majesty's Prison Service for England and Wales.

Research Parameters

Number of participants

182 who accessed STORM training, 161 completed the questionnaire before and after training.

Participants characteristics.

	Total (n=161)
Age, mean (SD)	39 (5.6)
Males, n (%)	117 (72.7%)
Experience at their current place of work	5.6 years (7.7)
Experience working in HM Prison Service	10 (7.7)
Discipline officers	132 (78%)
Health care staff	20

Inclusion criteria

Not reported

Exclusion criteria

Not reported

Population / Intervention

Intervention / Comparison

Intervention:

Skills-Based Training on Risk Management (STORM) is a suicide prevention training package developed for front-line National Health Service staff. At the forefront of the rationale of STORM is the interaction between staff and patients, and the training aimed to provide staff with the skills to competently assess and manage suicide risk in an interview situation. There are 4 modules: risk assessment, crisis management, problem solving, and crisis prevention. Each module begins with a presentation of facts and myths concerning suicide, based on converging research evidence. Trainees next watch a video demonstrating the skills required for the module. They then practice these skills in role plays, some of which are videotaped, and in the final section the group review these videos and provides feedback in a group setting.

For the adaption of STORM to prison settings, the overall structure was retained. Briefly, for each module this comprises a lecture-style presentation, a demonstration video of the skills being taught, role plays and group feedback. Further details concerning suicide and suicide risk in custody were added to the facts and myths section of the presentations elements, as well as concerning the various avenues of support available in prison.

Comparison:

Results

Primary outcomes

Attitude was measured using the Attitude to Suicide prevention Scale (ASPS);

A measure of knowledge about suicide risk was developed for the study. This measure was labelled Awareness of Suicide Risk Issues (ASRI);

Measures of confidence were used in previous evaluation of STORM.

	Pre (n=161)	6-8 month following (n=161)	Mean differences (95%CI)
Attitudes (ASPS)	28.51 (6.06)	26.44 (5.31)	-2.07 (-3.31, -0.83)
Knowledge (ASRI)	7.15 (1.76)	8.22 (1.71)	1.07 (-1.59, 3.73)
Confidence	6.39 (1.82)	7.31 (1.53)	0.92 (0.55, 1.29)
Likelihood of contact	8.41 (1.66)	8.47 (1.93)	0.06 (-2.93, 3.05

Author's conclusion

		Before and after the intervention	The study was to examine the success of adapting and implementing STORM suicide prevention training in a prison environment. Improvement to all outcome measures were noted, with high levels of satisfaction.
Limitations identified by author The outcome variables used in the study relied on self-reported of trainees, thus results were mediated by trainee's perceptions of their own abilities. Site were free to vary the format of the training according to local difference. During the pilot, it became clear that there were indeed differences in the implementation of STORM between the 3 sites. **Limitations identified by review team** Short follow-up period, only 6-8 months Instrument used to measure knowledge was developed for the study, had not been validated.			

E.1.1.14 Hegerl U et al 2010

Hegerl Ulrich et al 2010 Sustainable effects on suicidality were found for the Nuremberg alliance against depression. European archives of psychiatry and clinical neuroscience 260 (5)			
Study details	**Research Parameters**	**Population / Intervention**	**Results**
Author/year Hegerl U et al 2010 **Quality** + **Study type** Quais-experimental **Aim of the study** The aim of this study is to analyse whether or not the reduction in suicidality observed duringa2-year intervention is sustainable in the follow-up year. **Location and setting** Nuremberg and Wuerzburg both are located in the southern part of Germany,	**Inclusion criteria** The intervention region Nuremberg had 488,400 inhabitants before the intervention in 2000 and 493,500 at the end of 2003 which is a small Increase in inhabitants of 1.04%.The control region Wuerzburg is smaller than Nuremberg and is surrounded by a rural area. It had 287,000 inhabitants in 2000 and 292,500 in 2003, with a similar increase of 1.92% from 2000 to 2003. **Exclusion criteria** Not reported **Method of analysis** Owing to the relative low base rate of completed suicides and correspondingly high yearly fluctuation of the member, differences in suicide rates cannot	**Participant numbers** The intervention region Nuremberg had 488,400 inhabitants before the intervention in 2000 and 493,500 at the end of 2003. The control region Wuerzburg is smaller than Nuremberg and is surrounded by a rural area. It had 287,000 inhabitants in 2000 and 292,500 in 2003 **Participant characteristics** Intervention and control region differ in unemployment rate and percentage of migrant population. These differences were considered as tolerable because the aim of the study is not to compare the based rate but changes in suicidality.	**Primary outcomes** Suicide acts A significant reduction in suicidal acts that had been observed during the 2-year intervention(-24.0%) was also found for the follow-up yea: the number of suicidal acts (attempted + completed suicides) in the intervention region (Nuremberg) decreased from 620 at baseline to 419 (-32.4%) during the first year of follow-up. Based on figure 3 reported in the study, the number of suicide at Nuremberg in 2000 was around 100, and the study reported 88 suicide in 2003. In the control region (Wuerzburg), the number of suicidal acts changed from 183 at baseline to 173(-5.5%) during the first year of follow-up. Confirmatory tests revealed a significant reduction in suicidal acts in Nurem-berg when compared with the control region (2000vs. 2003: v2 = 7.42; df = 1; P = 0.0065; two-sided test). Attempted suicides Attempted suicides in the intervention region decreased from 520 at baseline to 331(-36.2%) in the first year of follow-up. In the control region, Wuerzburg, the number of attempted suicides increased from 125 at baseline to 131(?4.8%) in the same time interval. The difference was significant (v2 = 12.05, df = 1; P = 0.0005; two-sided test). Completed suicides

Length of study 2-year intervention 2001-2002, and follow up to 2006 **Source of funding** Not reported	be expected to be detectable for a town with a population of 500,000 inhabitants. Assessed raw data on attempted suicides were added to the data on completed suicides as provided by the Bavarian State Office for Statistics and Data Processing. Confirmatory tests concerning the outcome criterion of differences in changes for invention versus control region when compared with the baseline data were carried out using chi-square analysis or Fisher's extract test, where appropriate.	**Intervention** A 2-year intervention program had been performed in Nuremberg (years2001–2002). Interventions took place at four levels. (1)Primary care physicians were sensitized and trained to improve knowledge and care standards. 2)Media and public: a professional public relation campaign was implemented. A media guide was handed out to local media informing about the so-called ''Werthereffect' '(imitation suicide). (3)Around 2,000 community facilitators, such as teachers, priests, policemen and geriatric caregivers were trained. 4)Depressed persons, suicide attempters and their families were supported. Establishment of self-help groups was encouraged and assisted.	A number of registered completed suicides in the four follow-up years at Nuremberg (2003:88;2004:87;2005: 68; 2006:72) were inside of the 95%CI computed for the completed suicides at Nuremberg in 12 years before onset of the NAD. In the first intervention year (2001), the lowest suicide number ever recorded in Nuremberg was observed and an even lower number was observed in the follow-up year 2005. **Author's conclusions** The study demonstrates sustainable suicide Preventive effects of a four-level community-based intervention to reduce suicidality and supports the cost-effectiveness of the intervention.
Limitations identified by author It should be mentioned that less intense interventions were still going on in Nureberg during the follow-up year. **Limitations identified by review team** The data on completed suicide in control region reported in the study. Accuracy of data recording on suicide events			

E.1.1.15 Hubner-Liebemann et al 2010

Hubner-Liebermann Bettina et al 2010 Reducing suicides through an alliance against depression? General Hospital Psychiatry 32(5)			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Hubner-Liebermann Bettina et al 2010

Quality score

+

Study type

Quasi-experimental

Aim of the study

To evaluate the effect of Regensburg Alliance against depression on reducing suicide rate

Location and setting

Regensburg, Germany

Length of study

10 years study period, 1998 to 2007

Source of funding

Not reported

Number of participants

Residents in Regensburg, with a population of 150,000

Participant characteristics

Not reported

Inclusion criteria

Residents in Regensburg

Exclusion criteria

Not reported

Intervention / Comparison

Intervention:

The intervention program in Regensburg used the four- level approach from the Nuremberg pilot.

1.To improve cooperation with general practitioners, teaching videos and patient videos, information brochures, and screening sheets (WHO-5) were distributed; eight continuing medical education (CME) events with more than 350 participants were conducted in collaboration with the regional confederation of doctors; also a conference attended by more than 100 participants was held on the topic of depression

2.An educational campaign for the general public included the information materials developed in the pilot (posters, flyers, information brochures, information videos, CD-ROM or DVD, cinema advertising) and some 35 public lectures, as well as annual action days with about 150 participants each. Depression was the topic of television, radio, and newspaper/magazine reports. In cooperation with the local newspaper, a low-threshold telephone initiative was used to publicize the topic.

3. So-called multipliers were involved in more than 30 training workshops for secondary school teachers, lay helpers, carers for elderly people, police personnel, practice assistants, pharmacists, and professional fire brigades. A media guide for reporting suicide was agreed with the regional press

4.Two self-help groups and quite a few psychoeducational groups for relatives were set up for those affected by depression and their families. An email address was established to enable those affected and their families to contact the Regensburg Alliance Against Depression directly. Instead of an emergency card for crisis situations, flyers gave information

Primary outcomes

The mean rate of suicide for the city of Regensburg during the 1998 and 2007 was 16.9 per 100,000.

Suicide rate per 100,000 in the city of Regensburg

	City of Regensburg	County district of Regensburg
1998	21	19
1999	13	7
2000	19	14
2001	30	12
2002	24	16
2003	13	13
2004	7	9
2005	16	11
2006	12	14
2007	14	11

Author's conclusion

The results show that only the suicide rate in Regensburg fell significantly during the intervention period. An intensive community-based campaign could be effective in lowering suicide rates.

		on local crisis services and the psychiatric hospital, which is available 24/7 **Comparison:** Regensburg started in early 2003, comparison made period (1998-2002) before the implementation of the programme and period (2003-2007) after the implementation	
Limitations identified by author Owing to the design as a naturalistic intervention study, it was neither possible to randomize nor blind; therefore confounding factors might contribute to the findings The results have to be interpreted carefully because of the statistical problem of small numbers and the associated high fluctuations **Limitations identified by review team** As a multi-level intervention, the effect of individual component on suicide rate is difficult to conclude.			

E.1.1.16 Jacobson et al 2012

Jacobson Jodi M; (2012) Randomized trial of suicide gatekeeper training for social work students. Research on Social Work Practice 22(3): 270-281.			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Jacobson Jodi M; (2012)

Quality score

+

Study type

RCT

Aim of the study

1.Are there differences in suicide knowledge, attitudes toward suicide prevention, and practice skills to assess and respond to suicide risk between students who completed the QPR gatekeeper training(intervention group) and students who were not offered the training (control group)?

2.After completing the QPR training, is there a change over time in social work students' knowledge of suicide and suicide prevention, attitudes toward suicide prevention, and practice skills to assess and respond to client suicide risk?

3.How satisfied were students with the QPR gatekeeper training, and what, if any, additional feedback about the training did the students were share with the researchers? Did students share the QPR

Number of participants

73

Participant characteristics

	Intervention (n=35)	**Control (n=38)**
% female	90.9%	97.4%
% Caucasian	63.6%	68.4%
Age, mean (SD)	29.4 (7.92)	31.4 (11.12)
% Second year students	75.8%	71.1%
Provide direct client service	78.8%	92.1%

Inclusion criteria

Students had to be enrolled in their concentration (or advanced) year of their master of social work programme at the time of the study, in addition to entering their advanced or second-year field placement.

Exclusion criteria

Not reported

Intervention / Comparison

Intervention group: Students randomly assigned to the intervention group (QPR gatekeeper training). The trainings were 90 min in length and delivered by the QPR trainer. The topic covers: suicide rate and statistics across the lifespan, suicide warning signs, risk factors and protective factors, procedures regarding clients at risk to seek additional help, and local and national referral resources for support and response to suicide risk.

Control group: participants in control groups (no training) were offered the opportunity to complete the QPR training online after the completion of data collection for intervention groups.

Analysis

Not reported

Primary outcomes

Knowledge about suicide and suicide prevention

a standardised 14-item self report survey was used to measure knowledge of suicide warning signs and intervention behaviours, self-evaluation of suicide prevention knowledge, and knowledge of institutional resources.

	Intervention (n=35)	**Control (n=38)**	**MD (95%CI)**
pre			
Knowledge: warning signs and intervention behaviours (0-100)	75.7 (0.13)	78.3 (0.10)	-2.60 (-2.65, -2.55)
Risk factors list (0-25)	5.36 (0.33)	5.96 (0.41)	-0.60 (-0.77, -0.43)
Self-evaluation: prevention knowledge (1-7)	3.48 (0.22)	3.61 (0.20)	-0.13 (-0.23, -0.03)
Knowledge of institutional resources (0-1)	0.30 (0.07)	0.44 (0.07)	-0.14 (-0.17, -0.11)
Attitudes to suicide prevention (14-70)	27.21 (0.76)	27.77 (0.82)	-0.56 (-0.91, -0.21)

training material with others at their internship or school? If so, how was material received by others? **Location and setting** USA **Length of study** 6-month follow-up **Source of funding** The study was funded by the University Maryland, School of Social Work, Teaching Scholars Award.			Preparedness for gatekeeper role (1-7)	3.50 (0.14)	3.13 (1.08)	0.37 (0.02, 0.72)
			Efficacy to perform gatekeeper role (1-7)	3.87 (0.83)	3.99 (0.75)	-0.12 (-0.48, 0.24)
			Reluctance to engage with Clients (1-5)	2.57 (0.63)	2.42 (0.57)	0.15 (-0.13, 0.43)
			Asking depressed Clients about suicide (1-5)	3.36 (1.70)	4.18 (1.66)	-0.82 (-1.59, -0.05)
			Asking Clients about suicide (1-5)	1.82 (1.01)	2.34 (1.49)	0.52 (-1.10, 0.06)
			Use of gatekeeper behaviours (1-5)	2.22 (1.47)	2.02 (1.31)	0.20 (-0.44, 0.84)
			Appropriate referrals of Clients (0-100)	21.9%	23.7%	
			Post (4-month)	N=30	N=33	
			Knowledge: warning signs and intervention behaviours (0-100)	77.4 (0.07)	72.0 (0.09)	5.40 (5.36, 5.44)

			Risk factors list (0-25)	6.95 (0.57)	7.11 (0.63)	-0.16 (-0.46, 0.14)
			Self-evaluation: prevention knowledge (1-7)	5.23 (0.20)	4.39 (0.24)	0.84 (0.73, 0.95)
			Knowledge of institutional resources (0-1)	0.54 (0.07)	0.47 (0.07)	0.07 (0.04, 0.10)
			Attitudes to suicide prevention (14-70)	25.50 (0.83)	27.77 (0.82)	-1.92 (-2.33, -1.51)
			Preparedness for gatekeeper role (1-7)	5.16 (0.98)	3.13 (1.08)	0.92 (0.31, 1.53)
			Efficacy to perform gatekeeper role (1-7)	4.75 (0.62)	4.22 (0.84)	0.53 (0.17, 0.89)
			Reluctance to engage with Clients (1-5)	2.12 (0.56)	2.22 (0.77)	-0.10 (-0.43, 0.23)
			Asking depressed Clients about suicide	4.59 (1.25)	4.03 (1.25)	0.56 (-0.06, 1.18)
			Asking Clients about suicide	2.71 (1.41)	2.60 (1.45)	0.11 (-0.60, 0.82)
			Use of gatekeeper behaviours	2.90 (1.58)	2.94 (1.69)	-0.04 (-0.85, 0.77)

			Appropriate referrals of Clients | 44.0% | 45.3% | **Author's conclusion** Interaction effects between group assignment and time suggest improvement amongst the intervention group with regard to knowledge, efficacy to perform the gatekeeper role and skills. Both groups improved over time for reluctance to engage with clients at risk for suicide, referral, and gatekeeper behaviours. The intervention reported improved knowledge of resources and perceived preparedness.
Limitations identified by author The inability to observe actual social practice and the reliance on self-report data. It is not clear that training actually changed clinical behaviours amongst students in the experimental group as there could have been other factors influencing behaviours were that measured. The researcher cannot generalise results to students from other master of social worker programme. **Limitations identified by review team** Short study follow-up (4 months) Allocation and randomisation were not described in the study.			

E.1.1.17 Jorm et al 2010

Jorm , A.F. , Kitchener , K.A. , O ' Kearney , R. & Dear , K.B.G . (2010) . Mental health first aid training for high school teachers: A cluster randomized trial BMC Psychiatry , 10 , 51			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Jorm , A.F. , et al . (2010)

Quality score

+

Study type

RCT

Aim of the study

To evaluate a Mental Health First Aid training course on improvement in ability to recognise a mental disorder, changes of beliefs about treatment and improvement in confidence in providing help to others.

For teachers, the hypotheses tested were that mental health first aid training improves the following: mental health knowledge, stigmatizing attitudes, confidence in helping students, helping behaviours towards their students, knowledge of school policies and procedures for dealing with student mental health problems, support given to colleagues with mental health problems, seeking information about mental health problems and their own mental health.

For students, the hypotheses tested were that the mental health first aid training of their teachers would lead to an increase in the information they receive about

Number of participants

teachers

221 in intervention group, and 106 in wait-list group

Students

982 in intervention group, and 651 in wait-list group

Participant characteristics

	Mental health first aid	Control
Teachers		
Number of participants	221	106
Mean age, y	47.14	47.97
Number (%) men	78 (35.3)	36 (34.0)
Time working in schools, n (%)		
Less than 3 y	24 (10.9)	4 (3.9)
3-5y	30 (13.6)	13 (12.5)
6-10y	28 (12.7)	13 (12.5)
11-15y	22 (10)	7 (6.7)
16-20	22(10)	14(13.5)

Intervention / Comparison

Intervention:

Teachers received a modified version of the Youth Mental Health First Aid course. To meet the scheduling needs of schools, the course was organized into two one-day parts of seven hours each.

Part 1 was designed for all education staff and covered departmental policy on mental health issues, common mental disorders in adolescents (depressive and anxiety disorders, suicidal thoughts and behaviours, and non-suicidal self-injury) and how to apply the mental health action plan to help a student with such a problem. Part 2 was for teachers who had a particular responsibility for student welfare.

It provided information about first aid approaches for crises that require a more comprehensive response and information about responses for less common mental health problems. Topics included how to give initial help to students who are experiencing a psychotic or eating disorder or substance misuse. Training was administered at the participants' school, with all available staff participating.

Comparison:

Wait-list control.

Primary outcomes

The following teacher outcomes were measured at the individual level:

Knowledge about mental health problem, 21 questions.

Recognition of depression in a vignette;

Stigma towards depressed students;

Beliefs about treatment of depression which are like those of health professionals

Confidence in providing help;

Intentions to provide help to a depressed student

Help provided to students;

First aid provided to colleagues;

School practice and polices

Teachers psychological distress;

The following students outcomes were measured at the individual level:

Recognition of depression in a vignette;

Stigma towards depressed peer;

Beliefs in the helpfulness of school staff for a depressed student;

Help received from school staff members;

Information received from teachers;

Student mental health

Change in teachers' outcome (6-month follow-up)

mental health problems from their teachers, and that their mental health would improve.

Location and setting

High school, Australia

Length of study

6 month follow-up

Source of funding

More than 20y	95(43)	53(51)
Main role in school		
Leadership	38 (17.4)	28 (27.2)
Classroom	146(66.7)	58(56.3)
Student welfare	15(6.9)	6(5.8)
Support officer	14(6.4)	7(6.8)
Students		
Numbers	982	651
Male, n(%)	451 (46.2)	295(45.6)
Age, n(%)		
12	75(7.7)	36 (5.6)
13	363 (37.4)	256(39.9)
14	317(32.7)	220(34.3)
15	215(22.2)	130 (20.3)

Inclusion criteria

Eligible participants were teachers of the middle years in school (i.e. Years 8-10, ages 12-15 years) at schools willing to participate in the study. Students taught by these teachers were also surveyed.

Eligible clusters were all schools in the government, Catholic or independent systems in South Australia with Year 8-10 classes.

	Mental health first aid (n=221)	Control (n=106)	Mean differences (95%CI)
Mental health knowledge, mean score (SD)	12.68 (3.44)	10.76 (3.89)	1.92 (0.30, 3.54)
Recognition of depression	92.9%	83.8%	
Intended helping behaviour-have conversation with students	70.3%	49.4%	
Help given towards students, spoken with students about their mental health problems	54.8%	47.7%	
Seeking additional mental health information,			
Visit any website	26.8%	17.2	
Read books or other	39.9%	35.6%	

written material			
Teachers mental health			
Severe	25.8%	25.3%	
Medium-high	58.9%	69.0%	

These schools were sent a letter from the South Australian Department of Education and Children's Services explaining the study and inviting participation. Schools had to be willing to be randomized to do the training either in Terms 1 or 2 of 2008 (intervention schools) or Terms 3 or 4 of 2008 (wait-list control schools).

Exclusion criteria

Not reported

Change in student outcome measures (6-month follow-up)

	Mental health first aid (n=982)	Control (n=651)	
Recognition of depression	68.1%	70.5%	
Help-seeking, any adult source, mean (SD)	3.77 (2.91)	3.61 (2.81)	
Help received from Teacher			
Talk with staff	6.7%	4.2%	0.68 (0.04,10.85)
Received information	25.2%	130%	
Students mental health			
SDQ, abnormal	9.6%	10.3%	

SDQ, borderline	21.1%	19.9%	

Author's conclusion

The training increased teachers' knowledge, changed beliefs about treatment to be more like those of mental health professionals, reduced some aspects of stigma, and increased confidence in providing help to students and colleagues.

There was an indirect effect on students, who reported receiving more mental health information from school staff. Most of the changes found were sustained 6 months after training. However, no effects were found on teachers' individual support towards students with mental health problems or on student mental health.

Mental Health First Aid training has positive effects on teachers' mental health knowledge, attitudes, confidence and some aspects of their behaviour.

Limitations identified by author
The course content was modified to meet the role expectations of teachers and the duration of the training had to be abbreviated from 14 hours to 7 hours for the majority of staff to fit in with the scheduled staff training days available to schools. Given the modifications and shortening of this course for teachers, the findings do not necessarily apply to the full 14-hour Youth Mental Health First Aid course. Compromises also had to be made in the design of the study. Normally, randomization of schools would occur after baseline assessment. However, this was not feasible because schools needed to know in advance whether they were in the intervention or wait list group so that they could schedule their staff training at the start of the school year. We therefore had to do the pre-test assessment after allocation to groups had occurred. Two schools withdrawing from the project because changes in circumstances did not allow them to do the training as scheduled (e.g. one school got a new principal and the training schedule would have added extra disruption to the changes that this already entailed).
Limitations identified by review team
Randomisation after the baseline assessment (cluster RCT), not blinding of participants schools
Short study follow-up time. 22% teacher did not completed the post-test questionnaire and 28% the follow-up questionnaire; 24% of students did not complete the follow-up questionnaire

E.1.1.18 King et al 2015

King Cheryl A; Eisenberg Daniel ; Zheng Kai ; Czyz Ewa ; Kramer Anne ; Horwitz Adam ; Chermack Stephen 2015. Online suicide risk screening and intervention with college students: A pilot randomized controlled trial. Journal of Consulting and Clinical Psychology 83 (3)

Author/year	**Number of participants**	**Intervention / Comparison**	**Primary outcomes**
King C A et al 2015 **Quality score** **+** **Study type**	76 randomised **Participant characteristics** The baseline demographic and clinical characteristics of eBridge and control groups were not statistically different.	**Intervention group:** Electronic Bridge to Mental Health Services (eBridge) was designed for students at particularly elevated risk for suicide, operationalized as two or more of the following: history of suicide	**Perceived Need for Help** was assessed with a dichotomous variable (yes/no) based on students' responses to questions inquiring if, in the previous two months, they thought they needed help for emotional or mental health problems, or problems related to alcohol and/or substance abuse, or neither of the two. A dichotomous variable assessing Professional Help-Seeking was assessed by students' responses to a question (yes/no) asking if

RCT

Aim of the study

To examine the effectiveness of Electronic Bridge to Mental Health Services (eBridge).

Location and setting

MIchigan, USA

Length of study

2 months study follow-up

Source of funding

This study was supported by two NIMH awards.

	Intervention (n=41)	Control (n=35)	p
% of female	66	51	0.20
% of undergraduate	68	54	0.21
Age, mean (SD)	22.5 (4.8)	23.3 (5.3)	0.51
PHQ-9 score	13.9 (4.9)	13.3 (4.3)	0.61
% positive screen (PHQ-2≥3)	80	82	0.80
ADULT score	7.4 (5.7)	7.7 (6.7)	0.87
% Positive screen (ADULT ≥8)	46	51	0.66
% Suicidal ideation (past 2 weeks)	75	60	0.15
% suicide attempt (lifetime)	15	31	0.08

attempt, current suicidal ideation, depression, and alcohol abuse.

It is an online screening and intervention program for college students at risk for suicide and the first such intervention to be conceptualized within a health behavior theoretical model.

eBridge counselors were master's level mental health professionals who participated in MI training provided by a member of the Motivational Interviewing Network of Trainers in addition to multiple mock eBridge counseling sessions.

After completing the baseline assessment, students in each group had the opportunity to review personalized feedback (PF), which included a brief summary of reported emotional distress and alcohol use, and their impact on functioning. Graphics displayed how each student's scores compared to college students in general.

Control group:

Students in the control group completed the screening survey and received this feedback only.

Although information was provided to both groups on all online pages regarding mental health resources (with contact information), students in the control group did not have the option of making contact with the study team (online counseling or otherwise) related to their feedback or mental health resources.

they had met with a mental health professional (such as counselor, psychologist, social worker, psychiatrist) to get help with any concerns.

Perceived Public Stigma and Personal Stigma were assessed with two items: if respondents think that most people think less of someone who has received mental health treatment and if the respondent him/herself thinks less of someone who has received mental health treatment, respectively. Responses were rated on a 5-point scale, from strongly agree to strongly disagree.

Readiness to Access Help was assessed on an 11-point scale, with response anchors including: "Sometimes I think about doing this"; I have taken steps toward doing this"; and "I already did this". The scale presents six help-seeking behaviors: seeking information about mental health services from websites, pamphlets, or other sources; talking to a family member about seeking help from a mental health professional; talking to a friend or other non-family member about seeking help from a mental health professional; seeking help from a mental health professional; accessing self-help or support group; accessing academic support services.

	Intervention (n=31)	Control (n=29)	Differences
Outcomes on Likert/rating scales			
Readiness seeking information (0-10)	5.35	3.52	1.83
Readiness talking to family (0-10)	5.25	2.38	2.87
Readiness talking to friend (0-10)	5.35	2.55	2.80

% At least one of the above	80	77	0.72

Inclusion criteria

A total of 7,000 students were randomly selected from the 9,219 students in the participating university registrar's database who met study inclusion criteria:

- ≥18 years,
- no prior participation in eBridge feasibility study,
- living in university community [e.g., not studying abroad])..

Exclusion criteria

Students were excluded if they were currently in mental health treatment.

Analysis

Unadjusted differences in means between the intervention and control group were tested using two tailed t-tests for continuous measures and chi-square tests for binary measures. Differences between groups at two month follow-up also adjusted for covariates (gender, age; baseline PHQ-9 score, AUDIT score, suicidal ideation/attempt), and were estimated using logistic regressions for binary outcomes and linear regressions for other outcomes.

Readiness see MH professional (0-10)	5.71	2.45	3.26
Readiness self-help or support group (0-10)	1.87	1.10	0.77
Readiness academic support services (0-10)	1.68	2.07	-0.39
Readiness: AVERAGE (0-10)	4.22	2.34	1.88
Perceived public stigma score (0-4)	2.71	3.21	-0.50
Personal stigma score (0-4)	0.90	2.00	-1.10
PHQ-9 score (0-27)	11.39	11.0	0.39
ADULT score (0-40)	6.84	6.00	0.84
Binary outcomes			RR
Perceived a need for help (2 months)	22/31(72%)	18/29(62%)	1.14 (0.80, 1.64)

Met w/MH professional (2 months)	9/31 (28%)	0	17.81 (1.08, 292,99)
Therapy/counselling	7/31 (13%)	0	8.44 (0.47, 150,15)
Psychiatric medication (current)	3/31(9%)	0	6.56 (0.35, 121.80)

Notes: SD were not reported in the study results

Author's conclusion

Findings suggest that offering students personalized feedback and the option of online counseling, using motivational interviewing principles, has a positive impact on students' readiness to consider and engage in mental health treatment. Further research is warranted to determine the robustness of this effect, the mechanism by which improved readiness and treatment linkage occurs, and the longer term impact on student mental health outcomes.

Limitations identified by author
Sample size of the study is relatively small and consists entirely of students from one public university, which limits the potential generalizability of findings.
Data regarding readiness for professional treatment and perceived stigma are only available from students at two-month follow-up, enabling only a group comparison at this point in time.
Relatively short follow-up period of two months
Limitations identified by review team
No real control in the study, as both groups had feedback and being provided information regarding mental health resources, although students in control group did not have option of making contact with the study team related to their feedback or mental health resources.

E.1.1.19 Kitchener et al 2004

Kitchener , K.A. , Jorm , A.F.. (2004) . Mental health first aid training in a workplace setting: A cluster randomized trial BMC Psychiatry , 4 , 23			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Kitchener , K.A. and Jorm , A.F. , et al . (2004)

Quality score

+

Study type

RCT

Aim of the study

The main objective was to assess whether Mental Health First Aid training improved mental health literacy and helping skills relative to a wait-list control. A secondary objective was to assess any benefits to the participants' own mental health.

Location and setting

workplace, Australia

Length of study

5 month follow-up

Source of funding

Not reported

Number of participants

146 in intervention group, and 155 in wait-list group

Participant characteristics

78.1% of the participants were female, 49.2% were aged 18–39 years, 50.2% were aged 40–59 and 0.7% aged 60+ years.

There were 60.6% with a university degree, 1.3% were aboriginal and 8.6% did not have English as their first language. 13.0% described themselves as mental health consumers, 9.6% as carers for a person with a mental health problem, and 6.3% as health service providers. When asked their reason for doing the course, 27.2% cited reasons relating to their workplace, 11.7% reasons relating to family or close friends, 4.9% reasons relating to their own mental health status, 20.5% cited duty as a citizen, 29% said they were just interested, and 6.7% wanted more accurate or updated information on mental health.

165 (54.8%) of the participants worked at the Department of Health and Ageing and 136 (45.2%) at the Department of Family and Community Services

Inclusion criteria

Eligible participants (approximately 4800) were all Canberra-based employees of two Australian government departments: Health and Ageing, and Family and Community Services. The trial was advertised to staff by email. Participants had to agree to be randomly assigned to receive the training in either Month 1 or Month 6. Training was delivered and data collected at the worksite during office hours.

Exclusion criteria

Intervention / Comparison

Intervention:

Participants received a nine-hour Mental Health First Aid course, in three weekly sessions of three hours each. Training was administered in the local area in groups of up to 25 participants, with a minimum of 10 participants per course.

As documentation of the intervention, there is a lesson plan for each session and a participants' manual containing material that was given to take away.

All instructors were given training and a teaching kit of lesson plans, videos, books, master copies of handouts and a set of transparencies. Educators received a one-week training program in how to conduct Mental Health First Aid courses and subsequent supervision in running a course

Comparison:

Wait-list control

Primary outcomes

Following outcomes were measured:

Perception of mental health problem in self or family;

Recognition of disorder in vignette;

Benefits about treatments;

Social distance

Help provided to others

Participants' mental health

Change in outcome measures (5-month follow-up)

	Mental health first aid (n=146)	Control (n=155)	Mean difference (95%CI)
Perception of mental health problem			
Self	65.5%	55.6%	
Family	77.2%	75.7%	
Recognition of disorder in vignette			
Depression	95.8%	90.3%	
Schizophrenia	82.6%	81.9%	
Belief about treatment			
Depression	86.29 (18.30)	83.42 (18.48)	2.87 (-1.29, 7.03)

Schizophrenia	87.41 (18.26)	88.41 (16.11)	-1.00 (-4.90, 2.90)
Help provided to others			
% had contact with anyone with mental health	72.9%	65.6%	
% provide help (some or a lot)	39.0%	36.2%	
% advised professional help	29.4%	16.8%	
Mental health	47.48 (11.11)	45.11 (11.25)	2.37 (-0.16, 4.90)
Physical health	50.74 (8.14)	51.90 (8.68)	-1.16 (-3.06, 0.74)

Not reported

Author's conclusion

The trial found a number of benefits from this training course, including greater confidence in providing help to others, greater likelihood of advising people to seek professional help, improved concordance with health professionals about treatments, and decreased stigmatizing attitudes. An additional unexpected but exciting finding was an improvement in the mental health of the participants themselves.

The Mental Health First Aid training has shown itself to be not only an effective way to improve participants' mental health literacy but also to improve their own mental health. It is a course that has high applicability across the community.

Limitations identified by author
A particular limitation in the present study is that participants in the intervention group showed a poorer response to the follow-up questionnaire than controls.

The present trial evaluates efficacy rather than effectiveness. The trial was carried out in a workplace setting with well-educated employees who were allowed to do the course during working hours. There was only one instructor, who was the developer of the Mental Health First Aid course, limiting the generalizability of the findings to other instructors. **Limitations identified by review team** Intervention was not masked due to wait-list control used in the study. Short study follow-up time.

E.1.1.20 Knox et al 2010/2003

Knox Kerry L; et al 2010. The US Air Force suicide prevention program: implications for public health policy. 100 (12): 2457-63 (study 1)

Knox Kerry L; Litts David A; Talcott Wayne G; Feig Jill Catalano; Caine Eric D 2003 Risk of suicide and related adverse outcomes after exposure to a suicide prevention programme in the US Air Force: Cohort study. BMJ 327: 1376-78. (study 2)

Study details	Research Parameters	Population / Intervention	Results
Author/year Knox K et al 2010 Knox K et al 2003 **Quality score** **+** **Study type** Cohort study with quasi-experimental design **Aim of the study** To evaluate the impact of the US Air Force suicide prevention programme in reducing suicide. **Location and setting** US Air Force, USA **Length of study**	**Number of participants** a cohort of 5 260 292 active duty US Air Force personnel (study 2) **Participant characteristics** The study found no significant changes in sex, race, or age distribution in the cohort (study 2) **Inclusion criteria** Active duty US Air Force personnel **Exclusion criteria** Not reported	**Intervention / Comparison** **Intervention :** A population oriented risk reduction approach that focused on reducing modifiable risk factors and enhancing factors considered protective. "Initiatives" were developed that targeted strengthening social support, promoting development of effective coping skills, and changing policies and norms so as to encourage effective help seeking behaviours **Comparison:** Before-after the intervention	**Primary outcomes** Relative risk of suicide and related outcomes, relative risks (RR) as the ratio of the outcome of interest in the group exposed to the intervention after it was fully implemented (1997-2007) to the outcome of interest in the group not exposed to the intervention (1990-6). Rate of suicide in US Air Force, 1990-2002

	Suicide per 100,000 (95%CI)
1990	10.0 (7.3 to 12.7)
1991	13.0 (9.8 to 16.2)
1992	13.8 (10.4 to 17.2)
1993	13.1 (9.7 to 16.5)
1994	16.4 (12.5 to 20.3)
1995	15.8 (11.9 to 19.7)
1996	12.4 (8.9 to 15.9)
1997 (programme implemented)	12.1 (8.6 to 15.6)

1990-2007

Before the intervention: 1990-1996

After the intervention: 1997-2007

Source of funding

The project was supported by National Institute of Mental Health Grant.

1998	9.4 (6.3 to 12.6)
1999	5.6 (3.1 to 8.1)
2000	9.4 (6.2 to 12.7)
2001	10.4 (7.0 to 13.8)
2002	8.3 (5.3 to 11.3)
2003	8.01 (4.3 to 11.7)
2004	15.1 (12.3 to 17.9)
2005	8.1 (4.9 to 11.3)
2006	11.6 (9.4 to 13.9)
2007	10.8 (8.4 to 13.2)

Note: suicide rates between 1990 and 2002 were reported in Knox et al 2003, and suicide rates between 2003 and 2007 were calculated based on figure 1 reported in Knox et al 2010.

Comparison of the effects of risk for suicide and related adverse outcomes in US Air Force before (1990-6) and after implementation of programme (1997-2002)

	Relative risk (95%CI)	Risk reduction
Suicide	0.67 (0.57 to 0.80)	33%
Homicide	0.48 (0.33 to 0.74)	51%
Accidental death	0.82 (0.73 to 0.93)	18%
Severe family violence	0.46 (0.43 to 0.51)	54%
Moderate family violence	0.70 (0.69 to 0.73)	30%)

			Mild family violence | 1.18 (1.16 to 1.20) | +18% **Author's conclusion** A 33% relative risk reduction was observed for suicide after the intervention. A systemic intervention aimed at changing social norms about seeking help and incorporating training in suicide prevention has a considerable impact on promotion of mental health. The impact on adverse outcomes in addition to suicide strengthens the conclusion that the programme was responsible for these reductions in risk.
Limitations identified by author Generalisation of study population **Limitations identified by review team** Data used in the study were routinely collected for other purposes, including anonymised data collected in mortality databases for death due to all causes. Although the programme was begun in 1996, it did not attain full implementation until 1997. Therefore, conservatively, any effects in 1996 were attributed to the time period before the intervention.			

E.1.1.21 Matthieu, Ross and Knox 2006

M Matthieu Monica; Alan Ross ; L Knox Kerry 2006 Program evaluation of the Samaritans of New York's public education suicide awareness and prevention training program. Brief Treatment and Crisis Intervention 6(4): 295-307.

Study details	Research Parameters	Population / Intervention	Results
Author/year M Matthieu Monica; Alan Ross ; L Knox Kerry 2006 **Quality score** - **Study type** Quasi-experimental before and after **Aim of the study** This paper describes the initial evaluation of one developing program, that of the Samaritans of New York's Public Education Suicide	**Number of participants** 59 **Participants characteristics** Of the eligible employees participating in the pilot study, 59 provided evaluation data. The majority of the sample was African-American (62.1%) women (88.1%) with an average age of 44 years, 66.2% of whom had at least 1–2 years of college education. Almost 95% of the sample reported having no previous clinical interviewing experience. Yet, experiences with suicidal individuals were common among the sampled participants: almost 65% had previous contact with someone thought to be suicidal. Slightly less	**Intervention / Comparison** **Intervention:** the Samaritans of New York developed a three-hour public education suicide awareness and prevention programme to train lay and professional staff on effective suicide prevention practices and how to 'befriend' a person in crisis. This training programme is based on teaching the skills, tools and techniques associated with active listening, an approach to communication that puts the focus on the person being 'helped', what he/she thinks ,feels and is going through. A second component of the training curricular is sensitivity training, which address the fears, beliefs,	**Primary outcomes** Results of the pre- and post-training assessments regarding knowledge and efficacy to manage a caller in distress or a caller in need of assistance due to a suicidal crisis Self-efficacy to intervene with a person thought to be at risk of suicide | Pre: 15.0 (6.1) | Post: 25.7 (5.9) | Mean difference (95%CI): 10.70 (8.53, 12.87)

<table>
<tr>
<td>Awareness and Prevention Training Program, which focuses on educating frontline caregivers and service providers in the key behaviours and skills they have found to be effective in ‘‘befriending’’ a person in crisis.

Location and setting

city department of human resources ‘‘helpline’’, USA

Length of study

Published in 2006

Source of funding

This study was supported by funds from a September 11 Recovery Grant from the American Red Cross Liberty Disaster Relief Fund to the Samaritans of New York, Inc. In addition, Dr Matthieu was supported by an institutional training grant from the NIMH.</td>
<td>than three quarters of the participants’ report they had spoken to the person they were concerned about, with 33% asking directly and 25.6% asking indirectly about thoughts of wanting to kill themselves. In terms of death by suicide, 47.5% (n ¼ 28) knew someone who died by suicide. Of the relationships to the decedents noted, 32.1% of those who died by suicide were friends while family, acquaintances, and others were each reported at 25% of those who lost someone to suicide.

<table>
<tr><td></td><td>Total (n=59)</td></tr>
<tr><td>Age, mean (SD)</td><td>44.4</td></tr>
<tr><td>Females, n (%)</td><td>52 (88.1%)</td></tr>
<tr><td>Education</td><td></td></tr>
<tr><td>High school</td><td>9 (15.3%)</td></tr>
<tr><td>Trade,/vocational school</td><td>8 (13.6%)</td></tr>
<tr><td>1-2 years of college</td><td>22 (37.3%)</td></tr>
<tr><td>3-4 years of college</td><td>17 (28.8%)</td></tr>
<tr><td>5+ years of college</td><td>3 (5.1%)</td></tr>
<tr><td>Years of experience</td><td></td></tr>
<tr><td>0</td><td>5 (9.1%)</td></tr>
<tr><td>1-5</td><td>14 (25.5%)</td></tr>
<tr><td>6-10</td><td>8 (14.6%)</td></tr>
<tr><td>11-15</td><td>8 (14.6%)</td></tr>
</table>
</td>
<td>assumptions, presumptions, biases, judgement and personal values that impact and often impede how lay and professional care-givers approach and respond to those at risk.

The 3-hour training included an overview of the Samaritans befriending model, current research knowledge and statistics about suicide, myths and stigma surrounding suicide, warning signs, intervention and risk assessment techniques as well as the keys to effective active listening, the sensitivity components and developing a site-specific suicide prevention plan.

Comparison:

Before and after the intervention</td>
<td>Author’s conclusion

The training program increased the abilities, awareness, and confidence levels of people whose jobs it is on a daily basis to provide care, comfort, and support for those who are in crisis and at risk for suicide.</td>
</tr>
</table>

	<table><tr><td>16-20</td><td>12 (21.8%)</td></tr><tr><td>21 or more</td><td>8 (14.5%)</td></tr><tr><td>Previous experience in clinical interviewing</td><td>3 (5.7%)</td></tr></table> **Inclusion criteria** The agency staff was required to attend the training by their supervisors. Therefore, employees were identified by job description, interest, availability, and supervisor support to attend the training. For this evaluation, the contracting agency was a large urban city department of human resources in the northeast who were interested in training for their frontline customer service providers. Sixty-four participants enrolled in the training with 59 individuals participating in the evaluation. **Exclusion criteria** Not reported		
Limitations identified by author It is important to keep in mind that this program evaluation has several limitations, including possible selection bias of participants. In addition, these data are based on a 3-hr, multimedia, public education training delivered with a live trainer to employees at a large urban city department of human resources. The generalizability of these findings to other populations, service settings, and to other training methods (e.g., online) is limited at this time **Limitations identified by review team** Survey was completed before and after the training, and there is further follow-up data All information collected for this study was secondary data having been collected by the Samaritans staff as a part of their routine practice			

E.1.1.22 McLeand 2017

McLean Kate, Swanbrow Becker, and Martin A (2017) Bridging the Gap: Connecting Resident Assistants and Suicidal Residents Through Gatekeeper Training. Suicide & life-threatening behaviour			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

McLean et al 2017**Quality score**

-

Study type

RCT

Aim of the study

To examine the effectiveness of a suicide prevention training program in preparing RAs to serve as mental health gatekeepers on university campus halls, and whether raining has a

differential impact for RAs with more years of experience, through a post-test between groups experimental design in the context of one university..

Location and setting

A large south-eastern university, USA

Length of study

4 months follow-up after training

Source of funding

Inclusion criteria

Resident assistants

RAs (ages 18–22) at the university

Exclusion criteria

Not reported

Method of analysis

To determine the impact of the intervention group and years of experience on the outcome variables, we conducted a two-way independent ANOVA. An a priori power analysis indicated that to achieve .80 power with an alpha level of .05, and an effect size of .25, the study required a total sample size of 128 RAs, suggesting the sample of 162 should be sufficient to detect results of the intervention.

Participant numbers

One hundred sixty-two university RAs (ages 18–22) at a large south eastern university participated in the present study

Participant characteristics

RAs worked in 18 different on-campus resident halls of various living styles (i.e., community style, suite style, apartment style, living-learning community halls, and gender-specific halls).

The majority of the sample was female (59%). Of the 162 RAs, 60% had never served as an RA before, while 40% reported one or more years of prior experience.

RAs were assigned by matching halls with similar hall characteristics between conditions to attend either a suicide prevention training program or a stress and time management training program with 81 RAs in each training condition.

Using a matched-pairs sampling technique, participants were randomly assigned to attend either a specialized, 1-hour training program in suicide prevention (intervention group) or a stress and time management skills training program (control group).

RAs were randomly assigned to a condition by resident building, meaning all RAs in a given resident building

Primary outcomes

This study aimed to examine questions specifically from the Post-semester survey regarding the prevalence of RA intervention behaviours.

Those in the intervention group also completed a post-training assessment to evaluate the immediate impact of the suicide prevention training on participants. Each training program was 1 hour long, and was led by two UCC professionals.

Four months later, in December of 2014, the post semester survey was administered to RAs from both conditions.

Results suggest that RAs found the suicide prevention training effective as measured at post-training as their mean rating of whether they had sufficient knowledge to help their peers with a student in crisis rose from 6.7 at pre-training to 8.3 at post-training, a significant difference, $t(74) = 10.222$, $p < .001$.

To measure the frequency of offered support, participants were asked to provide an estimate of how many times they intervened with distressed residents and how many times distressed residents approached them over the course of the semester.

To assess for RA's ability to identify residents with suicidal thoughts, RAs were asked, "How many of your residents do you believe had thoughts of suicide this semester?" A significant difference between treatment and control groups was not found.

To measure RA perception of suicidal thought severity, RAs indicated the highest frequency of suicidal thoughts they believed at least one resident experienced on a 1 (were very mild or very occasional) to 5 (were very severe or very frequent) scale. Results indicate that those in the intervention group endorsed a similar perception of suicidal intensity among their residents as those in the control group.

	Intervention group (n=81)	**Control group (n=81)**	**Estimated effect (95%CI)**

Not reported		attended the same program (intervention or control). **Intervention** Suicide prevention The main objectives of the training followed a common format of most gatekeeper training programs in attempting to provide RAs with information regarding the prevalence of suicidality on college campuses, to communicate a feeling of responsibility unto RAs in regard to resident well-being, to increase the RA's ability to identify and intervene with students in distress, refer them to professional help, and practice these skills through role-plays. The university utilized a training model similar to that of QPR to educate RAs about risk factors and warning signs of suicide and increase their ability to intervene and refer suicidal students to professional help. To accomplish these goals, presenters set the stage for the training by showing clips from the motion picture The Truth About Suicide: Real Stories of Depression in College Students (Ant Hill Marketing, 2009). This film documents the traumatic stories of suicide survivors in a college setting. Statistics were presented to highlight the prevalence of suicidal ideation on college campus. Barriers to intervention were then explored, focusing on the false,	<table><tr><td>Number of interventions performed (behaviour)</td><td>4.6 (6.16)</td><td>4.9 (6.06)</td><td>-0.03 (-2.19, 1.59)</td></tr><tr><td>Number of suicidal residents reported (perceptions)</td><td>0.47 (0.95)</td><td>0.33 (0.65)</td><td>0.14 (-0.11, 0.39)</td></tr><tr><td>Suicidal thought severity</td><td>1.5 (0.86)</td><td>1.3 (0.73)</td><td>0.20 (-0.05, 0.45)</td></tr></table> **Author's conclusions** Results suggest that the 1-hour suicide prevention gatekeeper training program conducted at the beginning of the fall semester did not effectively increase RA intervention behaviours or RA awareness of resident suicidality over time.

		widespread belief that discussion suicide with a distressed individual will unintentionally lead to self-harm. The training facilitators then prompted the RAs to discuss their barriers to intervening with residents and explored ways to increase their confidence in how to intervene with residents. RAs were provided with information about how to intervene with distressed residents and then engaged in roleplays to practice communicating concern, asking questions about mental health, referring individuals to mental health resources, and encouraging help-seeking. **Comparison** Stress and Time Management Training Program (control group) The stress and time management training program sought to review healthy versus unhealthy lifestyle habits and coping skills to help aid RAs with balancing their job with school and a social life. RAs assigned to the stress and time management training program attended one, large session together. The training presented RAs with an overview of unhealthy lifestyle habits to avoid signs and symptoms of distress and various coping mechanisms. A time management matrix was also presented to help RAs visualize how to prioritize obligations. Lastly, RAs were provided with information on the UCC's hours and services, encouraging them to visit in times of distress. The presentation itself is one the campus has been utilizing for	

		years in trainings for students, faculty, and staff. This training served as a control group condition in this study as the participants received the same total hours of training as did the intervention group, but were trained in ways to better care for themselves rather than receiving information related to gatekeeper training or suicide prevention.	

Limitations identified by author
One potential limitation is the self-report methodology used to assess frequency of intervention behaviours, frequency of resident help-seeking behaviours, and beliefs about mental health prevalence. Additionally, RAs may have reported a lower perception of suicidal distress as influenced by a confirmation bias, where performing few interventions is equated to a minimal need for mental health support
Limitations identified by review team
All participants were from one university. No true control group, both groups received training.

E.1.1.23 Mishara and Martin 2012

Mishara Brian L; Martin Normand 2012 Effects of a comprehensive police suicide prevention program. Crisis 33 (3): 162-8

Study details

Author/year

Mishara Brian L; Martin Normand 2012

Quality score

+

Study type

Before-after

Aim of the study

Research Parameters

Number of participants

4,178 members of the Montreal police force

Participant characteristics

	Number (%)
Men	3255 (77.9%)
Age	
20-29	1147
30-39	1810
40-49	889
50-59	330

Population / Intervention

Intervention / Comparison

Intervention:

The long-term goal of Together for Life is to prevent suicides among members of the Montreal Police Force.

The program's short-term goal is to develop the abilities of officers to deal with suicide, develop mutual support and solidarity among members of the Force in suicide prevention, provide help for related problems, and develop competencies in using existing resources.

Results

Primary outcomes

The study obtained information from the Quebec Coroner's Office on all police suicides in the Montreal police and the other police suicides in the Province of Quebec for 11 years before the program began from 1986 to 1996 and for 12 years after the program, from 1997 to 2008. Because of delays in validating data there is a 2-year delay in obtaining suicide data from the Coroner's Office. The study began data collection with 1986 since this was the first year that the coroner systematically included information on the occupation of persons who died by suicide.

	1986-1996 (11 years)	1997-2008 (12 years)	Reduction
Suicide	14	4	

To examine the effectiveness of suicide prevention programme on police's knowledge.

Location and setting

Montreal Police Force, Canada

Length of study

1986-2008

Before the intervention: 1986-1996

After the intervention: 1997-2008

Source of funding

The study was supported by a grant from the Minister of Health and Social Services of the Province of Quebec.

60+	2
Ranks	
Officers	2998
Sergeants	444
Sergeant-Detectives	507
Lieutenants	47
Lieutenants-Detectives	52
Captains	1
Captain-Detectives	2
Commanders	98
Inspectors	9
Chief-Inspectors	12
Assistant-Directors	5
Associate-Directors	2

Inclusion criteria

Montreal police force in the local community posts and police headquarters.

Exclusion criteria

Not reported

The program involves four complementary components:

– **Training for all units**: All police personnel received a

half day training session conducted in each neighbourhood police post, administrative unit, and operational centre on the nature of suicide, identification of suicide risk and how to help a colleague in difficulty.

– **Police resources**: A new telephone helpline for police officers was established. Callers could choose from four problem areas (work events (traumatic situations); gay and lesbian issues; alcoholism, gambling and other dependencies; marital and relationship problems). Callers are asked to leave a message with their contact information so that they can be called back by a police volunteer trained in suicide prevention "in complete discretion."

– **Training of supervisors and union representatives**: This full-day training session conducted by psychologists focused upon improving supervisors' abilities to identify officers at risk of suicide and how to provide help.

– **Publicity campaign "Together for Life"**: This campaign to inform police officers about suicide prevention involved publishing articles in the internal police newspapers, hanging large posters on the program in each police unit, and distributing a brochure describing the program to all members of the force.

Comparison:

Before-after the intervention

Population	4178	5189	-78.9% (-99.3% to -33.4%)
Rate per 100,000 (95%CI)	30.46 (18.04-51.44)	6.42 (2.31-17.88)	

Author's conclusion

In the 12 years since the program began the suicide rate decreased by 79%. Also, knowledge increased, supervisors engaged in effective interventions, and the activities were highly appreciated. Comprehensive suicide prevention programs tailored to the work environment may significantly impact suicide rates.

Limitations identified by author
Possibly some unidentified factors unrelated to the program could have influenced the observed changes.
Limitations identified by review team
It is multi-component intervention, and reported an overall reduction in suicide rate.

E.1.1.24 Ono et al 2013

Ono Y utaka, Sakai Akio, Otsuka Kotaro, Uda Hidenori, Oyama Hirofumi, Ishizuka Naoki, Awata Shuichi, Ishida Yasushi, Iwasa Hiroto, Kamei Yuichi, Motohashi Yutaka, Nakamura Jun, Nishi Nobuyuki, Watanabe Naoki, Yotsumoto Toshihiko, and Nakagawa A. 2013. "Effectiveness of a multimodal community intervention program to prevent suicide and suicide attempts: A quasi-experimental study". PloS one 8:e74902.

Study details

Author/year

Yutaka Ono et al, 2013

Quality score

+

Study type

Quasi-experimental

Aim of the study

To examine the effectiveness of a community-based multimodal intervention for suicide prevention in rural areas where the suicide rate was high, with a non-randomised comparative intervention trial using parallel prevention-as-usual control

Location and setting

Japan

Research Parameters

Inclusion criteria

We set two areas, rural areas and highly populated areas, as the study targets.

The participants in the rural areas were the inhabitants living in four matched pairs of intervention groups and control groups (consisting of 17 communities); In highly populated areas, two neighbouring communities were designated as the intervention and control groups, respectively. The participants in the highly populated areas were the inhabitants living in three matched pairs of intervention group and control group (consisting of six communities)

Exclusion criteria

Not reported

Population / Intervention

Participant numbers

	Rural areas	
	Int	Control
no. areas	7	10
No. people	291,459	339,674

Participant characteristics

	Rural areas	
	Int	Control
% of male	47	47
% under 25	16	16
% aged 25-64	55	53

Results

Primary outcomes

Incidence rate of combined suicide including completed suicide and suicide attempts

	Rural areas	
	Before (2003-2005)	After (2006-2009)
No. of suicide per year	133	110
Mean population per year	590,073	573,186
Rate 100,000 person years	22.48	19.15

In the rural areas, the overall median adherence of the intervention was significantly higher. The RR of the composite outcome in the intervention group decreased 7% compared with that of the control group. Subgroup analyses demonstrated heterogeneous effects among subpopulations: the RR of the composite outcome in the intervention group was significantly lower in males (RR = 0.77, 95% CI 0.59–0.998, p = 0.0485) and the RR of suicide attempts was significantly lower in males (RR = 0.39, 95% CI 0.22–0.68, p = 0.001) and the elderly (RR = 0.35, 95% CI 0.17–0.71, p = 0.004). The

Length of study 3.5 years **Source of funding** This work is supported by Ministry of Health, Labour, and Welfare of Japan.	**Method of analysis** In the primary analysis, we compared the rate ratios (RRs) of incidence of the composite outcome as adjusted by covariates for the effect of the intervention.	**Intervention** A community-based multimodal intervention for suicide prevention: Leadership involvement was an important factor for the effective implementation of long-term programs by creating society commitment at multiple levels and establishing community support networks. Education and awareness programs aimed to reduce the stigmatisation of mental illness and suicide. The programs also aimed at improving the recognition of suicide risk and facilitating help-seeking and access to mental health services through improved understanding of the causes and risk factors for suicidal behaviour. Training programs targeting gatekeepers and care providers aimed to facilitate their roles in early detection within potentially vulnerable populations and to increase preventive functions. The screening programs aimed to identify at-risk individuals in the community and direct them to treatment. In addition, the program recommended that the local health authorities provide appropriate care for suicide survivors to support their grief work, if necessary.	intervention had no effect on the RR of the composite outcome in the highly populated areas **Author's conclusions** Our findings suggest that this community-based multimodal intervention for suicide prevention could be implemented in rural areas, but not in highly populated areas.
Limitations identified by author There are several limitations of the present study. 1) The study was not a randomised trial. Therefore, we used a matched pair design and a model adjusted for possible confounding factors in the analysis. However, some unmeasured and residual confounders may still persist. We need to perform randomised trials confirming our insights. 2) The study participants, investigators and the reporters of events were not blind to the intervention. Although the outcomes were systematically collected from official records, the study might have some misclassification bias. 3) Adherence to the intervention was limited. The adherence would be improved by investing sufficient budgets and resources. **Limitations identified by review team** Non-randomised trial study design. Health related profiles of population in target areas were unclear, potential factors associated with suicide were not clear.			

E.1.1.25 Petrova et al 2015

Petrova Mariya ; Wyman Peter A; Schmeelk-Cone Karen ; Pisani Anthony R 2015. Positive-Themed Suicide Prevention Messages Delivered by Adolescent Peer Leaders: Proximal Impact on Classmates' Coping Attitudes and Perceptions of Adult Support. Suicide & life-threatening behaviour 45(6).			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Petrova M et al 2015

Quality score

-

Study type

RCT

Aim of the study

to examine the short-term impact of positive-themed suicide prevention messaging delivered by adolescent peer models through Sources of

Strength and to evaluate the added benefit of soliciting active participation from the target

audience

Location and setting

School, USA

Length of study

Published in 2015

Source of funding

The study is support by the National Institute of Mental Health (RO1MH091452,

Number of participants

Of 833 students in the 36 classrooms, 706 (84.8%) participated

Participant characteristics

The students were predominantly white (91.6%). The three randomized conditions were balanced on sex, grade, race/ethnicity, and past year suicidal ideation (SI), which was reported by 12.7% of students.

	PL modelling (n=252 students, 11 classes)	PL modelling & interactive (n=244 students 13 classes)	Control (n=210 students, 12 classes)
White, no. (%)	221 (91.7)	208 (90.0)	191 (93.2)
Female, no (%)	132 (52.6)	118 (48.4)	97 (46.2)
Suicide ideation, no. (%)	32 (12.9)	31 (13.0)	25 (12.2)
Suicide attempts. No. (%)	12 (4.9)	16 (7.0)	12 (5.8)

Inclusion criteria

All students received an information form that included helping resources for suicidal students or those concerned about the safety of a peer. All parents were sent an information letter, which included instructions on how to decline their child's participation. Less than 1% of parents declined

Intervention / Comparison

Within each school, classrooms were stratified by grade level and randomly assigned to: (1) peer leader modelling; (2) peer leader modelling plus classroom interactive component; or (3) control condition

Intervention group:

Peer Leader Modelling—To offer other students models of positive coping and increase acceptability of engaging trusted adults, each peer leader told a personal narrative about how using two or more of the 'sources of strength' helped him/her cope with adversity; highlighted the concept that the more resources one has the better he/she can handle difficult times; how he/she would contact a trusted adult when aware of a suicidal friend and shared the names of 1-2 of his/her own trusted adults (approximately one min. per peer leader; 3-5 PL presenters).

Peer Leader Modelling + Interactive Activity (Naming of Adults)—In addition to all elements of the standard modelling presentation, the final presenting peer leader invited students to write the names of adults who they would go to for help if concerned about a suicidal friend on a post-it note and, if they wished, add the note to a poster.

Control group:

Analysis

To test the effects of the peer leader messaging activities, multi-level models were estimated using HLM 6.0 in which students were nested within classrooms.

Primary outcomes

Coping with Distress and Suicide Concerns

Help Seeking from Adults at School, assesses attitudes and perceived norms about help seeking acceptability (4-items);

Reject Codes of Silence, assesses attitudes toward overcoming secrecy barriers to engage adults for suicidal peers with three items.

Maladaptive Coping, about acceptability of getting help, using drugs and alcohol to cope with problems, and suicide acceptability (4-items).

Sources of Strength Coping, assesses extent to which students view eight resources identified by research as suicide behavior protective factors as useful to them in overcoming challenges in their life. (9-items).

Perceptions of Adult Support

Adult Help for Suicidal Youth, assesses perceptions that adults can help suicidal students in their school using four items.

Trusted Adults at School, evaluates students' perceptions about their engagement with caring adults in their school (4-items).

Naming Trusted Adults, is measured by students being asked to write down the names of specific adults they would ask for help for themselves or a friend.

We found consistent evidence that exposure to either peer leader presentation enhanced proximal classroom coping attitudes and perceptions of adult support, as shown by directionally-positive estimates ($p < .05$) for presentation condition in HLM models that included all three presentation conditions

Model estimated for 3-groups

	Coefficient (SE)	P value

<table>
<tr>
<td>K23MH101449) and New York State-Office of Mental Health</td>
<td>Exclusion criteria

Not reported</td>
<td>Main models compared presentation conditions as follows: control (coded as 0), PL Modelling (coded as 1), and PL Modelling + Interactive (coded as 2).</td>
<td>
<table>
<tr><td>Coping attitudes & suicide norms</td><td></td><td></td></tr>
<tr><td>Help-seeking from adults</td><td>0.115 (0.3036)</td><td><0.01</td></tr>
<tr><td>Reject codes of silence</td><td>0.078 (0.029)</td><td><0.01</td></tr>
<tr><td>Maladaptive Coping</td><td>-0.057 (0.031)</td><td>Not reported</td></tr>
<tr><td>Sources of Strength Coping</td><td>0.053 (0.034)</td><td>Not reported</td></tr>
<tr><td>Perceptions of adult support</td><td></td><td></td></tr>
<tr><td>Adult help for suicide youth</td><td>0.068 (0.029)</td><td><0.05</td></tr>
<tr><td>Trusted adults at school</td><td>0.066 (0.035)</td><td>Not reported</td></tr>
<tr><td>Trusted adult naming</td><td>0.235 (0.105)</td><td><0.05</td></tr>
</table>
Author’s conclusion

The present study is the first to evaluate the impact of positive-themed suicide prevention communications on high school students’ attitudes and perceptions. Findings have significance for suicide prevention by demonstrating that peer modelling of healthy coping attitudes and practices is a promising alternative to widely used communication strategies focused on negative costs of mental health problems.
</td>
</tr>
<tr>
<td colspan="4">Limitations identified by author
This study evaluated only immediate, proximal effects of peer presentations on classmates’ attitudes and perceptions.
Participants were selected from predominantly rural communities, the participating schools served primarily white students, which limits generalization.
The study could not separate the effects of the messenger (student peers) and message content and structure (modelling consequences of positive coping vs. negative consequences of untreated problems),
Limitations identified by review team
The study occurred during Sources of Strength implementation, and study effect may be contaminated by different components of SOS.</td>
</tr>
</table>

Previous training experience were unknown.

E.1.1.26 Pope et al 2016

Pope N D et al 2016 Evaluating a training intervention to prepare geriatric care managers to assess for suicide and firearm safety. Educational gerontology 42 (10): 706-16.

Study details	Research Parameters	Population / Intervention	Results
Author/year Pope N D et al 2016 **Quality score** **+** **Study type** Quasi-experimental before and after **Aim of the study** To described the training intervention that consisted of two parts: (1) a gatekeeper training for suicide assessment amongst older people; (2) CALM, and evidence-based brief training that teaches effective strategies to talk with clients about reducing access to lethal means. A second objective of the study is to report on change in providers' knowledge, attitudes, and practices related to suicide and firearm assessment and safety counselling with community dwelling older adults. **Location and setting** Ohio, USA	**Number of participants** 66 **Participants characteristics**. Participants were primarily White 989%) female (94%). The mean age of respondents at baseline was 43.79 years 9SD=11.62). Mean years of employment at AAA was 8.01 (SD=7.71). Over half (56%) of the sample had a bachelor's or master's degree. Nursing (44%) and social worker (32%) were the most common case manager disciplines. Most participants reported working primarily with rural and suburban older adults (87%). **Inclusion criteria** Sample eligibility criteria were aimed at identifying older adult caseworkers providing direct social service care. Participants were required to be employee of the selected AAA region, one of 12 AAAs that cumulatively represent the 88 counties in Ohio. **Exclusion criteria** Individuals were ineligible if they were not employee of this AAA regional office.	**Intervention / Comparison** **Intervention:** The 5-hour training included the following three educational components: under-standing suicide risk among older adults, assessing for suicide risk using QPR (Question, Persuade, Refer), and CALM (Counselling on Access to Lethal Means). Approximately 3 hours of the training was spent on depression recognition, suicide risk factors, and suicide assessment. The objectives of the training were to (a) increase knowledge about the causes of suicide among older adults, (b) learn about the connection between depression and suicide, (c) dispel myths and misconceptions about suicide among older adults, (d) learn risk factors and signs of suicidal behaviour in older individuals, and (e) learn to assess risk and find help for those at risk. The second phase of the training, lasting 2 hours in length, was on firearm assessment and safety counselling, specifically teaching CALM. CALM is considered a best practice endorsed by the Suicide Prevention Resource Centre. The training was originally developed for adolescents and their families but has been adapted for other populations included older adults. The training is "designed to help provides implement counselling strategies to help clients at risk	**Primary outcomes** **Self-evaluation knowledge**; The 9-item scale measures individuals' perceived knowledge regarding clients experiencing suicidal ideation or attempts. The 7-point Likert scale(1= nothing, 7 = very much) produces a total score, with higher scores reflecting more positive self-evaluation knowledge (range 9–63). **Perceived preparedness for gatekeeper role** The 8-item scale measures case managers' preparedness to complete suicide prevention activities. Item responses range from not prepared (1) to quite well prepared (7). **Efficacy to perform gatekeeper role** 7-item gatekeeper efficacy scale. The scale measures an individual's perceived ability to perform suicide prevention activities. **Reluctant to perform gatekeeper role** Case manager reluctance to engage suicidal clients was assessed using the 9-item Gatekeeper Reluctance Measure. **Knowledge and attitudes of firearm assessment and safety counselling** Perceived preparedness to address suicide risk and firearm safety was measured using the Knowledge and Attitudes of Firearm Assessment and Safety Counselling Measure **Change in knowledge of suicide assessment and perceived preparedness to address suicide risk score after gatekeeper training.**

Length of study Published in 2016 **Source of funding** Not reported		for suicide and their families reduce access to lethal means, particularly firearm. **Comparison:** Before and after the intervention	<table><tr><th></th><th>Pre-test</th><th>Post-test</th><th>Mean difference</th></tr><tr><td>Self-evaluation knowledge</td><td>38.44 (11.93)</td><td>47.46 (7.77)</td><td>9.02 (5.59, 12.45)</td></tr><tr><td>Preparedness</td><td>32.24 (9.78)</td><td>40.35 (6.85)</td><td>8.11 (5.23, 10.99)</td></tr><tr><td>Gatekeeper efficacy</td><td>29.28 (6.27)</td><td>33.32 (4.69)</td><td>4.04 (2.15, 5.93)</td></tr><tr><td>Gatekeeper reluctance</td><td>22.08 (5.80)</td><td>21.52 (6.17)</td><td>-0.56 (-15.51, 14.39)</td></tr><tr><td>Knowledge and attitudes of firearm assessment and safety counselling</td><td>50.20 (7.14)</td><td>53.34 (7.81)</td><td>3.14 (0.59, 5.69)</td></tr></table> **Author's conclusion** The study demonstrates that specific training on suicide and counselling on access to lethal means can have immediate impact on participants' perceived knowledge, preparedness, and efficacy regarding suicide assessment. Training can also positively impact knowledge and attitudes of firearm assessment and safety counselling amongst participants.
Limitations identified by author A causal association between attitude, knowledge and behaviours cannot be offered at this baseline, pre/post test stage. **Limitations identified by review team** Data only collected before and immediately after the training, and no follow-up data were collected.			

E.1.1.27 Sareen et al 2013

Sareen J ; et al 2013 Gatekeeper training for suicide prevention in First Nations community members: a randomized controlled trial. Depression and anxiety 30(10).

Study details

Author/year

Sareen J ; et al 2013

Quality score

+

Study type

RCT

Aim of the study

To compare the short- and long-term capacity of two interventions, the RR versus ASIST,

To improve First Nations community members' preparedness to help those at risk for suicide.

Location and setting

Community, Canada

Length of study

6 month follow-up

Source of funding

Canadian Institutes of Health Research\Manitoba Health Research Council

Research Parameters

Number of participants

55

Participant characteristics

	Resilience retreat (n=24)	**ASIST (n=31)**
Male, no (%)	12 (50)	10 (32.3)
Age (years)		
16-21	9 (39.1)	15 (48.4)
22-24	10 (43.5)	8 (25.8)
45+	4 (17.4)	8 (25.8)
Education		
Grade9 or lower	3 (12.5)	19 (61.3)
Grade 10 or higher	21 (87.5)	12 (38.7)
Language spoken most often		
English	20 (83.3)	20 (69.0)
Employment status		

Population / Intervention

Intervention / Comparison

Intervention group:

ASIST is a 2-day intensive, interactive and practice-dominated workshop aimed at enabling people to recognize risk and learn how to intervene immediately to prevent suicide. The workshop, facilitated by 2 trained facilitators, allows for a maximum enrolment of 30 participants. In the present study, we limited the number of participants to 24 people per training session based on feedback from Swampy Cree communities.

ASIST is designed for anyone from professionals and volunteers to members of the community. Participants ranged from those in caring roles to people concerned about family members or friends. ASIST is designed to help all caregivers become more willing, ready and able to help persons at risk of suicide.

The ASIST program has 5 learning sections:

(1) Preparing—This section sets the tone, norms, and expectations of the workshop;

(2) Connecting—This section allows participants to explore their own attitudes towards suicide and creates an understanding of the impact that attitudes have on the intervention process;

(3) Understanding—This section describes the intervention needs of a person at risk, focusing on providing participants with the knowledge and skills needed to recognize risk and develop safe plans to reduce the

risk of suicide;

Results

Primary outcomes

Skills in Suicide Intervention: Suicide Intervention Response Inventory (SIRI). The Suicide Intervention Response Inventory-2 (SIRI-2) was used to detect enhancement of intervention skills in participants. The SIRI is a self-administered test that was designed to measure competence in choosing appropriate responses to a series of clinical scenarios with suicidal individuals.

It contains 25 items, each of which consists of a

"client" remark and two "helper" responses. Respondents are required to choose which "helper" response is the most appropriate. Correct responses are judged based on response options made by highly expert suicidologists. The SIRI has shown good internal consistency with an alpha of 0.83.

Secondary Outcomes.

Self-reported preparedness to intervene with suicidal behaviour was measured by 4 questions that were developed in conjunction with Living Works, Inc. The questions assessed

knowledge of the intervention process, confidence in intervening, skills in identifying suicidal individuals, and preparedness to intervene. Responses to each of these questions were asked on a 4-point likert scale with higher scores representing greater skills.

The response options were very confident(4), confident(3), somewhat confident(2), or not at all confident(1).

At 6-months follow up, gatekeeper behaviours were measured using similar items used by Wyman et al.in the school-based study.

	ASIS (n=31)	**Retreat (n=24)**	**Mean differences (95%CI)**

Working full-or part-time	8 (33.3)	6 (19.4)	
Unemployed/social assistance	11 (45.8)	14 (45.2)	
Know someone who had died by suicide	21 (87.5)	28 (90.3)	
Person who died (among those who knew someone)			
Family member other than parent, grandparent, or sibling	13 (61.9)	10 (35.7)	
Friend	11 (52.4)	11 (39.3)	
When most recent suicide death			
More than 1 year ago	10 (47.6)	18 (69.2)	
Within the last years	8 (38.1)	3 (11.5)	
Within the last 6 months	3 (14.3)	5 (19.2)	

(4) Assisting—This section presents a model for suicide intervention, allowing participants to develop their skills through observation and supervised simulation experiences in large and small groups;

(5) Networking—This section generates information about resources in the local community, encouraging participants to explore local resources to create wider networks of support in the community

Resilience Retreat (RR).

RR did not focus on suicide education and awareness was developed as a control group for ASIST

The 2-day RR was divided into cultural teachings and activities, sharing circles, small group discussions, and story telling. Swampy Cree community liaisons from each community identified 2 First Nations community members who are respected in their communities and have had experience in leading camps and working with youth. These individuals were chosen to lead each retreat. The RR, developed in collaboration with First Nations community members, included four main components:

4.578

(1)Seven Sacred Teachings—after a presentation by a First Nations community member and discussion amongst all communities on this topic, attendees separated into individual community groups for discussion, where in

each community member selected one teaching and shared a personal meaning with their community group.

(2)Self-identity—focused on knowing your identity, the past, and celebrating your

Post-training			
SIRI (range 0-25)	14.83 (3.92)	14.30 (3.42)	0.53 (-1.41, 2.47)
Confidence to intervene (range 1-4)	2.73 (0.78)	2.57 (0.99)	0.16 (-0.32, 0.64)
Skills at detecting risk (range 1-4)	2.50 (0.76)	2.23 (0.97)	0.27 (-0.20, 0.74)
Knowledge of risk (range 1-4)	2.65 (0.75)	2.23 (0.92)	0.42 (-0.03, 0.87)
Prepared to help someone (range 1-4)	2.77 (0.91)	2.39 (0.84)	0.38 (-0.08, 0.84)
6-month follow-up			
SIRI (range 0-25)	13.52 (3.72)	15.05 (3.58)	-1.53 (-3.47, 0.41)
Confidence to intervene	2.63 (0.93)	2.68 (0.84)	-0.05 (-0.52, 0.42)
Skills at detecting risk	2.43(0.92)	2.27 (0.77)	0.16 (-0.29, 0.61)
Knowledge of risk	2.50 (0.88)	2.23 (0.81)	0.27 (-0.18, 0.72)
Prepared to help someone	2.43 (0.96)	2.45 (0.86)	-0.02 (-0.50, 0.46)

	Inclusion criteria All members of the Swampy Cree tribal communities who were currently residing on the reserves were eligible to participate in the study.Approximately11,000people live across these eight communities. **Exclusion criteria** Exclusion criteria for the study included being less than 16 years of age, prior training in Safe TALK (a briefer version of suicide awareness training) or ASIST, being an elected official in a First Nations community, living off reserve, and an inability to read or write English.	history. Following the presentation, participants divided into community groups for discussion and then reconvened with all attendees to share discussion points. (3)Healthy communities—explored and discussed the following questions regarding healthy communities using both verbal and pictorial explanations: (a)What is a healthy community?(b) What are the strengths of your community?(c) What are the challenges in your community? And (d) How can your community move from these challenges to being a healthy community? All participants then reconvened to share discussions. (4) Bracelet-making activity—this was facilitated by a community member and involved each participant selecting several beads in a color(s) that represented something significant for them. Once the bracelets were made, each participant shared the "meaning" of their bracelet with another participant. The intention of the exercise was to make connections with people and get to know them. **Control group:** head to head comparison between interventions as above. **Analysis** Descriptive statistics were compared across both groups at baseline. Chi-square analyses were used for categorical variables. Fisher's exact test was used if the expected count in any of the cells was less than five. Mean values on the primary and secondary outcomes were compared across the three time points using linear mixed effects regression models.	**Mean for distress, alcohol use and resilience measures at 6 month follow-up** **ASIST (n=28)** / **Retreat (n=22)** / **Mean differences** **Total distress score**: 6.40 / 6.77 / -0.37 **Adult alcohol total score**: 8.38 / 8.76 / -0.36 **Mean resiliency score**: 33.68 / 37.82 / **Suicide measures amongst participants at baseline, post and 6 months follow-up** ASIST (n=31) / RR (n=24) / Baseline Lifetime suicide ideation: 14 (45.2%) / 14 (58.3%) / 0.77 (0.46, 1.30) Lifetime suicide attempt: 6 (19.4%) / 6 (25.0%) / 0.77 (0.29, 2.10) Suicidal ideation in prior 2 day Not at all: 29 (93.5%) / 22 (91.7%) / 1.02 (0.88, 11.9)

			A little to a lot	2 (6.5%)	2 (8.3%)	0.77 (0.12, 5.10)
			Post-retreat			
			Suicidal ideation in prior 2 day			
			Not at all	23 (92.0%)	21 (91.3%)	0.85 (0.66, 1.10)
			A little to a lot	2 (8.0%)	2 (8.7%)	0.77 (0.12, 5.10)
			6-months follow-up			
			Suicidal ideation since retreat			
			Not at all	21 (75.0%)	21 (95.5%)	0.86 (0.66, 1.11)
			A little to a lot	7 (25.0%)	1 (4.5%)	5.42 (0.71,41,11)
			Suicide attempt since retreat	0	0	
			Author's conclusion In comparison with the Resilience Retreat (n = 24), ASIST training (n = 31) was not associated with a significant impact on all outcomes of the study based on intention-to-treat analysis. There was a trend toward an increase in suicidal ideation among those who participated in the ASIST in comparison to those who were in the Resilience Retreat. The			

			lack of efficacy of ASIST in a First Nations on-reserve sample is concerning in the context of widespread policies in Canada on the use of gatekeeper training in suicide prevention.

Limitations identified by author
The study recruited broadly from First Nations Communities, rather than designated care providers. Thus the findings of the study may not be generalizable to designated gatekeepers.
The sample of participants had a high level of suicide ideation, and suicide attempts at baseline that might have had an impact on the results of the study.
There were baseline educational differences between the ASIST group and RR group that might have impacted the outcome
The small sample of participants cannot be assumed to be represented of the entire study population
Randomising individuals within communities may have led to some cross-contamination across interventions.
The training might have had an impact on suicide attitudes that were not measured by our self-reported measures
Limitations identified by review team
No real "control" in the study, both groups had training.

E.1.1.28 Schilling et al 2014

Schilling Elizabeth A et al 2014 "Signs of Suicide" shows promise as a middle school suicide prevention program. Suicide & life-threatening behaviour 44(6).

Study details	Research Parameters	Population / Intervention	Results
Author/year Schilling Elizabeth A et al 2014 **Quality score** **+** **Study type** RCT **Aim of the study** To examine the effect of Sign of Suicide (SOS) on suicide prevention amongst middle school students. **Location and setting** Middle school, USA	**Number of participants** 386 **Participant characteristics** Participants were fifth through eighth Graders in middle schools with a high proportion of students who had parents in the military (high military impact schools). **SOS (n=299)** / **Control (n=87)** No. (%) white: 113 (37.9) / 44 (50.6) Male: 143 (47.8) / 40 (46.0)	**Intervention / Comparison** Schools were randomly assigned to Intervention and control groups **Intervention group:** The program was presented in schools in the intervention group from November 2009 through March2010. The program was presented mainly by school psychologists and counselors; in one school, a health teacher also presented the program. These school personnel were trained in the program presentation with a detailed manual and DVD included with their SOS program kit, as well as an online interactive module that qualified for continuing education credits for school counselors, social	**Primary outcomes** Three specific outcomes: • Self-reported suicide ideation and suicide attempts The primary endpoint was a combination of 3 single-item measures of self-reported suicide ideation, planning, and attempts which were adapted from the Centres for Disease Control and Prevention's Youth Risk Behaviour Survey. • Knowledge and attitudes about depression and suicide The measure of knowledge and attitudes about depression and suicide were adapted from instruments previously used to evaluate school-based suicide prevention programme. Scores on knowledge reflected the number of correct answers. The measure of attitudes was 10-item summary scale that assessed attitudes toward intervening with friends who exhibit symptoms of depression and/or suicide intent and toward getting help for themselves. 5-point scale. • Help-seeking 8 questions were used to assess help-seeking behaviours.

Length of study

3 months study follow-up

Source of funding

Not reported

English language learners	63 (21.1)	9 (10.3)
Parent or caregiver in military	251 (84.5)	74 (85.1)
Parent or caregiver deployed	93 (31.2)	6 (7.0)

Students were more likely to be White(40.8%) than Hispanic(20%), multi-ethnic(18.4%),or African American(11.7%).Students were also somewhat more likely to be female (52.6%) than male (47.4%). A minority of Students were English language learners (ELL; 18.7%),and 36% were eligible to Receive free or reduced lunch .A large majority(85%) had at least one parent or caregiver serving in the military, and a quarter of students(25.8%) reported having a deployed parent.

Inclusion criteria

Twenty middle schools identified by the Department of Defense as high-impact were approached for participation in the study.

The SOS programme was scheduled to be presented independent of the evaluation at all of these schools. The evaluation included students who were scheduled to receive the program.

Exclusion criteria

Not reported

workers, guidance counselors, and school psychologists.

Control group:

Students in the control group completed the pre-test questionnaires but did not participate in the program.

	Intervention (n=299)	Control (n=87)	Effect
Suicide measures			
Suicide ideation during past 3 months	11 (3.7%)	9 (10.5%)	0.36 (0.15, 0.83)
Suicide planning during past 3 months	14 (4.7%)	10 (11.6%)	0.41 (0.19, 0.88)
Suicide attempts past 3 months	5 (1.7%)	0	3.23 (0.18, 57.79)
Suicide behaviour past 3 months	23 (7.8%)	11 (12.9%)	0.61 (0.31, 1.20)
Lifetime suicide attempt	18 (5.9%)	6 (7.1%)	0.87 (0.36, 2.13)
Scale			
Knowledge of depression and suicide	4.58 (1.20)	4.55 (1.31)	0.03 (-0.28, 0.34)
Attitudes toward help-seeking	4.01 (0.59)	4.05 (0.57)	-0.04 (-0.18, 0.10)
Help-seeking			

Treatment from psychiatrist, psychologist, social worker	25 (8.3%)	13 (14.9%)	0.56 (0.30, 1.05)
Talked to adult about a friend	44 (14.6%)	21 (24.1%)	0.61 (0.38, 0.97)
People talked to			
Parents and guardians	71 (23.7%)	17 (19.5%)	1.22 (0.76, 1.95)
Siblings	22 (7.5%)	10 (11.5%)	0.64 (0.32, 1.30)
Teachers or guidance counsellor	25 (8.5%)	11 (12.6%)	0.66 (0.34, 1.29)
Friend	62 (20.7%)	31 (35.6%)	0.58 (0.41, 0.83)
Crisis or telephone hotline	1 (0.3%)	1 (1.1%)	0.29 (0.02, 4.60)

Author's conclusion

This is the first evaluation of the SOS programme among middle school students with results suggesting promise for its efficacy with younger adolescents.

The SOS programme had an impact on students' self-reported suicide behaviour 3 months study follow-up. Participants in the SOS programme was associated with positive changes in knowledge of suicide and depression Consistent with results from evaluation in high school

			samples, no significant effect of the SOS on change in help-seeking behaviour.

Limitations identified by author
The study did not include enough self-reported suicide attempts to evaluate whether participation in SOS at the middle school level was associated with fewer attempt. The validity of the knowledge measure in the control group was low. Limited number of assessment on suicide thoughts and behaviours. Short study follow-up
Limitations identified by review team
Allocation, masking and randomisation were not described in the study.
Financial incentives were provided during the recruitment.
Self-reported measures were used in the study.

E.1.1.29 Schilling et al 2016

Schilling Elizabeth A; Aseltine Robert H; Jr ; James Amy ; 2016 . The SOS Suicide Prevention Program: Further Evidence of Efficacy and Effectiveness. Prevention science : the official journal of the Society for Prevention Research. 17 (2)

Study details	Research Parameters	Population / Intervention	Results
Author/year Schilling et al 2016 **Quality score** **+** **Study type** RCT **Aim of the study**	**Number of participants** 1052 participants completed both pre-and post questionnaires. **Participant characteristics** Participants were ninth grade students in 16 technical high schools in the state of Connecticut and a comprehensive secondary school.	**Intervention / Comparison** Schools were randomly assigned to Intervention and waiting list control groups **Intervention group:** Signs of Suicide educates students that suicidal intent and behaviour are usually symptoms of mental illness and are a part of the diagnostic criteria for major depressive disorder.	**Primary outcomes** Suicidal behaviours; Knowledge and attitude

	SOS (n=719)	Control (n=553)
No. (%) white	469 (64.8)	301 (54.2)

	Intervention (n=650)	Control (n=396)	Effect (RR)
Suicide measures			
Suicide ideation during past 3 months	45(6.9%)	36 (9.0%)	0.76 (0.50, 1.16)

To evaluate of the Signs of Suicide (SOS) prevention program in a high school population

Location and setting

Technical high school, USA

Length of study

3 months study follow-up

Source of funding

This study was supported by a Garrett Lee Smith Memorial Act Grant

Male	407 (55.8)	342 (61.6)
English language learners	69 (9.5)	57 (10.2)
Free/reduced lunch	163 (24.7)	210 (41.9)

Inclusion criteria

Participants were ninth grade students in 16 technical high schools in the state of Connecticut and a comprehensive secondary school.

Exclusion criteria

Not reported

School participants in the programme receive a kit of materials containing the DVD, discussion guide, screening forms, and other education and promotional items.

Control group:

Wait-listed group

Suicide planning during past 3 months	40 (6.1%)	29 (7.3%)	0.84 (0.53, 1.33)
Suicide attempts past 3 months	11 (1.7%)	20 (5.0%)	0.34 (0.16, 0.69)
Lifetime suicide attempt	54 (8.3%)	59 (14.9%)	0.56 (0.39, 0.79)
Scale	N=420	N=350	
Knowledge of depression and suicide	5.15 (1.33	4.59(1.33)	0.56 (0.37, 0.75)
Attitudes toward help-seeking	3.74 (0.66)	3.61 (0.64)	0.20 (0.60, 0.34)

Author's conclusion

Participants of the SOS programme was associated with an increase in students' knowledge and favourable attitudes toward getting help for themselves or friend for suicide thoughts. They were associated with lower rate of suicide attempts at 3 months following the programme but was not associated with changes in suicidal ideation.

Limitations identified by author
The fidelity of the discussion led by school staff was not assessed;
Various programme components were not evaluated separately.
Measures of knowledge and attitudes have not been formally validated.
Missing data in the study

Limitations identified by review team
Students' previous training were not reported.
Masking of participants were not reported.

E.1.1.30 Shelef et al 2016

Shelef L ; Tatsa-Laur L ; Derazne E ; Mann J J; Fruchter E 2016 An effective suicide prevention program in the Israeli Defense Forces: A cohort study. European psychiatry 31: 37-43.

Study details

Author/year

Shelef L ; Tatsa-Laur L ; Derazne E ; Mann J J; Fruchter E 2016

Quality score

+

Study type

Quasi-experimental (before-after)

Aim of the study

To evaluate the effectiveness of the IDF Suicide Prevention Program, implemented since 2006

Location and setting

Defence force, Israeli

Length of study

1992-2012

Before the intervention: 1992-2005

After the intervention 2006-2012

Research Parameters

Number of participants

1,171,357

active duty mandatory service IDF soldiers

Participant characteristics

	No prevention (n=766,107)	Prevention (n=405,252)	P
Male	401,297 (52.4%)	223,794 (55.2%)	<0.000
Mental health diagnosis	22,562 (2.9%)	8,493 (2.1%)	<0.000
Combat duty	113,236 (15.2%)	78,348 (20.1%)	<0.000
Socio-economic status			<0.000
Low	178,660 (23.5%)	99,902 (24.9%)	
Average	410,727 (54.0%)	214,186 (53.4%)	

Population / Intervention

Intervention / Comparison

Intervention:

The IDF Suicide Prevention Program is a population-based program, incorporating: reducing weapon availability, de-stigmatizing help-seeking behaviour, integrating mental health officers into service units, and training commanders and soldiers to recognize suicide risk factors and warning signs.

Comparison:

Before and after the programme implemented in 2006

Results

Primary outcomes

The main outcome variable was time-to-death-by-suicide. Of the 1,171,357 soldiers enrolled in the study, 462 deaths were classified as suicide following an extensive official cause-of-death investigation, carried out routinely after every non-combat death.

After excluding 29 suicide deaths of soldiers who were inducted before the intervention began but died by suicide afterwards, the suicide group comprised 433 deaths by suicide over a 20-year period, 1992–2012.

Soldiers enter or are discharged from the army at specific periods throughout the year after completing mandatory service. Thus, at least three cohorts would be serving in the IDF at any given time. We calculated the suicide rate by dividing the entire population into cohorts, based on their enlistment date. The suicide rate was determined by dividing the number of suicides in the two- or three-year cohorts by the number of person-years for any given cohort. By convention, we report the suicide rate per 100,000 person-years.

There were 344 suicides reported during the 14 years prior to the intervention (1992–2005: 24.6 suicides per year; 93% male).Eighty-nine suicides were reported during the seven years after the intervention commenced (2006–2012: 12.7 suicides per year; 87% male).

	Before (1992-2005, 14 years)	After (2006-2012, 7 years)
Number of suicides	344	89

Source of funding Not reported	High | 171,365 (22.5%) | 87,041 (21.7%) | **Inclusion criteria** Active duty mandatory service IDF soldiers **Exclusion criteria** A subsection of the population (n = 176,287) that does not represent the regular mandatory service IDF soldiers (several population groups defer military service, such as academic reserve soldiers and conscription evaders) was excluded		Participants: 766107 | 405252 Cumulative follow-up: 1476779 | 800079 We fit a Cox regression model, which covered the entire period, using exposure to the SPP as the explanatory variable. Suicide rates dropped from an average of 23/100,000 per year prior to the intervention to 11/100,100 per year subsequent to the intervention. The hazard ratio was 0.48 (95% CI: 0.37–0.60) and adjusting for other explanatory variables lowered the hazard ratio to 0.43 (95% CI: 0.33–0.55). **Author's conclusion** There was a 57% decrease in the suicide rate following the administration of the IDF Suicide Prevention Program as shown at the years 2006–2012, compared with 1992–2005. The effect of the intervention appears to be related to use of a weapon, and being able to benefit from improved help-seeking and de-stigmatization. The success of the IDF program may inform suicide prevention in other military organizations and in the civilian sector.
Limitations identified by author The SSP did not alter time to a suicide, a primary a priori outcome measure, and the quasi-experimental design of the study lacked random assignment and a parallel treatment group. One element of the SPP, namely decreased weapon availability, may account for the entire suicide prevention effect, because between 2007–2012. 84% of the soldiers died by firearms and 13% by hanging. Thus, interventions that specifically impact firearm availability will have a disproportionately big effect. The major component gun control, that is likely to be a major candidate for the ''active'' ingredient, given no other compelling information, is also not likely to be easily transferable to other military services or countries. **Limitations identified by review team** None.			

E.1.1.31 Szekely et al 2013

Szekely Andras et al 2013 How to decrease suicide rates in both genders? An effectiveness study of a community-based intervention (EAAD) PloS one 8(9)			
Study details	**Research Parameters**	**Population / Intervention**	**Results**

Author/year

Szekely Andras et al 2013

Quality score

+

Study type

Experimental

Aim of the study

To evaluate the effectiveness of a regional community-based four-level suicide prevention programme on suicide rates.

Location and setting

Szolnok, Hungary

Length of study

6 years study period, 2002 to 2007

Source of funding

The European Alliance Against Depression programme was funded within the Public Health Programme of the European Commission. This study received funding from OSPI-Europe as part of the European Community's Seventh Framework Program.

Number of participants

Residents in city of Szolnok, with a population of 76,881 in 2004

Participant characteristics

Of 76,881 inhabitants in 2004, 36,314 men and 40,567 women. The population was essentially stable during the intervention. The unemployment rate was 5.9% in 2004, 6.5% in 2005 and 6.0% in 2006.

Inclusion criteria

Residents in city of Szolnok

Exclusion criteria

Not reported

Intervention / Comparison

Intervention:

The 4-level intervention concept of the European Alliance Against Depression (EAAD).

Level 1: Co-operation with general practitioners. Interactive workshops using educational packages were developed and offered to GPs. To improve detection of patients with depression, GPs were encouraged to use the shortened Beck Depression Inventory in their practices. To improve treatment utilization, the collaboration between the psychiatric outpatient service and the GPs was strengthened by organizing education programs, panel and roundtable discussions, and setting up an online information centre.

Level 2: Public relations campaign. The programme started with an opening conference at the town hall for helping professionals and for media workers. 10,000 leaflets and 250 posters were disseminated in Szolnok during the intervention and two publications were released and disseminated on the subject entitled Together against Depression and Depression among children and adolescents. After the campaign kick-off, press conference, and press release there were 49 subsequent appearances in the media (including TV, radio interviews, articles in local and national newspapers). Twenty-four of these were during the three week period directly after the press conference but there were also several replays later.

Primary outcomes

Suicide mortality and population data for Hungary and Szolnok were obtained from the Hungarian Central Statistical Office.

Suicide rate per 100,000 in the city of Regensburg

	Number of suicide	Suicide rate per 100,000
2002	25	32.42
2003	21	27.35
2004	23	30.08
2005	10	13.15
2006	11	14.55
2007	9	11.96

Author's conclusion

For the duration of the programme and the follow-up year, suicide rates in Szolnok were significantly lower than the average of the previous three years (p = .0076). The suicide rate thus went down from 30.1 per 100,000 in 2004 to 13.2 in 2005 (256.1 %), 14.6 in 2006 (251.4 %) and 12.0 in 2007 (260.1 %). These results seem to provide further support for the effectiveness of the EAAD concept.

		Level 3: Community facilitators. In view of the important role of community facilitators, educational workshops were arranged for teachers, district nurses, hotline workers, counsellors, clerics, nurses, policemen, pharmacists and others. These professionals might be influential in depressed and suicidal persons' decisions to access care. Special educational packages were developed for these community facilitators on the following topics: epidemiology, recognition and treatment of suicide risk and depression, depression and anxiety, depression in young and old individuals, the role of different helping professionals in suicide prevention, and suicide risk recognition. During the intervention, 230 community facilitators were trained. There was also close cooperation with the media to promote preventive activities. Media guidelines were handed out recommending how to report on suicides, and how not to report on them in order to avoid imitation suicides. Level 4: High risk groups and self-help. An ''emergency card'' was produced with an emergency hotline telephone number. The emergency cards were attached to the leaflets with information on facilities such as telephone emergency services, professionals, psychiatrists and relevant local charitable organisations. The leaflets with emergency cards were distributed among the patients of the local psychiatry. A local information data network was built up required for facilitating fast communication on the subject. In addition, educational materials were	

		provided to support the local non-stop telephone emergency services. Head of this latter organization was also involved in the EAAD core group. **Comparison:** The first phase of the EAAD project (2005-2006) set up the programme. Suicide rates of the years before the intervention (2002, 2003, 2004) were compared to those during and after the intervention	
Limitations identified by author The magnitudes of the effects are numerically correct, but have to be interpreted with caution in view of the small sample sizes. Also, such community-based interventions, although controlled for general trends in suicide rates in the whole population and in a control city, do not provide proof for efficacy with the same evidence level as a randomized controlled study. Besides random fluctuations, there are too many factors which are hard to control. **Limitations identified by review team** As a multi-level intervention, it is not possible to draw conclusions as to which elements of the four-level intervention might have been the most relevant to the reduction of the number of suicide			

E.1.1.32 Walrath et al 2015

Walrath Christine ; Garraza Lucas Godoy; Reid Hailey ; Goldston David B; McKeon Richard 2015 Impact of the Garrett Lee Smith youth suicide prevention program on suicide mortality. American journal of public health 105 (5): 986-93.

Study details	Research Parameters	Population / Intervention	Results
Author/year Walrath Christine ; Garraza Lucas Godoy; Reid Hailey ; Goldston David B; McKeon Richard 2015 **Quality score** - **Study type** Quasi-experimental study **Aim of the study**	**Number of participants** 320,500 **Characteristics of population** Mean intervention group (n=479(Mean control group (n=1616) Suicide rate by age (per 100,000) 10-18y: 4.9 / 4.3	**Intervention / Comparison** **Intervention:** Garrett Lee Smith Youth Suicide Prevention. The GLS state and tribal grants stipulated that grantees promote or develop early intervention and prevention services aimed at reducing risk for suicidal behaviours. GLS grantees also have been encouraged to use funds for facilitating timely referrals of youth at risk for suicidal behaviours, and for improving access to services for youth from varied backgrounds.	**Primary outcomes** The main outcome of interest was the county's suicide mortality rate the year after the implementation of GLS training sessions amongst the population aged 10-24 years between 2007 and 2010. Secondary analyses focused on suicide rate by age groups 10 to 18 years and 19 to 24 years. Mortality information is collected by state registries and provided to the National Vital Statistics System, It includes cause of death and demographic descriptors indicated on death certificates.

To examine the effect of Garrett Lee Smith (GLS) program on the reduction in youth suicide mortality occurred between 2007 and 2010

Location and setting

Counties across the USA

Length of study

2007-2010

Source of funding

The study was supported through a SAMHSA contract to ICF Macro.

19-24y	15.7	15.6
≥25y	17.4	16.5
Total population, in 1000s	208.7	111.8
Population by age, %		
10-18y	13.1	13.3
19-24y	8.8	8.3
≥25y	64.9	65.2

Inclusion criteria

All counties with a population of at least 3000 youths aged between 10 and 24 years were considered for inclusion.

Exclusion criteria

Not reported

Comparison

Counties with no Garrett Lee Smith Youth Suicide Prevention programme implemented.

	Average effect of GLS training	
	Estimate (SE)	P values
Suicide rate10-24 age group		
GLS training session last year	-1.33 (0.49)	0.0160
GLAS training session ≥2y ago	0.39 (0.71)	0.5911
Suicide rate10-18 age group		
GLS training session last year	-0.73 (0.44)	0.1188
GLAS training session ≥2y ago	0.01 (0.53)	0.9865
Suicide rate19-24 age group		
GLS training session last year	-2.16 (1.27)	0.1090
GLAS training session ≥2y ago	1.17 (1.76)	0.5162
Suicide ≥25y age group		
GLS training session last year	0.62 (0.58)	0.3010
GLAS training session ≥2y ago	0.03 (0.52)	0.9684

Author's conclusion

			The study observed a reduction in the rate of suicide mortality amongst youths in counties implementing GLS suicide prevention programmer compared with counties that were not targeted by GLS programmes. These results suggest the existence of an important reduction in youth suicide rate resulting from the implementation of GLS suicide prevention programme.
Limitations identified by author The study did not address related question regarding the nature of the intervention, such as specific types of training session or gatekeeper that may have been more effective and the specific components of the GLS programme beyond the training sessions that contributed to the results. An increase in early identifications and referrals of youth at risk was not directly examined or distinguished from alternative mechanisms through which other programme components may have contributed to the results. **Limitations identified by review team** The GLS was implemented between 2006 and 2009 in counties across the USA, and the year 2010 was the latest for which mortality information was available. Therefore, "true" effect of the intervention may be overestimated.			

E.1.1.33 Wasserman et al 2015

Wasserman D ; et al 2015. School-based suicide prevention programmes: The SEYLE cluster-randomised, controlled trial. Lancet 385.			
Study details	**Research Parameters**	**Population / Intervention**	**Results**
Author/year Wasserman D ; et al 2015 **Quality score** **++** **Study type** RCT **Aim of the study** To investigate the efficacy of school-based preventive interventions of suicidal behaviours.	**Number of participants** 168 schools (11 110 pupils) randomly assigned to interventions or control **Participant characteristics** We recruited 11 110 pupils (median age 15 years [IQR 14–15], mean age 14·8 years [SD 0·8]; 59% girls). Of the 11 110 pupils with baseline assessment, 9798 (88%) were available at 3 months and 8972 (81%) at 12 months (figure), with only 622 (5·6%) pupils not participating at either follow-up. Study recruitment procedures generated about an equal number of pupils in each group (figure): 2692 pupils were assigned to QPR;	**Intervention / Comparison** **Intervention group:** **Question, Persuade, and Refer (QPR)** is a manualised gatekeeper programme, developed in the USA. QPR was used to train teachers and other school personnel to recognise the risk of suicidal behaviour in pupils and to enhance their communication skills to motivate and help pupils at risk of suicide to seek professional care. QPR training materials included standard power point presentations and a 34-page booklet distributed to all trainees. Teachers were also given cards with local health-care contact information for distribution to pupils identified by them as being at risk. Although QPR targeted all school staff , it	**Primary outcomes** The primary outcome was incident suicide attempt(s)—ie, all new cases of suicide attempt(s) identified at either the 3 month or 12 month follow-up. Another outcome was severe suicidal ideation in the 2 weeks preceding the follow-ups—ie, all new cases of suicidal ideation identified at either of the two follow-ups. Pupils were identified as having an incident suicide attempt if, at the 3 month and 12 month follow-up, they answered "yes" to the question: "have you ever made an attempt to take your own life?" Pupils were identified as having severe suicidal ideation, if they answered: "sometimes, often, very often or always" to the question: "during the past 2 weeks, have you reached the point where you seriously considered taking your life, or perhaps made plans how you would go about doing it?"

Location and setting

School-based, 10 European Union countries including Austria, Estonia, France, Germany, Hungary, Ireland, Italy, Romania, Slovenia, and Spain.

Length of study

12 months study follow-up

Source of funding

The SEYLE project was supported through Coordination Theme 1

(Health) of the European Union Seventh Framework Programme.

2721 were assigned to the YAM;

2764 were assigned to ProfScreen, and 2933 were assigned to the control group.

221 pupils in the QPR group, 199 in YAM, 306 in the ProfScreen group, and 231 in the control group were excluded from the analysis because they reported a previous suicide attempt or severe suicidal ideation in the 2 weeks before baseline, or were missing data for the respective variables.

	QPR (40 schools, 2692 pupils)	Youth aware of mental health programme (45 schools, 2721 pupils)	Screening by professionals (43 schools, 2764 pupils)	Controls (40 schools, 2933 pupils)
Mean age (years)	14.80	14.80	14.81	14.78
Strength and difficulties questionnaire score	10.47 (4.96)	10.83 (4.96)	10.70 (5.11)	10.14 (4.95)

was, in effect, a selective approach, because only pupils recognised as being at suicidal risk were approached by the gatekeepers (trained school personnel).

The Youth Aware of Mental Health Programme (YAM)

was developed for the SEYLE study and is a manualised, universal intervention targeting all pupils, which includes 3 h of role-play sessions with interactive workshops combined with a 32-page booklet that pupils could take home, six educational posters displayed in each participating classroom and two 1 h interactive lectures about mental health at the beginning and end of the intervention.

YAM aimed to raise mental health awareness about risk and protective factors associated with suicide, including knowledge about depression and anxiety, and to enhance the skills needed to deal with adverse life events, stress, and suicidal behaviours.

This programme was implemented at each site by instructors trained in the methodology through a detailed 31 page instruction manual.

The Screening by Professionals programme (ProfScreen), which was also developed for the SEYLE study, is a selective or indicated intervention based on responses to the SEYLE baseline questionnaire. When pupils had completed the baseline assessment, health professionals reviewed their answers and pupils who screened at or above pre-established cut off points were invited to participate in a professional mental health clinical assessment and subsequently referred to clinical services, if needed.

Suicide attempts and severe suicidal ideation were studied with the above mentioned questions from the five item Paykel Hierarchical Suicidal Ladder that measures the intensity of suicidal behaviour, from feelings that life is not worth living, to death wishes, suicidal thoughts, severe suicidal ideation with plans, and suicide attempts.

	QPR	YAM	ProfScreen	Control
3-month				
Suicide attempts				
No. of pupils	2209	2166	2203	2366
No. of cases	15	19	27	27
Severe suicidal ideation				
No. of pupils	2210	2172	2203	2365
No. of cases	25	32	27	35
12-month				
Suicide attempts				
No. of pupils	1978	1987	1961	2256
No. of cases	22	14	20	34

No. of girls	1675 (63%)	1637 (60%)	1607 (58%)	1647 (56%)
Ever attempted suicide	83 (3%)	115 (4%)	102 (4%)	86 (3%)
Severe suicidal ideation during past 2 weeks	99 (4%)	106 (4%)	96(4%)	103 (4%)

Inclusion criteria

Schools were deemed eligible if they were public, contained at least 40 pupils aged 15 years, had more than two teachers for pupils aged 15 years, and had no more than 60% of pupils of the same sex.

Within each country, the cluster design first led to randomisation of eligible schools to one of four trial groups.

Within the schools, all classes with pupils aged mainly 15 years were approached for participant recruitment.

To avoid discrimination, all pupils in the participating classrooms, including those aged 14 and 16 years, were also approached for recruitment.

Exclusion criteria

All pupils reporting ever making a suicide attempt before the baseline date or having severe suicidal ideation in

Control group:

The control group was exposed to

the same six educational posters displayed in their classrooms as those used in the YAM.

Pupils in the control group who self-recognised the need for help could contact local health-care providers whose information was provided on a poster.

Severe suicidal ideation				
No. of pupils	1977	1991	1962	2261
No. of cases	29	15	22	31

Author's conclusion

YAM was effective in reducing the number of suicide attempts and severe suicidal ideation in school based adolescents. These findings underline the benefit of this universal suicide preventive intervention in schools.

	the 2 weeks before baseline were excluded from the analyses.		

Limitations identified by author
Limitations of this study include reliance on self-report;
For ethical reasons the control group was exposed to the same mental-health information as the YAM group, displayed on posters in the classrooms. Therefore, we assume that the effect sizes for the YAM are probably underestimated.
Limitations identified by review team
no additional limitation identified.

E.1.1.34 Wyman et al 2008

Wyman Peter A; Brown C Hendricks; Inman Jeff ; Cross Wendi ; Schmeelk-Cone Karen ; Guo Jing ; Pena Juan B (2008) Randomized trial of a gatekeeper program for suicide prevention: 1-year impact on secondary school staff. Journal of consulting and clinical psychology 76(1).

Study details	Research Parameters	Population / Intervention	Results
Author/year Wyman et al 2008 **Quality score** **+** **Study type** RCT **Aim of the study** To examine on the impact of a widely-implemented	**Number of participants** 249 **Participant characteristics** Follow-up participation rates were 73.5% and 72.2%, respectively, for staff in training and control schools. Attrition was not associated with any baseline measure nor differentially predicted by staff condition as a function of baseline (training condition by baseline measure interaction). Staff in trained and untrained schools were comparable on baseline measures. These null differences paralleled the minimal differences between trained and non-trained groups on demographic and job role characteristics. Staff in different job roles had substantially different baseline levels of knowledge, appraisals, and	**Intervention / Comparison** **Intervention group:** In each school assigned to training, all staff members were asked by their principals to attend QPR (Question, Persuade, Refer) Training. The 1 ½ hour training covers: rates of youth suicide; warning signs and risk factors for suicide, procedures for asking a student about suicide, persuading a student to get help, and referring a student for help. Training was conducted by one of eight staff from the District's	**Primary outcomes** **Knowledge of QPR:** Fourteen multiple-choice questions assessed content taught by the training, eight pertaining to appropriate question, persuade, and refer (QPR) behaviours with students and six to suicide risk factors. A respondent's score is the percentage of correct responses. Higher scores on a shorter list of these items have distinguished between respondents who have and have not received specialized training in suicide risk assessment. **Appraisals:** Five scales assessed appraisals targeted by training. Eight questions assessed preparation to perform activities such as 'ask appropriate questions about suicide', responded to on a seven-point Likert scale ('not prepared'=1, 'quite well prepared'=7). Higher mean item scores reflect positive Gatekeeper Preparedness (Cronbach's alpha = .94). Nine items assessed perceived knowledge answered on a 7-point scale ('nothing' =1, 'very much'=7), with higher scores

gatekeeper program, QPR (Question, Persuade, Refer), on staff in secondary schools in a district with an extensive, existing suicide prevention program. **Location and setting** School district, USA **Length of study** 1 year follow-up **Source of funding** Supported by National Institute of Mental Health under grants R34MH071189, P20MH071897 and R01MH40859, and by the Substance Abuse and Mental Health Services Administration under grant 5 UD1 SM57405.	behaviours. Health/Social Service staff had the highest knowledge, the most positive gatekeeper appraisals, and highest rates of gatekeeper behaviours and communication. Support staff reported lowest levels. Staff reported large differences in asking students about suicide by job role: 72% of Health/Social Service staff asked one or more students about suicide in the prior 6 months, compared to 22% of Administrators, 7% of Teachers and 1% of Support Staff. **Inclusion criteria** Random assignment occurred at the school level because training was intended for all staff. A random sample of staff from each school was identified prior to school randomization and followed an average of 1-year after training. **Exclusion criteria** Two high schools and one middle school were excluded due to prior gatekeeper training	Prevention/Intervention Center (P/I Center) who received QPR Instructor and Triage training (12 – 16 hours) and co-led by a counselor in each school who received Instructor Training (6–8 hours) and served as the primary source for referrals in that school. Staff were invited for a 30-minute QPR refresher several months after training, a School District action to promote ongoing suicide prevention. **Control group:** a waitlisted control group for future training. **Analysis** Separate analyses take into account the school-level randomization of training, the small amount of mobility of staff members across condition during the trial, and refresher training before time 2. In all analyses schools were included as random factors and also as level-2 influences through their mean levels of baseline variables. Both intent-to-treat analyses (ITT) and as-treated (AT) analyses were conducted, the former to evaluate QPR in a realistic setting where training is not complete, and the latter to focus on direct exposure to training.	reflect more positive Self-Evaluation Knowledge (Cronbach's alpha = .97). Two scales were created from 16 questions assessing appraisals regarding performing suicide prevention activities on a 7-point scale ('Strongly Disagree' to 'Strongly Agree'). Factor analyses using promax rotation identified the same 2-factor solution for baseline and follow up responses. Higher scores on the first 7-item factor (e.g., 'I can make appropriate referrals within my school for students contemplating suicide') indicate more Gatekeeper Efficacy (Cronbach's alpha = .80). The second factor, Gatekeeper Reluctance, was created from nine items (e.g., 'School teachers and staff should not be responsible for discussing suicide with students') (Cronbach's alpha = .68). We have recoded this scale so that higher values mean less reluctance. The fifth 4-item scale assessed awareness of school policies and ability to use referral resources for suicidal students. Responses were coded into no (0) or yes (1), and higher mean scores indicate more Access to Services (Cronbach's alpha = .74). **Gatekeeper Behaviours**: Corresponding to QPR, the primary outcome variable was response to the question, 'How many times in the last 6 months have you asked a student whether s/he was considering suicide?' Higher responses on a 5-point frequency scale (None, 1, 2, 3, 4 or more times) were coded to indicate more frequent Ask Students about Suicide. Staff also indicated how frequently in past six months they performed six QPR behaviours consistent with safety protocols (e.g., 'Notified the appropriate referral resources'), ranging from Never (1) to Always (5) (Cronbach's alpha = .94). We used this measure to assess consistency with safety protocols rather than as behaviours performed to identify new cases of students at risk for suicide. Higher scores indicated more frequent Referral Behaviours. **Communication with Students**: To assess staff-student communication, three questions assessed appraisals of staff interactions with students (e.g., 'Students talk to me about their thoughts and feelings') using a 6-point Likert scale (Never=1, Always=6). Higher mean item scores reflected more positive Natural Gatekeeper scale (Cronbach's alpha = .89). Staff also indicated how often in the last six months they asked students about distress or depressed mood, QPR

training was not expected to change responses to these communication questions.

Gatekeeper training variables and communication at 1-year follow-up by training status (intention to treat analyses)

	Trained (n=122)	**Non-trained (n=127)**	**Mean differences (95%CI)**
Knowledge	76.3 (12.2)	71.2 (12.1)	4.52 (1.51, 7.53)
Preparedness	5.01 (1.34)	3.75 (1.40)	1.26 (0.92, 1.60)
Self-evaluation knowledge	4.83 (1.31)	3.34 (1.46)	1.49 (1.15, 1.83)
Gatekeeper efficacy	4.64 (1.13)	3.52 (1.10)	1.12 (0.84, 1.4)
Gatekeeper reluctance	5.96 (0.69)	5.77 (0.64)	0.19 (0.02, 0.36)
Access to service (referral)	0.74 (0.31)	0.38 (0.40)	0.36 (0.26, 0.46)
Gatekeeper behaviour			
Asking students about suicide	0.56 (1.20)	0.41 (0.95)	0.15 (-0.12, 0.42)
Referral	2.54 (1.61)	2.40 (1.43)	0.14 (-0.24, 0.52)

Communication			
Natural gatekeeper	3.24 (0.82)	3.29 (0.85)	-0.05 (-0.26, 0.16)
Asking students about distress	2.19 (1.50)	2.33 (1.41)	-0.14 (-0.50, 0.22)

Author's conclusion

The study found that the QPR training impact was consistent with our hypothesized 'gatekeeper communication' model. Congruent with this model, the large increases in staff appraisals of efficacy and preparedness from training that occurred for many staff were not directly linked to increased communication with students about either suicide or their distress. Instead, the study's findings suggest that identifying more students at high risk for suicide in school settings with pre-existing suicide prevention awareness will require expanding staff members' open communication with students about issues of emotional distress. Such a gatekeeper communication model will likely involve the actions of a small number of staff, who already have close communication with students either through their ongoing job role (e.g., nurses, school counselors) or by virtue of personal qualities such as warmth and empathy that draw in students for supportive interactions.

The study found that staff communication styles with students were not changed due to a brief training program such as QPR was clarified by our finding that barriers to open communication include students' reluctance to seek assistance from adults.

Limitations identified by author
One was the moderate rate of staff enrolment into this study, i.e., only one-third of staff enrolled once selected. Although we identified few differences between enrolled and non-enrolled staff, we cannot rule out differences in motivations or awareness that may limit generalization of findings. The present study also occurred with primarily White/Non-Hispanic school staff and may not generalize to staff from different backgrounds.
Another limitation was the absence of direct measures of staff members' interactions with students and reliance on staff self-reports.
Finally, we tested the implications of the surveillance and communication models in this one study, but the design did not test these two models head to head, which would have provided more scientific evidence.
Limitations identified by review team

Selection bias, study participants were self-selected to take part in the study. Characteristics of those who did not complete 1 year follow-up were unclear. The effect of training on students' help-seeking attitudes between trained and untrained schools was not reported. All measures based on self-reported data.

E.1.1.35 Wyman et al 2010

Wyman Peter A; et al 2010 An outcome evaluation of the Sources of Strength Suicide prevention programme delivered by adolescent peer leaders in high school. American Journal of Public Health 100 (9).

Study details	Research Parameters	Population / Intervention	Results
Author/year Wyman et al 2010 **Quality score** **+** **Study type** RCT **Aim of the study** To examine the effectiveness of the Sources of Strength suicide prevention program in enhancing protective factors among peer leaders trained to conduct schoolwide messaging and among the full population of high school students. **Location and setting** Schools, USA	**Number of participants** 12 schools **Participant characteristics** The surveyed students (n=2675) in the intervention and control schools were also equivalent in terms of gender, age, and race/ethnicity **Inclusion criteria** Random assignment occurred at the school level Six metropolitan. Schools in Cobb County, Georgia, participated in the first phase (2007–2008). Eight predominantly rural schools in New York and 4 in North Dakota participated in phase 2 (2008–2009). **Exclusion criteria** Not reported	**Intervention / Comparison** **Intervention group:** Sources of Strength was implemented using the 3 standard phases: (1) school and community preparation, (2) peer leader training, and (3) schoolwide messaging. The school and community preparation phase included training 2 to 3 staff members as adult advisors who would guide the peer leaders to conduct safe suicide prevention messaging (4 to 6 hours of training). A 1-hour orientation to the intervention was provided to school staff. Staff in Georgia schools had attended a 1-hour gatekeeper training within the previous 2 years. Peer leader training consisted of 4 hours of interactive training for peer leaders and adult advisors led by certified trainers following 15 modules. One focus was on 8 protective ''sources of strength'' and skills for increasing those resources for themselves and other students. Another focus was on engaging ''trusted adults'' to help distressed and suicidal peers. In the schoolwide messaging phase, peer leaders carried out specific messaging steps with adult advisor mentoring: they engaged trusted adults, encouraged friends to identify their	**Primary outcomes** Peer leaders completed questionnaires covering 3 constructs: (1) suicide perceptions and norms, (2) social connectedness, and (3) peer leader behaviors Students in the school population completed 4 scales measuring constructs targeted by peer leaders' messaging: Help for Suicidal Peers, Reject Codes of Silence, Help-Seeking From Adults, and Sources of Strength Coping. Source of strength training variables at 1-year follow-up by training status

	Trained (n=268)	**Non-trained (n=185)**	**Mean differences (95%CI)**
Peer leader, referred distressed peers	0.49 (0.62)	0.38 (0.49)	0.11 (0.01, 0.21)
Peer leader, support to peer	6.20 (1.31)	5.88 (1.39)	0.32 (0.07, 0.57)
	Trained schools(n=6)	**Non-trained (n=6)**	**Mean differences (95%CI)**
Help-seeking from adults	2.73 (0.45)	2.48 (0.40)	0.25(-0.23, 0.73)
Help for suicidal peer	2.99 (0.43)	2.73 (0.40)	0.26 -0.21, 0.73)

Length of study 4 months follow-up **Source of funding** Supported by support from the Center for Mental Health Services (SAMHSA; grant 5-UD1-SM57405), the National Institutes of Health (grants P20MH071897, O1MH40859, and UL1-RR024160), the New York State Office of Mental Health, and the JDS Foundation		trusted adults, and disseminated messages about Sources of Strength through presentations, public service announcements, and video or text messages on Internet social network sites. Peer leaders in each school completed at least 3 of the 4 messaging steps; participation in messaging ranged from 59% to 100% across schools. **Control group:** a waitlisted control group for future training. **Analysis** To test for intervention effects on peer leaders, we used a 2-level linear mixed-effects model (LMM) in which level 1 included individual covariates (gender, grade, age, race/ ethnicity, and baseline scores) and level 2 included fixed factors of intervention condition and state.	**Author's conclusion** Training of peer leaders with the Sources of Strength curriculum led to changes in norms across the full population of high school students after 3 months of school-wide messaging. The norms most strongly enhanced through the intervention were students' perceptions that adults in their school can provide help to suicidal students and the acceptability of seeking help from adults. These changes were congruent with the proximate goals of Sources of Strength to enhance norms pertaining to suicide, knowledge of capable adults, and the perceived acceptability of engaging adults for help within student peer groups. We also found that the largest, most positive increases in perceptions of adult help for suicidal youth occurred among students with a history of suicidal ideation. Sources of Strength is the first suicide prevention program involving peer leaders to enhance protective factors associated with reducing suicide at the school population level.
Limitations identified by author Study findings were limited by our reliance on self report measures. Short study follow-up. **Limitations identified by review team** Cluster trial, randomisation at a school level. Waiting-list control			

E.1.2 Qualitative study

E.1.2.1 Dhaliwal and Harrower 2009

Dhaliwal Rani ; Harrower Julia ; 2009. Reducing prisoner vulnerability and providing a means of empowerment: Evaluating the impact of a Listener Scheme on the listeners. The British Journal of Forensic Practice 11:35-43.				
Study details	**Research Parameters**	**Inclusion/ Exclusion criteria**	**Population**	**Results**
Author name and year Dhaliwal Rani ; Harrower Julia ; 2009	**Data collection** Semi-structured interviews were used to construct a detailed account	**Inclusion criteria** Nine	**Participant numbers** 9	Through the process of IPA, six master themes emerged, with a number of subordinate themes under each category.

Quality score + **Study type** A qualitative approach using interpretative phenomenological analysis (IPA) **Aim of the study** The aim of this paper is to explore Listeners' experiences through a qualitative reflection on their practice, and how Listeners make sense of their experience. Three research questions were generated. 1.What skills and/or benefits do Listeners feel they acquire through the process of being a Listener? 2. What do Listeners think is the emotional impact of the specific issues they are presented with, and how is it managed? 3.What further support and training are required by Listeners? **Location and setting** Prison, UK **Source of funding** Not reported	of each participant's experience of becoming a Listener. The research questions were used as prompts, but it was also important to ensure that the interviews were participant-led to allow for an accurate reflection of each Listener's personal experience. All interviews were audio-taped and transcribed verbatim **Method of analysis** Qualitative research allows in-depth exploration of perceptions, understanding or accounts of phenomena in a way that is difficult to achieve by quantitative methods It also gives participants their own 'voice' to describe their experiences authentically. IPA focuses on the uniqueness of a person's experience, and how experiences are made meaningful. The researcher's own perspective is employed in interpreting the viewpoint of participants, identifying themes and making sense of the data by establishing patterns and significances. Transcripts were analysed using the method namely reading and re-reading each transcript, annotating statements and observations in order to identify themes that capture the participants' experiences, and then noting how themes occur across transcripts and allocating appropriate labels to these themes. The final stage of the process is to value the significance of themes across all the transcripts in order to identify the subordinate themes, and ltimately the overarching master themes.	individuals met the inclusion criteria of having been a Listener for a minimum of six months, and seven individuals agreed to take part. **Exclusion criteria** Unknown	**Participant characteristics** The age range of participants was 26–60 years (mean age 42), six of the participants' criminal offences were for sexual offending, and one participant's offence was for attempted murder. Participants had worked as Listeners for between 8 and 34 months, with an average of 17 months **Intervention** The Listener Scheme was established in 1991 and involves joint working between the Prison Service and the Samaritans. Listeners are prisoners selected and trained by Samaritans to provide confidential listening support to fellow prisoners in distress or who may be at risk of suicide.	*Master theme 1: Benefits of being a Listener* All participants expressed a sense of achievement and personal satisfaction from being a Listener. They also felt good after receiving appreciation of the support given to service users. Another benefit of being a Listener is that it gave some participants the opportunity to gain trust and responsibility with officers and service users. *Master theme 2: Personal growth* All participants reported developing new skills or enhancing existing skills such as communication, perspective taking, assertiveness, empathy, patience and problem solving. Participants also reported developing an increase in self-efficacy, self-esteem and confidence through the experience of being a Listener. Participants developed increased vigilance and understanding of other people's needs *Master theme 3: Changes* It was evident from the accounts of participants that there was an increase in cognitive flexibility leading to change in attitude from the experience of being a Listener. All participants expressed a shift in their beliefs. It was evident form participants that some had become more flexible in

				their thinking about coping with difficult situations such as being in prison and dealing with difficult events. Some participants reported a change in their behaviour, in sitting down and speaking to other about their problems on a more personal level, communicating their thoughts in writing and seeking support from others instead of letting problems build up. *Master theme 4: Challenges* Participants reported some challenges they faced including long hours, being approached at any time and any place, dealing with a diverse range of people with assorted problems, observing people self-harm and experiencing burn-out. Another challenge face is listening to specific topics that may be emotionally distressing for the participant due to the content, or if a participant has experiencing similar themselves. Majority of participants regarded confidentiality policy that Listeners must abide by as a challenge, and those who experienced the rule as challenging also accepted it because they understood the rationale behind it. *Master theme 5: Resilience* The theme indicated the participants' varying levels of resilience to cope with the challenges that they face whole working as a Listener.

				Participants identified both cognitive and behavioural strategies that they use to cope with the challenges they face. *Master theme 6: Needs* Participants reported further training and support that were needed from the prison service. The participants wanted longer training sessions to discuss specific topics in depth and how to manage them as a Listener. These topics included mental health, suicide, child abuse, diversity and new crimes. Participants also requested opportunities to role-play and to shadow other Listeners. What the participants would like from the prison service is recognition for the work that they do, not just for individual prisoners but for the organisation. Participants identified qualities, motivations, and life experience as important factors when one is working or is considering becoming a Listener. **Author's conclusion** This study has highlighted the potential benefits of an effective Listener Scheme operating in prisons for vulnerable prisoners, prison staff and Listeners themselves.
Notes **Limitations identified by author** Small-scale study of this kind, conducted in one prison, presents difficulties for generalisation to the wider prison population. **Limitations identified by review team** Not identified				

E.2 Health economic review

E.2.1 Doran et al 2016

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Doran 2016 **Ref Id** **Economic study type** Cost benefit **Country(ies) where the study was done** Australia, New South Wales (NSW) **Perspective & Cost Year** Perspective not stated: costs included imply a social perspective. Cost year is 2010	**Study dates** Pre-intervention 2008-2012 Post intervention 2013-2017. **Intervention** A workplace suicide prevention strategy for construction industry (CI): "Mates in Construction" (MIC). MIC has three main components: general awareness training (GAT); connector training; and applied suicide intervention skills training (ASIST). **Comparison(s)** .	**Source of effectiveness data** Suicide data were obtained from the National Coronial Information System (NCIS) for the period 2001–2012 Baseline suicide risk: overall suicide risk calculated from time series data. Multiplied by an estimate of the construction industry (CI) workforce. Post-intervention suicide risk: the relative risk ratio (RRR) for the 5-year time period after MIC was implemented in another Australian location (Queensland) was used to estimate reduced risk in study location. **Source of cost data** Both direct and indirect costs were considered for a range of economic agents (including employers, workers, and the government) and by severity of injury. For CI workers, total	**Time horizon and discount rate** • 5 years after intervention • 4.11% discount rate (varied in sensitivity analysis) **Method of eliciting health valuations (if applicable)** . **Modelling approach** The potential economic impact of implementing MIC in the NSW CI is derived by comparing the economic savings from fewer suicide and suicide attempts with the cost of implementing the program. Results are expressed as a	**Cost per patient per alternative** • The average cost associated with an incident involving a short-term absence is estimated to cost AU $925; each self-harm incident resulting in full incapacity is estimated to cost AU $2.78 million; and each suicide incident resulting in a fatality is estimated to cost AU $2.14 million • The cost of self harm and suicide in the NSW CI was AU $527 million in 2010 **Effectiveness per patient per alternative** • . The potential economic impact of implementing MIC in the NSW CI is an estimated saving of AU $3.66 million each year. The majority of benefits are estimated to flow to the government with a saving of AU $3.56 million each year. • If the budget for rolling out the MIC program • in NSW is AU $800,000 each year, the benefit–cost • ratio is equivalent to 4.6:1, that is, for every AU $1 invested there is a return of AU $4.60, representing a positive economic investment of public funds.. **Incremental cost-effectiveness** Mean ICER Probabilistic ICER (95% CI)	**Limitations** • The analysis relied on NCIS data to identify fatalities by suicide in the CI. This data source may, however, have underestimated the number of suicides occurring in Australia owing to coronial and system-related issues. • Only male suicides were examined in this study because of the small number of female suicides and subsequent confidentiality issues. • Any underreporting of suicides in the NCIS data are likely to influence the calculated suicide risk, the QLD RRR, and the

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Source of funding .		costs of self-harm and suicide were estimated by multiplying average indirect and direct costs by cases of self-harm and suicides. • Production costs: Australian Bureau of Statistics; • Human capital costs: Australian Bureau of Statistics; Commonwealth Australia; Reserve Bank of Australia; Department of Human Services; • Medical costs: Safe Work Australia; • Administrative costs: Safe Work Australia; • Transfer costs: Access Economics; • Carer/ aids / postvention costs: Safe Work Australia; wider literature Costs of suicide or attempted suicide considered include: production disturbance cost (absences); human capital costs; medical costs; administrative costs; transfer costs; costs of carers and aids/modifications; postvention services for fatalities	ratio of benefits to costs with a positive ratio representing a positive economic investment.	• . **Other reporting of results** • The results suggest that if implemented in the NSWCI, MIC could potentially avert 0.4 suicides, 1.01 suicide attempts resulting in full incapacity, and 4.92 suicide attempts resulting in a short absence from work. • Reducing the proportion of suicide attempts resulting in full incapacity from 17% to 12 % changes the benefit—cost ratio from 4.57 to 3.54; attributing a higher proportion of incidents reduced to MIC from 9.4% to 19.4% increases the number of averted incidents, the economic savings, and the benefit-cost ratio. All variations of the discount rate resulted in a positive benefit-cost ratio **Uncertainty** Three different sensitivity analyses were undertaken to test the robustness of results to changes in key parameters. • First, the proportion of suicide attempts resulting in full incapacity (i.e., 17% of suicide attempts) was varied by ± 5 percentage points. • Second, the attribution of MIC to averted suicide and suicide attempts (i.e., 9.4%) was increased by 5 and 10 percentage points of 9.4%.	potential economic impact of MIC **Conclusion(s)** • This study provides new evidence on the costs associated with self-harm and suicide in the NSW CI for the year 2010 and the potential return on investing in a workplace suicide prevention strategy. • These results suggest that MIC can save lives at the same time as saving scarce resources. It represents a positive economic investment into workplace safety in the NSW CI..

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		Other data sources e.g. transition probabilities .		• Third, the discount rate (i.e., 4.11%) was adjusted to 0%, 3%, and 5%.	

E.2.2 Garraza et al 2016

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Garraza et al 2016 **Ref Id** **Economic study type** Cost benefit **Country(ies) where the study was done** USA	**Study dates** The analytical period covered the initial implementation of the program from 2006 to 2009 (including setup costs during 2005) and the results obtained during the period from 2007 to 2010. **Intervention** Garrett Lee Smith Youth Suicide Prevention.	**Source of effectiveness data** Decrease in suicide rate following the implementation of GLS (per 1,000 youth) (Garraza et al 2015) **Source of cost data** Program Costs. Program costs included the amounts of federal funds directly spent by the 58 grantees during 2005–2009 as well as the expenditures on technical assistance Information on the amount spent by grantees was provided by SAMHSA and is based on the Annual Federal Financial Report submitted annually by each grantee.	**Time horizon and discount rate** A discount rate of 3% was used to obtain the present value of benefits and costs accrued at varying points during the period (the discount rate is closely related to the interest rate and reflects the value placed on immediate vs. delayed preference for the use of resources).	**Cost of the intervention** • In total, the GLS program awarded 46 GLS state grants (in 38 states) and 12 tribal grants (in 8 tribes) estimated at $49.4 million. • The cost of technical assistance went down from 50%, 23%, and 12% in the initial 3 years to close to 9% of the federal program cost during 2008 to 2009. **Effectiveness per patient per alternative** • Of the 79,379 averted suicide attempts, an estimated 19,448 attempts would have resulted in a hospital stay, and 11,424 attempts would have required an ED visit without subsequent hospitalization. • This equates to discounted cost savings of $187.8 million from averted hospitalizations and $34.1 million from averted ED visits, or total medical cost	**Limitations** • The estimates of reductions in rates of attempts were not derived from randomized controlled trials. • The estimates of averted health expenditures were derived from secondary sources, rather than health cost data collected in the context of the GLS program. • The previous evaluation of the GLS program did

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Perspective & Cost Year Perspective not stated: cost saving to the health care service Cost year is 2005-2009 **Source of funding** Substance Abuse and Mental Health Services Administration US Department of Health and Human Services.	The GLS state and tribal grants stipulated that grantees promote or develop early intervention and prevention services aimed at reducing risk for suicidal behaviours. GLS grantees also have been encouraged to use funds for facilitating timely referrals of youth at risk for suicidal behaviours, and for improving access to services for youth from varied backgrounds. **Comparison(s)** .	**Other data sources e.g. transition probabilities** Only a portion of the averted suicide attempts would have required medical attention, and among them, only a subset would have led to hospitalization. We used data gathered by the National Survey on Drug Use and Health (NSDUH) between 2008 and 2011 among individuals aged 18 to 25 to approximate these proportions. NSDUH respondents reporting a suicide attempt in the previous 12 months were then asked whether they subsequently received medical attention from a doctor or other health professional for the attempt. Those who reported requiring medical attention were further asked whether they stayed in a hospital overnight or longer because of the attempt. During this period, 39% of the youth who attempted suicide required medical attention, and 63% of those requiring medical attention were hospitalized.	**Method of eliciting health valuations (if applicable)** . **Modelling approach** A cost–benefit analysis of the GLS program, we compared the cost savings (or benefits) to the health care system arising from averted nonfatal attempts with the total GLS program costs. GLS benefits and costs were monetized and expressed in 2010 dollars to adjust for inflation.	savings of $222.1 million (95% CI: $78.7 million, $365.4 million). **Incremental cost-effectiveness** Mean ICER Probabilistic ICER (95% CI) • . **Other reporting of results** Given program costs of $49.4 million, the estimated benefit–cost ratio equals $4.50 (95% CI: $1.59, $7.40). In other words, the GLS program returned $4.50 in medical cost savings for each dollar invested in its implementation (benefit-cost ratio). **Uncertainty** • The benefit–cost ratio was most sensitive to changes in the average inpatient hospitalization cost. The benefit–cost ratio ranged from $3.65 to $5.09 (for estimated hospitalization costs ranging from $8,478 to $12,611). • The benefit–cost ratio was relatively invariant to assumptions regarding the percentage of suicide attempts that required an ED visit but not hospitalization, ranging from $4.24 to $4.77 for estimated rates ranging from 9% to 14%. • Further, to reach the breakeven point; that is, where benefits equal costs, the cost of hospitalization would have had to be as low as $877 or, alternatively, the	not show a reduction in suicide attempt or suicide mortality rates extending after the first year following GLS prevention activities. **Conclusion(s)** • It has been recognized that preventing suicidal behaviour requires sustained program intervention. • The results of this analysis suggest that such sustained investment may be paid back many times over via savings to the broader health system.

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		The NSDUH does not provide estimates for the proportion of attempts requiring an emergency department (ED) visit but not subsequent hospitalization. We used the ratio of 0.6 ED visits not resulting in hospitalization (i.e., "treat and released") to each hospitalization due to self harm during 2007–2010 from the Web based Injury Statistics Query and Reporting System Nonfatal Injury Reports.		percentage of attempts requiring hospitalization as low as 2%.	

E.2.3 Kinchin and Doran 2017

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Kinchin and Doran 2017 **Ref Id** **Economic study type** Cost benefit	**Study dates** 2014 **Intervention** Universal workplace suicide prevention intervention "Mates in Construction" (MIC) is an example of a	**Source of effectiveness data** Suicide data were obtained from the National Coronial Information System (NCIS) for 2014. NCIS is a national internet based data storage and retrieval system for Australian coronial cases, established in 2001. NCIS is utilized by coroners, government agencies, and	**Time horizon and discount rate** **Method of eliciting health valuations (if applicable)** . **Modelling approach**	**Cost per patient per alternative** • The average cost of a short-term absence is estimated at $1184 per incident; $2.25 million per incident resulting in full incapacity; and $1.69 million for each fatality. The key cost driver in both full incapacity cases and a fatality is lost income (and taxes) and, for full incapacity only, the additional cost of welfare payment. • The total cost of suicide and NFSB in 2014 is estimated at $6.73 billion. The majority of this cost is attributed to the cost associated with NFSB resulting in full incapacity (77.3% of total costs or $5.19 billion),	**Limitations** • Given a lack of good quality Australian data on NFSB, we have used the World Health Organization ratio of 15 cases of NFSB to every death by suicide to approximate the

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Country(ies) where the study was done Australia **Perspective & Cost Year** Perspective not stated: costs included imply a social perspective. Cost year is xx **Source of funding**	multifaceted workplace suicide prevention strategy developed in Australia. MIC has three main components: general awareness training (GAT); connector training; and applied suicide intervention skills training (ASIST). **Comparison(s)** .	researchers for identifying cases for death investigation, research, and to monitor external causes of death in Australia. **Source of cost data** Six cost groups were used to derived the total cost of suicide and non-fatal suicidal behaviour: • Production disturbance cost: Production disturbance costs reflect short-term impacts until production is returned to pre-incident levels and includes the value of lost production and staff turnover costs. Value of lost production is measured by combining average duration of absence (by severity category) with average weekly earnings (AWEs), where AWE is a weighted income of two groups of employees permanent or fixed term and casual. Cost of overtime reflects the proportion of		followed by the cost of a suicide (22.5% of total costs or $1.52 billion) and NFSB resulting in a short absence from work (0.2% of total costs or $13.31 million). **Effectiveness per patient per alternative** • The potential economic impact of implementing the multifaceted workplace suicide prevention strategy (MIC) across the Australian workforce has an estimated saving of $61.26 million each year. • The majority of benefits (97%) are estimated to flow to the government with a saving of $59.44 million each year. The total annual cost of implementing the program is estimated at $40.97 million, suggesting a benefit cost ratio equivalent to 1.50:1, representing a positive economic investment of public funds. **Incremental cost-effectiveness** Mean ICER Probabilistic ICER (95% CI) • . **Other reporting of results** • The results suggest that if implemented in the NSWCI, MIC could potentially avert 0.4 suicides, 1.01 suicide attempts resulting in full incapacity, and 4.92 suicide attempts resulting in a short absence from work.	number of non-fatal attempts; • The costing analysis relies on averages—average weekly earnings and median age of death. • The NCIS does not contain information on full-time or part-time status, though the average weekly earnings figures took into account a weighted income for permanent or fixed term and casual employees. • The effectiveness parameters are based on a pre-post study without control group; • The analysis did not attempt to estimate the costs saved by the transfer of knowledge gained through workplace

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		overtime related to work-related injuries and wage of workers that would not be required if there were no injury. Overtime is valued by combining AWE with duration of absence (by severity category) and an average taxation rate of 40%.The cost of replacing existing staff affected by work-related incidents is equivalent to 26 weeks of AWE, and the cost of training new staff in the event of full incapacity or a fatality is equivalent to 2.5 weeks of AWE. • Human capital costs: Human capital costs consider the long-run costs, such as loss of potential output, occurring after a restoration of pre-incident production levels. They are calculated as a residual between total human capital loss and deadweight loss to		• Reducing the proportion of suicide attempts resulting in full incapacity from 17% to 12 % changes the benefit—cost ratio from 4.57 to 3.54; attributing a higher proportion of incidents reduced to MIC from 9.4% to 19.4% increases the number of averted incidents, the economic savings, and the benefit-cost ratio. All variations of the discount rate resulted in a positive benefit-cost ratio **Uncertainty** • The results of sensitivity analyses. All variations in key parameters have little impact on the positive economic benefit of MIC, resulting in the benefit-cost ratio ranging between 1.11 and 3.07.	training such as MIC. **Conclusion(s)** • Rates of suicide and NFSB are far too high in Australia and elsewhere. Although being employed has a protective effect on suicide behaviour, over one-third of all Australian suicide fatalities during 2014 were among employed people. • The associated economic burden of $6.73 billion is avoidable. • More needs to be done to reduce this burden. Although workplace strategies are appropriate for those employed, these interventions must be used within a

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		society from taxation redistributions. For full incapacity or fatality, human capital costs are measured by considering the value of potential future earnings from time of injury to retirement age in Australia (i.e., 65 years) assuming a discount profile and productivity loss. NCIS data is used to identify the average age of suicide. The median age of suicide is used as a proxy for the average age of a full incapacity case. For full incapacity, future earnings also include the average social welfare payments received, since these contribute to post-injury income. These costs are borne by the government through the disability support pension—equivalent to $777.50 per fortnight (in 2014 dollars). The average life expectancy			multifaceted approach that reflects the complex nature of self-harming behaviour.

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		at birth in Australia in 2014 is 82.4 years (84.4 years for females and 80.3 years for males) • Medical costs: Medical costs are expenses incurred by workers and the community through medical treatment. Average medical costs per incident by severity are sourced from Safe Work Australia: $820 per short absence; $12,515 per full incapacity case; and $2430 per fatality. In all work-related incidents involving medical care, the employer covers the first $500, and employers contribute 15% of the difference with the government accounting for the remainder. • Administrative costs: included in this analysis are investigation costs, travel costs, and funeral costs. Investigation costs consider the costs of investigating an			

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		incident and the administrative cost of collecting and reporting information on work-related incidents. Average investigation costs by severity are sourced from SafeWork Australia: $28 per short absence; $2374 per full incapacity case; and $2840 per fatality. • Other cost included in this analysis are cost of carers and aids/modifications for full incapacity cases and the cost of postvention services for fatalities. • Transfer cost The redistribution of public sector resources to care for incapacitated persons incurs deadweight costs on society—for every dollar of tax raised, about 28.75 cents is absorbed in the distortions induced and the administration of the tax system. In this analysis the deadweight loss is			

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
		measured as the value of taxation receipts foregone, equivalent to 28.75 cents in every foregone tax dollar. **Other data sources e.g. transition probabilities** .			

E.2.4 Knapp et al 2011

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Knapp et al 2011 **Ref Id** **Economic study type** Modelling study, cost-effectiveness	**Study dates** Modelling study – paper published in 2011 **Intervention** One-off suicide prevention training for all GPs in England.	**Source of effectiveness data** Not specified – the model indicates that in Year 1 603 suicides avoided; in Year 5 706 suicides avoided; in Year 10 669 suicides avoided. **Source of cost data**	**Time horizon and discount rate** • 10-year time horizon • Discount rate not specified (authors state that the model does not assume any decrease in the risk of	**Cost per patient per alternative** Intervention: Suicide awareness training Cost after 1 year (£m): 8.1 Cost after 5 years (£m): 8.1 Cost after 10 years (£m): 8.1	**Limitations** • No limitations identified by author • No detail given on model • No detail given on sources of cost data

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<th>Intervention and Comparison</th>
<th>Data sources</th>
<th>Time horizon & Method</th>
<th>Results</th>
<th>Authors' discussion</th>
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England

Perspective & Cost Year

Public health perspective

Source of funding

Not specified</td>
<td>Intention that there will be increased identification of those at risk (assumption that GPs will have a 20% greater chance of identifying those at risk of suicidal behaviour in year following training) - Cognitive behavioural therapy combined with ongoing pharmaceutical and psychological therapy can then be administered

Comparison(s)

No intervention</td>
<td>• Source of cost data for suicide prevention training not specified
• Source of cost data for other elements not specified

Other data sources e.g. transition probabilities

NA</td>
<td>suicide in the 10 years after the first self-harm event other than that initially achieved).

Method of eliciting health valuations (if applicable)

NA

Modelling approach

Not specified</td>
<td>
<table>
<tr><td>Suicide prevention measures</td><td>1.8</td><td>7.2</td><td>12.5</td></tr>
<tr><td>Emergency treatment</td><td>-0.4</td><td>-0.9</td><td>-1.0</td></tr>
<tr><td>Police / coroner costs</td><td>-0.3</td><td>-0.5</td><td>-0.6</td></tr>
<tr><td>TOTAL PUBLIC SERVICES</td><td>9.2</td><td>14.0</td><td>19.0</td></tr>
<tr><td>Funerals</td><td>-0.5</td><td>-0.9</td><td>-1.2</td></tr>
<tr><td>Productivity losses</td><td>-186.2</td><td>-340.2</td><td>-416.8</td></tr>
<tr><td>Intangible costs</td><td>-390.3</td><td>-713.0</td><td>-873.6</td></tr>
<tr><td>Total</td><td>-567.8</td><td>-1,040.1</td><td>-1,272.6</td></tr>
</table>
Negative figure is a cost saving
Costs and benefits are cumulative over time

Effectiveness per patient per alternative

<u>Intervention</u>:
Year 1: 603 suicides avoided (£567.8m / 603 = cost savings of £941,625 per suicide avoided)
Year 5: 706 suicides avoided (£1,040.1m / 706 = cost savings of £1,473,229 per suicide avoided)
</td>
<td>• No detail on how QALY data was arrived at
• No detail given on contents of "intangible costs" to identify whether a public health perspective was appropriately used
• Discount rate unclear
• Important to note that reliance on productivity data means that only those who are working age and in work are considered

Conclusion(s)

• Authors state that if all GPs in England undertake one-off suicide prevention training, the model (which assumes a 20% greater chance of</td>
</tr>
</table>

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
				Year 10: 669 suicides avoided (£1,272.6m / 669 = cost savings of £1,902,242 per suicide avoided) **Incremental cost-effectiveness** <u>Mean ICER</u> • Not reported <u>Probabilistic ICER (95% CI)</u> • Not reported **Other reporting of results** • Cost per QALY: Year 1: £1,573 per QALY saved Year 5: £2,044 per QALY saved Year 10: £2,924 per QALY saved **Uncertainty** • No sensitivity data reported	identifying those at risk of suicidal behaviour when GPs have undertaken training) predicts that savings of £1.27bn will be accrued from a public health perspective over 10 years. TO NOTE: section 2.11 was used in this data extraction: Population-level suicide awareness training and intervention

E.2.5 Pil et al 2013

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Pil 2013 **Ref Id** **Economic study type** Cost effectiveness **Country(ies) where the study was done** Belgium, Flanders **Perspective & Cost Year** Social perspective. Cost year is 2012. **Source of funding**	**Study dates** 2011 **Intervention** Suicide helpline which offers telephone and chat services to people calling in / engaging in chat. Population are those with no to mild, or with moderate to strong suicidal thoughts. **Comparison(s)** A scenario in which the suicide helpline was absent.	**Source of effectiveness data** Modelled. Relative risk reduction applied from a study conducting a pre-and post-test immediately after a call to a US hotline*. Same risk reductions used for telephone and for chat service. **Source of cost data** • Cost of suicide: estimation derived from American study and converted using purchasing power parity. • Intervention cost obtained from Flemish centre for prevention of suicide. Suicide costs include: ambulance transport, medical examiner costs, emergency department, inpatient hospitalization and / or nursing home costs, absenteeism costs	**Time horizon and discount rate** • 10 year time horizon • Discount rate of 3% applied to future costs, and discount rate of 1.5% applied to effects. **Method of eliciting health valuations (if applicable)** NA **Modelling approach** Age- and gender-dependent state transition Markov model with ten-year time horizon and a one-year cycle length. The model used a	**Cost per patient per alternative** • Total cost of the intervention is €218,299. • Cost per person reaching the helpline (5054) was €43/per person (not per contact). Costs saved: • Authors estimate that in Flanders, the intervention would save €1,452,022 for the public health service; €1,188,519 through the telephone service and €263,503 through the chat service. • Telephone service: total costs decrease by €2171 for female users and €2366 for male users • Chat service: total costs would decrease by €2457 for female users and €2272 for male users **Effectiveness per patient per alternative** • Over ten years, overall reduction of 36% for suicides and first suicide attempts (205 attempts and 33 suicides prevented). Suicide and attempted suicides prevented • Telephone service: would prevent 16 suicides and 47 first suicide attempts per 1000 males. 6 and 54 per 1000 females respectively. • Chat service: would prevent 10 suicides and 60 first suicide attempts per 1000 males. 2 and 68 per 1000 females respectively. QALYs gained	**Limitations** • Authors note that: relative risk reduction was from an American helpline with unclear transferability. • The length of one cycle is a year, whereas in reality an individual may make an attempt and a re-attempt in the same year. • Incidence rates for suicide in suicidal individuals were taken from Spain and America. • Cost of suicide was taken from data for America. **Conclusion(s)** • The model results were that there was a small QALY gain in users of the intervention service

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Flemish Centre for Suicide Prevention.		(applied only between 20 and 60 years of age). Intervention costs included including salaries, transport costs of personnel, compensation for the trained volunteers, operation costs and costs of telephony and instant messaging. **Other data sources e.g. transition probabilities** States were: the initial state (i.e. at risk for suicide), first attempt, follow-up, re-attempt, suicide and death from other causes. Transitions between these states were allowed once a year. Transition probabilities obtained from various published studies.	friction cost method (FCM)	• Telephone service: 0.019 (95% CI -0.015, 0.052) QALYs gained by women and 0.063 (95% CI 0.030, 0.097) gained by men. • Chat service: -0.005 (95% CI -0.071, 0.062) QALYs gained by women and 0.035 (95% CI -0.026, 0.096) gained by men. **Incremental cost-effectiveness** <u>Mean ICER</u> • Intervention dominates comparison, so no ICER is presented **Uncertainty** One-way and sensitivity analyses carried out. Parameters of the following were increased and decreased by 15% to evaluate effects: direct costs, utility of suicidal thoughts, utility of making an attempt, incidences of attempts and suicides in suicidal individuals, the relative risk reduction and the discount rate on net costs and net QALYs. • One-way sensitivity analysis demonstrated that all variables had little effect on the difference in QALYs (strongest effect from the utility of suicidal thoughts). Variables also had little effect on net cost (relative risk reduction had strongest effect). Scenario analysis using human capital analysis (HCA) produced more positive results. Scenario analysis assuming that the degree of suicidal thoughts will increase with time since the attempt also produced more positive results	but these were not statistically significant apart from for males using the telephone service. Savings were made to society for both telephone and chat services. • Telephone services seemed to lead to more health gains, especially in male users. To note: FCM includes absenteeism costs for suicides in that year only.

E.2.6 Sari et al 2008

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation Sari et al 2008 **Ref Id** **Economic study type** Cost effectiveness **Country(ies) where the study was done** Florida, USA **Perspective & Cost Year** Social net benefits, 2000 **Source of funding** Not reported	**Study dates** 2011 **Intervention** **General suicide education**, typically used in middle and high schools, is a curriculum based suicide prevention program. The second program**, peer support group program**, can be conducted in either school or non-school settings, and is designed to foster peer relationships, competency development, and social skills as a method to prevent suicide	**Source of effectiveness data** The data on suicide are based on the reported results from Florida Vital Statistics Annual Reports. **Source of cost data** • Cost of suicide: Suicide may have direct and indirect costs to the individual and to the society. Direct costs are costs directly traceable to youth suicide deaths, such as ambulance services and autopsy services. Indirect costs, however, are not directly associated with the event, but represent the lost value of a productive member of society, i.e., potential earnings lost due to premature death, and productivity loss of immediate family members. Based on information available from the Agency for	**Time horizon and discount rate** The net benefits of each programme at a range of discount rates from 4% to 20% **Method of eliciting health valuations (if applicable)** NA **Modelling approach** The calculation presented in the suicide costs per youth is converted into benefits to society. The potential earning lost is calculated under the assumption that the future	**Cost per patient per alternative** • The total cost of implementing the general awareness education in 119 college campuses is US$ 17.49 million. • Estimated total annual cost for the peer support program would be US$ 84,760 in year 2000. This implies that the total cost of state wide implementation of the program is US$ 10.09 million. Costs saved: • The benefit cost ratio for the peer support program is 3.71, suggesting that the benefit to the society is US$ 3.71 for each dollar invested. • General suicide education program also shows a positive net benefit with benefit–cost ratio of 2.03 **Effectiveness per patient per alternative** Suicide and attempted suicides prevented QALYs gained • . **Incremental cost-effectiveness** Mean ICER **Uncertainty**	**Limitations** • Authors note that: One of the important limitations is the conjecture of the underreporting of suicide. • Some assumptions with regard to the direct cost of suicide were made. The ambulance cost calculations, for instance, are based on data reported by the American Ambulance Association, rather than original ambulance invoices. Autopsy services may also vary in cost, especially when dealing with suicide deaths. These assumptions can be addressed by directly working with each suicide

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
	among high-risk individuals **Comparison(s)** Two types of interventions	Health Care Administration and the American Ambulance Association Intervention cost obtained from Flemish centre for prevention of suicide. • US Census Bureau, average annual earnings as a proxy to estimate the contribution of each individual to the production process. **Other data sources e.g. transition probabilities**	growth rate of potential earnings would be equivalent to the rate of growth in the Consumer Price Index plus an increase in earnings due to productivity growth. To calculate the total benefit from each program, we use effect rates as weights to estimate the total number of students who would have been saved if the programs were available in 2000.	The analysis calculated the net benefit for each program at various discount rates and effect rates, with a range of discount rates from 4% to 20%. The net benefits of both programs are positive as long as the discount rate is lower than 11%. For the peer support program, the break-even discount rate is even higher. Although the net benefit of the peer support program is higher at all discount rate, the results imply that implementation of either programs would contribute substantially to the social welfare if the discount rate is not higher than 10%.	case if researchers have a direct access to the suicide database. **Conclusion(s)** The economic evaluation of two specific suicide prevention programs, general suicide education and peer support programs, shows that both pro-grams are cost beneficial interventions. Even with the most conservative estimates, these programs would provide at least US$ 22 million per year.

E.2.7 Vasiliadis et al 2015

Bibliographic details	Intervention and Comparison	Data sources	Time horizon & Method	Results	Authors' discussion
Full citation	**Study dates**	**Source of effectiveness data**	**Time horizon and discount rate**	**Cost per patient per alternative**	**Limitations**

<table>
<tr><th>Bibliographic details</th><th>Intervention and Comparison</th><th>Data sources</th><th>Time horizon & Method</th><th>Results</th><th>Authors' discussion</th></tr>
<tr>
<td>Vasiliadis et al 2015

Ref Id

Economic study type

Modelling study. Cost-effectiveness. (authors call this a prospective value implementation study)

Country(ies) where the study was done

Canada

Perspective & Cost Year

Health care system and societal perspective

Costs are in 2010 Canadian Dollars</td>
<td>2007 (status quo data from 2007)

Intervention

Transferring the results of the European Nuremberg Alliance against Depression (NAD) trial with the addition of 4 community-based suicide prevention strategies:
- Training of family physicians in the detection and treatment of depression
- Population campaign aimed at increasing awareness about depression
- Training of community leaders among first responders (i.e. teachers,</td>
<td>Not specified

Source of cost data

• Costing of resources based on guidelines for economic evaluations*. Also interviews with key decision makers in ministry of health, social services, regional health agencies, community suicide prevention and crisis intervention programs)
• Salary data from Statistics Canada
• Patient data from the databases from Quebec's health insurance plan (RAMQ) and ministry of health and social services (MHSS)

Costs considered included: increased costs of treatment of depression (as detection increases).</td>
<td>• Not specified
• Discounted at 3% per year

Method of eliciting health valuations (if applicable)

NA

Modelling approach

Both human capital approach (HCA) and friction cost method (FCM) approaches were used to model cost of suicide annually, In a sensitivity analysis, these were found to greatly influence the cost of a suicide</td>
<td>• Total cost of implementing the programmes in Quebec was $23,982,293 annually
• Using FCM: average cost of a death by suicide $34,572 (range $13,170 to $141,277).
• Using HCA: average cost of a suicide was $593,927 (range $473,569 to $716,985).

Effectiveness per patient per alternative

• Considering effects of NAD programme, expected reduction in suicide attempts of 27% (95% CI 18% to 36%) and suicides by 16% (95% CI 11% to 25%).

Potential impact of the NAD program

<table>
<tr><th></th><th>Status quo 2007</th><th colspan="3">Events after reduction.</th></tr>
<tr><th></th><th></th><th>Average reduction</th><th>Lower limit reduction</th><th>Higher limit reduction</th></tr>
<tr><td>Suicide attempts</td><td>6823</td><td>4981</td><td>5595</td><td>4367</td></tr>
<tr><td>Adult suicides</td><td>1069</td><td>898</td><td>951</td><td>802</td></tr>
<tr><td>Person life years lost (discounted at 3%)</td><td>21,296</td><td>17,432</td><td>19,166</td><td>16,308</td></tr>
</table>

Incremental cost-effectiveness

<u>Mean ICER</u>
Using FCM:</td>
<td>• Authors state that data came from many varied sources. Results may not be generalizable. The two models used present very different results. It is not possible to attribute portions of the results to portions of the programme, which is multicomponent.
• Sources of effectiveness data not specified: authors state that they used "recent data in the literature on the effectiveness of the NAD trial in Europe".

Conclusion(s)</td>
</tr>
</table>

<table>
<tr><th>Bibliographic details</th><th>Intervention and Comparison</th><th>Data sources</th><th>Time horizon & Method</th><th>Results</th><th>Authors' discussion</th></tr>
<tr>
<td>Source of funding

Quebec Health Research Fund</td>
<td>shelters, social workers, therapists, pharmacists, police)
- Follow-up of individuals who attempted suicide

Comparison(s)

Status quo</td>
<td>Costs of suicide considered: therapy for bereaved individuals, hospitalisation and emergency department visits; ambulatory visits' physician fees and outpatient medications. Also investigation costs, funeral costs. Indirect costs included loss of years of life, loss of productivity, short term disability related to depression, presenteeism and absenteeism.

Other data sources e.g. transition probabilities

Patient data from the databases from Quebec's health insurance plan (RAMQ) and ministry of health and social services (MHSS)</td>
<td></td>
<td>• ICER using FCM showed costs of $55,123 per 1 averted suicide

Using HCA and future healthcare costs:
• ICER using HCA showed cost savings of $3,979 per life year saved.

<u>Probabilistic ICER (95% CI)</u>

• Not specified

Uncertainty

FCM Sensitivity Analysis (one-way):
<table>
<tr><th></th><th>Cost per averted suicide</th></tr>
<tr><td>Main calculation</td><td>$55,123</td></tr>
<tr><td>Reducing population of depression successfully treated from 7% to 1% additional</td><td>$269,564</td></tr>
<tr><td>Decreasing effects of intervention on suicide attempts to 18% and suicides to 11% (from 27% and 16%)</td><td>$161,420</td></tr>
<tr><td>Using upper limit of healthcare costs, societal costs and indirect costs of suicide (rather than average)</td><td>Savings of $2,418,264</td></tr>
</table>
</td>
<td>• Cost effectiveness results depend on the model used.
• If considering HCA model, intervention programme is cost saving per life year saved (average of $3,979 per life year)
• If considering FCM model, averting one suicide incurs costs of $55,123 on average
• Sensitivity analysis (varying impact of the programme on depression treatment, on suicide attempts and suicides, and using lower and upper limits of costs) create significant variations in results.</td>
</tr>
</table>

<table>
<tr><th>Bibliographic details</th><th>Intervention and Comparison</th><th>Data sources</th><th>Time horizon & Method</th><th>Results</th><th>Authors' discussion</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Using lower limit of healthcare costs, societal costs and indirect costs of suicide (rather than average)</td><td>$222,643</td></tr>
</table>

HCA Sensitivity Analysis (one-way):
<table>
<tr><td></td><td>Cost per life year saved</td></tr>
<tr><td>Main calculation</td><td>Savings of $3,979</td></tr>
<tr><td>Reducing population of depression successfully treated from 7% to 1% additional</td><td>$5,513</td></tr>
<tr><td>Decreasing effects of intervention on suicide attempts to 18% and suicides to 11% (from 27% and 16%)</td><td>$1,522</td></tr>
<tr><td>Using upper limit of healthcare costs, societal costs and indirect costs of suicide (rather than average)</td><td>Savings of $146,216</td></tr>
<tr><td>Using lower limit of healthcare costs, societal costs and indirect costs of suicide (rather than average)</td><td>$4,120</td></tr>
</table>
</td><td></td></tr>
</table>

Appendix F:GRADE tables

F.1 RCT

F.1.1 Suicide attempts

Quality assessment							Number of events		Effect		Committee confidence
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	intervention	Control	Relative risk ratio (RR) (95% CI)	Absolute in rate reported	
Applied Suicide Intervention Skills Training (ASIST)-(population = community members)											
1 (Sareen et al 2013)	RCT	Serious[1]	Not applicable (N/A)	Serious[2]	Serious[3]	none	0/28	0/22	Not estimated	-	VERY LOW
Question, Persuade, Refer (QPR)-(population = school teachers)											
1 (Wasserman et al 2015)	RCT	No serious	N/A	No serious[4]	Serious[5]	none	22/1978 (1.1%)	34/2256 (1.5%)	0.74 (0.43, 1.26)	4 fewer per 1000	MODERATE
Signs of Suicide (SOS)- (population = school students)											
3 (Aseltine 2007, Schilling et al 2014, Schilling et al 2016)	RCT	Serious[6]	Serious[7]	No serious[4]	No serious	none	77/2988 (2.6%)	116/2577 (4.5%)	0.60 (0.45 to 0.80)	18 fewer per 1000	LOW
Youth Aware of Mental Health Programme (YAM)-(population = school students)											
1 (Wasserman et al 2015)	RCT	Serious[8]	N/A	No serious[4]	No serious	none	14/1987 (0.7%)	34/2256 (1.5%)	0.47 (0.25 to 0.87)	8 fewer per 1000	MODERATE

1. Masking of participants and personnel were not reported in the study; control group received resilience rest, which did not focus on suicide risk factors, so it was not expected to have an impact on primary outcome of the study.
2. Participants were recruited from First Nations communities.
3. No event was reported after the intervention (6-months study follow-up), and the effect cannot be estimated.
4. Interventions, population and outcomes are in line with review protocol
5. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
6. Selection bias (interventions were not masked in Aseltine et al 2007 and Schilling et al 2016, participants in control group were wait-list control; allocation was altered in Schilling et al 2014)
7. Visual interpretation of forest plot indicates some variability (95%CI of RR from Aseltine et al 2007 and Schilling et al 2014 cross 1)
8. Participants in control group exposed to the same mental health information as the YAM group.

F.1.2 Suicide ideation

Quality assessment							Number of events		Effect		Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**intervention**	**Control**	**Relative risk ratio (RR) (95% CI)**	**Absolute difference in rates**	
Applied Suicide Intervention Skills Training (ASIST)- (population = community members)											
1 (Sareen et al 2013)	RCT	Serious[1]	N/A	Serious[2]	Serious[3]	none	7/28 (25%)	1/22 (4.5%)	5.5 (0.73 to 41.44)	205 more per 1000	VERY LOW
Applied Suicide Intervention Skills Training (ASIST)-((population = telephone crisis centre staff)											
1 (Gould et al 2013)	RCT	Serious[4]	N/A	No serious[5]	No serious	none	107/763 (14%)	120/638 (18.8%)	0.75 (0.59 to 0.95)	47 fewer per 1000	MODERATE
Question, Persuade, Refer (QPR)-(population= school teachers)											
1 (Wasserman et al 2015)	RCT	No serious	N/A	No serious[5]	Serious[3]	none	29/1977 (1.5%)	31/2261 (1.4%)	1.07 (0.65 to 1.77)	1 more per 1000	MODERATE
Signs of Suicide (SOS)- (population = school students)											

2 (Schilling et al 2014, Schilling et al 2016)	RCT	Serious[6]	No serious[7]	No serious[5]	Serious[3]	none	56/949 (5.9%)	45/483 (9.3%)	0.57 (0.28 to 1.18)	40 fewer per 1000	LOW
Sources of Strength- (population=school students)											
1 (Wyman et al 2010)	RCT	Serious[8]	N/A	No serious[5]	Serious[3]	None	122/2778 (4.4%)	64/1236 (5.2%)	0.85 (0.63 to 1.14)	8 fewer per 1000	LOW
Youth Aware of Mental Health Programme (YAM)-(population = school students)											
1 (Wasserman et al 2015)	RCT	Serious[9]	N/A	No serious[5]	No serious	none	14/1991 (0.7%)	31/2261 (1.4%)	0.51 (0.27 to 0.96)	7 fewer per 1000	MODERATE

1. Masking of participants and personnel were not reported in the study; control group received resilience rest, which did not focus on suicide risk factors, so it was not expected to have an impact on primary outcome of the study.
2. Participants were recruited from First Nations communities.
3. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
4. Selection bias (the study recruited all Lifeline crisis centres with interest and motivation to participate)
5. Interventions, population and outcomes are in line with review protocol
6. Selection bias (interventions were not masked in Schilling et al 2016, participants in control group were wait-list control; allocation was altered in Schilling et al 2014)
7. Visual interpretation of forest plot indicates little variability (95%CI of RR in Schilling et al 2016 cross 1), but overall direction of the effect was consistent.
8. Intervention was not masked
9. Participants in control group exposed to the same mental health information as the YAM group.

F.1.3 Service uptake

Quality assessment							Number of event (%)		Effect		Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**intervention**	**Control**	**Relative ratio (RR) (95% CI)**	**absolute**	
Met mental health professional (Electronic Bridge to Mental Health Services, population=students with elevated suicide risk)											

1 (King et al 2015)	RCT	Serious[1]	N/A	No serious[2]	Serious[3]	none	9/31 (29%)	0/29	17.81 (1.08 to 292.88)	-	LOW
Treatment (Electronic Bridge to Mental Health Services, population= students with elevated suicide risk; Signs of Suicide (SOS)- (population = school students))											
2 (King et al 2015, Schilling et al 2014)	RCT	Serious[4]	Serious[5]	No serious[2]	Serious[6]	none	32/330 (9.7%)	13/116 (11.2%)	2.18 (0.07 to 68.67)	25 more per 1000	VERY LOW
Talk to crisis or telephone hotline (Signs of Suicide (SOS)- (population = school students))											
1 (Schilling et al 2014)	RCT	Serious[7]	N/A	No serious[2]	Serious[6]	None	1/299 (0.3%)	1/87 (1.1%)	0.29 (0.02 to 4.6)	2 fewer per 1000	LOW
Mental health first aid (population=high school teachers, student outcome reported help received from teachers)											
Jorm et al 2010	RCT	Serious[8]	NA	No serious	No serious	None	66/982 (6.7%)	27/651 (4.2%)	1.62 (1.05 to 2.51)	26 more per 1000	MODERATE

1. Selection bias (allocation sequence and masking of participants were not reported)
2. Interventions, population and outcomes are in line with review protocol.
3. 95% CI of RR around point estimate not crossing line of no effect which the committee agreed should be the minimal important difference, but 95%CI is wide
4. Selection bias (allocation sequence and masking of participants were not reported in King et al 2015; allocation was altered after randomisation (Schilling et al 2014).
5. Visual interpretation of forest plot indicates some variability (the direction of 2 RCTs was opposite)
6. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
7. Selection bias (allocation of intervention and control group was altered)
8. Intervention not masked (waiting list control)

F.1.4 Change in knowledge

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Intervention**	**Control**	**Intervention (pre to end-point)**	**Control (pre to end-point)**	**Mean difference (95%CI)**	

Applied Suicide Intervention Skills Training (ASIST)- (population = community members)												
1 (Sareen et al 2013)	RCT	Serious[1]	NA	Serious[2]	Serious[3]	6-months follow-up	31	24	2.16 (0.97) to 2.50 (0.88)	2.19 (0.87) to 2.23 (0.81)	0.27 (-0.18 to 0.72)	VERY LOW
Mental Health Online (MHO)-(population= people working with youth)												
1 (Ghoncheh et al 2016)	RCT	Serious[4]	NA	No serious[5]	No serious	3-months follow-up	82	92	10.59 (2.74) to 13.82 (3.00)	11.05 (3.07) to 12.05 (3.30)	1.77 (0.83 to 2.71)	MODERATE
Question, Persuade, Refer (QPR)-(population= school personnel, parents, Master of social work students)												
Cross et al 2011	RCT	Serious[6]	NA	No serious[5]	Serious[3]	3-months follow-up	72	75	70.69 (12.07) to 77.52 (11.85)	70.44 (12.07) to 75.79 (12.26)	1.73 (-2.15 to 5.61)	MODERATE
Jacobson et al 2012	RCT	Serious[7]	NA	No serious[5]	No serious	4-months follow-up, standard deviation reported in the study seemed to be small.	30	33	75.7 (0.13) to 77.4 (0.07)	78.3 (0.10) to 72.0 (0.09)	5.4 (1.44 to 9.36)	MODERATE
Wyman et al 2008	RCT	Serious[8]	NA	No serious[5]	No serious	12-months follow-up	122	127	70.1 (12.2) to 76.3 (12.2)	71.0 (12.2) to 72.8 (12.1)	4.52 (1.51 to 7.53)	MODERATE
Signs of Suicide (SOS)- (population = school students)												
Schilling et al 2014	RCT	Serious[8]	NA	No serious[5]	Serious[3]	3-months follow-up, baseline scores were not reported	299	87	4.58 (1.20)	4.55 (1.31)	0.03 (-0.28 to 0.34)	LOW
Schilling et al 2016	RCT	Serious[8]	NA	No serious[5]	No serious	3-months follow-up	420	350	4.62 (1.31) to 5.15 (1.33)	4.45 (1.28) to 4.59 (1.33)	0.56 (0.37 to 0.75)	MODERATE
Youth prevention-(study population= people working with the youth)												
(Chagnon et al 2007)	RCT	Serious[9]	N/A	No serious[5]	No serious	Immediate after training	43	28	6.47 (1.38) to 8.25 (1.17)	5.38 (1.55) to 5.57 (1.58)	2.68 (2.00 to 3.36)	MODERATE
Mental health first aid (population=high school teachers)												

Jorm et al 2010	RCT	Serious[10]	NA	No serious	No serious	6-month follow-up	221	106	11.14 (13.07) to 12.68 (3.44)	11.26 (3.07) to 10.76 (3.89)	1.92 (1.05 to 2.79)	MODERATE

1. Masking of participants and personnel were not reported in the study; control group received resilience rest, which did not focus on suicide risk factors, so it was not expected to have an impact on primary outcome of the study.
2. Participants were recruited from First Nations communities.
3. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
4. Intervention was not masked.
5. Interventions, population and outcomes are in line with review protocol.
6. Selection bias (masking of participants or personnel was not reported in studies); Participants received QPR training in both intervention and control group, with additional behaviour rehearsal training was provided in intervention group (Cross et al 2011).
7. Masking of intervention, participants were not reported in the study and 11% missing data at the end of study follow-up
8. Selection bias (one third of staff enrolled were selected to participate the study).
9. Selection bias (interventions were not masked in Schilling et al 2016, participants in control group were wait-list control; allocation was altered in Schilling et al 2014)
10. Selection bias (allocation and randomisation were not reported in the study)

F.1.5 Change in attitudes

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Intervention**	**Control**	**Intervention (pre to end-point)**	**Control (pre to end-point)**	**Mean difference (95%CI)**	
Question, Persuade, Refer(QPR)-(population= Master of social worker students), lower scores indicate more positive attitudes												
1 (Jacobson et al 2012)	RCT	Serious[1]	NA	No serious[2]	No serious	4-months follow-up, standard deviation reported in the study seemed to be small.	30	33	27.21 (0.69) to 25.50 (0.83)	27.77 (0.82) to 27.42 (0.76)	-1.92 (-2.31 to -1.53)	MODERATE
Signs of Suicide (SOS)- (population = school students), higher scores indicate more positive attitudes												
Schilling et al 2014	RCT	Serious[3]	NA	No serious[2]	Serious[4]	3-months follow-up,	299	87	4.01 (0.59)	4.05 (0.57)	-0.04 (-0.18 to 0.10)	LOW

						baseline scores were not reported						
Schilling et al 2016	RCT	Serious[3]	NA	No serious[2]	No serious	3-months follow-up	420	350	3.71 (0.61) to 3.74 (0.66)	3.67 (0.63 to 3.61 (0.64)	0.13 (0.04 to 0.22)	MODERATE
Youth prevention-(study population= people working with the youth), higher scores indicate more positive attitudes												
1 (Chagnon et al 2007)	RCT	Serious[5]	N/A	No serious[2]	No serious	Immediate after training	43	28	15.30 (1.57) to 16.41 (1.24)	15.68 (1.26) to 15.55 (1.09)	0.86 (0.31 to 1.41)	MODERATE

1. Selection bias (randomisation was not reported; incomplete reporting (11% missing data at the end of study follow-up)
2. Interventions, population and outcomes are in line with review protocol.
3. Selection bias (interventions were not masked in Schilling et al 2016, participants in control group were wait-list control; allocation was altered in Schilling et al 2014)
4. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
5. Allocation and randomisation were not reported in the study

F.1.6 Change in behaviours

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Intervention**	**Control**	**Intervention (pre to end-point)**	**Control (pre to end-point)**	**Mean difference (95%CI)**	
Question, Persuade, Refer(QPR)-(population= Master of social worker students; school personnel)												
Asking individuals about suicide												
Jacobson et al 2012	RCT	Serious[1]	NA	No serious[2]	Serious[3]	4-months follow-up	30	33	1.82 (1.01) to 2.71 (1.41)	2.34 (1.49) to 2.60 (1.45)	0.11 (-0.60 to 0.82)	LOW
Wyman et al 2008	RCT	Serious[4]	NA	No serious[2]	Serious[3]	12-months follow-up	122	127	0.33 (0.95) to 0.56 (1.20)	0.28 (0.83) to 0.41 (0.95)	0.15 (-0.12 to 0.42)	LOW
Following safety protocol												

Jacobson et al 2012	RCT	Serious[1]	NA	No serious[2]	Serious[3]	4-months follow-up	30	33	2.22 (1.47) to 2.90 (1.58)	2.02 (1.31) to 2.94 (1.69)	-0.04 (-0.84 to 0.77)	LOW
Wyman 2008	RCT	Serious[4]	NA	No serious[2]	Serious[3]	12-months follow-up	122	127	1.96 (1.37) to 2.54 (1.61)	1.95(1.36) to 2.40 (1.43)	0.14 (-0.24 to 0.52)	LOW
QPR-(population=university resident assistant)												
Support to the resident												
McLean et al (2017)	RCT	Serious[5]	NA	No Serious[2]	Serious[2]	4-months follow-up	81	81	4.6 (6.16)	4.9 (6.06)	-0.30 (-2.19 to 1.59)	LOW
Source of Strength-(population= school students)												
Referred distressed peer												
1 (Wyman et al2010)	RCT	Serious[6]	N/A	No serious[2]	No serious	12-months follow-up, baseline data were not reported	268	185	0.49 (0.62)	0.38 (0.49)	0.11 (0.01 to 0.21)	MODERATE
Support to peer												
1 study (Wyman et al 2010)	RCT	Serious[6]	N/A	No serious[2]	No serious	12-months follow-up, baseline data were not reported	268	185	6.20 (1.31)	5.88 (1.39)	0.32 (0.07 to 0.57)	MODERATE

1. Selection bias (randomisation were not reported in studies) and incomplete reporting (11% missing data at the end of study follow-up)
2. Interventions, population and outcomes are in line with review protocol.
3. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
4. Selection bias (one third of staff enrolled were selected to participate the study).
5. Study participants were recruited from one university; both intervention and control groups received training programme.
6. Intervention was not masked

F.1.7 Change in beliefs

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other consideration	Intervention	Control	Intervention (pre to end-point)	Control (pre to end-point)	Mean difference (95%CI)	
Air Force Suicide Prevention Programme (AFSPP) (population=duty airmen)												
Bryan 2009	RCT	Serious[1]	N/A	No serious[2]	Serious[3]	Immediate after training, baseline data were not reported	153	112	5.07 (1.57)	5.15 (1.50)	-0.08 (-0.45 to 0.29)	LOW
Source of Strength (population=school students)												
Support suicidal peer												
1 (Wyman et al 2010	RCT	Serious[4]	N/A	No serious[2]	No serious	12-months follow-up, baseline data were not reported	6 schools (2778 students)	6 schools (1236 students)	2.99 (0.43)	2.73 (0.40)	0.26 (0.23 to 0.29)	MODERATE
Seeking help from adults												
1 (Wyman et al 2010)	RCT	Serious[4]	N/A	No serious[2]	No serious	12-months follow-up, baseline data were not reported	6 schools (2778 students)	6 schools (1236 students)	2.73 (0.45)	2.48 (0.40)	0.25 (0.22 to 0.28)	MODERATE
Mental health first aid (population=employee of human resources staff)												
1 (Kitchener and Jorm 2004)	RCT	Serious[4]	NA	No serious	Serious[3]	6-months follow-up	146	155	82.10 (17.27) to 86.29 (18.30)	83.00 (18.95) to 83.42 (18.48)	2.87 (-1.29 to 7.03)	LOW

1. Randomisation was not reported and both groups received the intervention, with additional one presentation slide being added to the intervention group.
2. Interventions, population and outcomes are in line with review protocol.
3. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
4. Intervention was not masked

F.1.8 Change in skills

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other consideration	Intervention	Control	Intervention (pre to end-point)	Control (pre to end-point)	Mean difference (95%CI)	
Preparedness												
Applied Suicide Intervention Skills Training (ASIST)- (population = community members)												
1 (Sarren et al 2013)	RCT	Serious[1]	NA	Serious[2]	Serious[3]	6-months follow-up	31	24	2.19 (0.87) to 2.43 (0.96)	2.33 (0.76) to 2.45 (0.86)	-0.02 (-0.05 to 0.46)	VERY LOW
Mental Health Online (MHO)-(population= people working with the youth												
1 (Ghonchen et al 2016)	RCT	Serious[4]	NA	No serious[5]	No serious	3-months follow-up	82	92	18.21 (7.29) to 25.93 (5.34)	16.78 (7.44) to 17.52 (7.34)	8.41 (6.52 to 10.30)	MODERATE
Question, Persuade, Refer(QPR)-(population= Master of social worker students; school personnel)												
Jacobson et al 2012	RCT	Serious[6]	NA	No serious[5]	No serious	4-months follow-up	30	33	3.50 (.014) to 5.16 (0.98)	3.13(1.08) to 4.24 (1.45)	0.92 (0.31 to 1.53)	MODERATE
Wyman 2008	RCT	Serious[7]	NA	No serious[5]	No serious	12-months follow-up	122	127	3.48 (1.61) to 5.01 (1.34)	3.41 (1.55) to 3.75 (1.40)	1.26 (0.92 to 1.60)	MODERATE
Skills to perform prevention activities												
Applied Suicide Intervention Skills Training (ASIST)- (population = community members)												
1 (Sarren et al 2013)	RCT	Serious[1]	N/A	Serious[2]	Serious[3]	6-months follow-up	31	24	12.90 (2.78) to 13.52 (3.72)	14.17 (4.10) to 15.05 (3.58)	-1.53 (-3.47 to 0.41)	VERY LOW

Question, Persuade, Refer(QPR)-(population= Master of social worker students; school personnel and parents)												
Cross et al 2011	RCT	Serious[8]	NA	No serious[5]	Serious[3]	3-months follow-up, baseline scores were not reported	72	75	11.02 (2.02)	10.49 (2.26)	0.53 (-0.16 to 1.22)	MODERATE
Jacobson et al 2012	RCT	Serious[6]	NA	No serious[5]	No serious	4-months follow-up	30	33	3.87 (0.83) to 4.75 (0.62)	3.99 (0.75) to 4.22(0.84)	0.53 (0.17 to 0.89)	MODERATE
Wyman 2008	RCT	Serious[7]	NA	No serious[5]	No serious	12-months follow-up	122	127	3.50 (1.08) to 4.64 (1.13)	3.40 (1.07) to 3.52 (1.10)	1.12 (0.84 to 1.40)	MODERATE
Youth prevention-(population=people working with the youth)												
1 study (Chagnon et al 2007)	RCT	Serious[9]	N/A	No serious[3]	No serious	Immediate after training	43	28	14.64(2.94) to 18.75(2.77)	13.47(2.64) to 14.07(2.10)	4.69 (3.55 to 5.83)	MODERATE

1. Masking of participants and personnel were not reported in the study; control group received resilience rest, which did not focus on suicide risk factors, so it was not expected to have an impact on primary outcome of the study.
2. Participants were recruited from First Nations communities.
3. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
4. Intervention was not masked
5. Interventions, population and outcomes are in line with review protocol
6. Selection bias (randomisation were not reported in studies) and incomplete reporting (11% missing data at the end of study follow-up)
7. Selection bias (one third of staff enrolled were selected to participate the study).
8. Selection bias (masking of participants or personnel was not reported in studies); Participants received QPR training in both intervention and control group, with additional behaviour rehearsal training was provided in intervention group (Cross et al 2011).
9. Selection bias (allocation and randomisation were not reported in the study)

F.2 Non RCT

F.2.1 Suicide rate

Quality assessment							Suicide rate per 100,000		Effect		Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**After**	**Before**	**Relative risk ratio**	**Absolute in rates**	

									(RR) (95% CI)		
Military-based suicide prevention (Air Force Suicide Prevention Programme (AFSPP) and Israeli Defence Force suicide Prevention programme-(population = active duty force soldiers)											
2 (Knox et al 2010/2003; Shelef et al 2015)	Experimental (before-after)	Serious[1]	No serious[2]	No serious[3]	No serious	none	9.8	20.9	0.54 (0.32 to 0.92)	11.1 fewer per 100,000	MODERATE
Police suicide prevention											
1 (Mishara et al 2012	Experimental (before-after)	Serious[4]	NA	No serious[3]	No serious	none	6.4	30.5	0.21 (0.07 to 0.66)	3 fewer per 1000	MODERATE
Prison peer suicide prevention											
1 (Hall and Gabor 2004)	Mixed method	Serious[6]	NA	No serious[3]	Serious[5]	none	65.6	131.1	0.50 (0.09 to 2.72)	3 fewer per 1000	LOW
Garret Lee Smith Memorial suicide prevention Programme (GLS)-(population = residents in counties where the programme implemented across USA)											
Suicide rate aged 10-24 years											
1 (Walrath et al 2015)	Experimental	Serious[7]	N/A	No serious[3]	No serious	none	Not reported (NR)	NR	-	1.33 fewer per 1000 [95%CI 0 to 2 fewer]	MODERATE
Multimodal community intervention programme-(study population=residents in the areas where interventions were implemented)											
1 (Ono et al 2013)	Experiment (before-after)	Serious[8]	NA	No serious[3]	Serious[5]	none	19.1	22.5	0.85 (0.66 to 1.10)	3.4 fewer per 100,000	LOW
Alliance against depression											

3 (Hergerl 2010, Hubner 2010, Szekely 2013)	Experimental (before-after)	Serious[8]	No serious	No serious[3]	No serious	None	16.3	21.7	0.75 (0.59, 0.95)	5.4 fewer per 100,000	MODERATE

1. During the observation, there was the activation of US air force for warfare (Afghanistan and Iraq).
2. Visual interpretation of forest plot indicates some variability as 95%CI of Knox et al study cross 1 but overall direct of estimated effect was toward favouring the implementation of intervention.
3. Interventions, population and outcomes are in line with review protocol
4. Populations were not representative to general population
5. 95% CI of RR around point estimate crosses line of no effect which the committee agreed should be the minimal important difference
6. This is a mixed method study reported quantitative data on the number of completed suicides in one institute.
7. Population were selected at a county level, and data before the implementation of the programme were not available. Comparison made between counties with or without implementing GLS.
8. Accuracy of data reporting/recording.

F.2.2 Service uptake (help-seeking)

Quality assessment							Number of event (%)		Effect		Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**After**	**Before**	**Relative ratio (RR) (95% CI)**	**Absolute difference**	
Connect- (population = community youths) (higher percentage indicate more youths sought adults assistance)											
1 (Bean and Baber 2011)	Experimental (before and after)	Serious[1]	N/A	No serious[2]	No serious[3]	none	114/204 (55.9%)	82/204 (40.2%)	1.39 (1.13 to 1.71)	157 more per 1000	VERY LOW

1. Selection bias as the 2 intervention communities were selected through an application process.
2. Interventions, population and outcomes are in line with review protocol.
3. 95% CI of RR around point estimate not crossing line of no effect which the committee agreed should be the minimal important difference.

F.2.3 Change in knowledge(dichotomous outcome)

Quality assessment							Number of event		Effect		Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**After**	**Before**	**Relative risk ratio (RR) (95% CI)**	**Absolute difference**	
Connect- (population = community adults) (higher percentage indicates more correct responses)											
1 (Bean and Baber 2011)	Experiment (before and after)	Serious[1]	N/A	No serious[2]	No serious[3]	none	544/648 (84%)	335/648 (51.7%)	1.62 (1.5 to 1.76)	321 more per 1000	VERY LOW
Connect- (population = community youths)											
1 (Bean and Baber 2011)	Experimental (before and after)	Serious[1]	N/A	No serious[2]	No serious[3]	none	189/204 (92.6%)	148/204 (72.5%)	1.28 (1.16 to 1.4)	203 more per 1000	VERY LOW

1. Selection bias as the 2 intervention communities were selected through an application process.
2. Interventions, population and outcomes are in line with review protocol
3. 95% CI of RR around point estimate not crossing line of no effect which the committee agreed should be the minimal important difference

F.2.4 Change in knowledge(continuous outcome)

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Before**	**After**	**Before**	**After**	**Mean difference (95%CI)**	
Counselling on Access to Lethal means (CALM)- (population = geriatric case manager) knowledge about suicide, suicide risk and suicide prevention (higher score indicates improved knowledge)												
1 (Pope et al 2016)	Experimental (before and after)	Serious[1]	N/A	No serious[2]	No serious	Immediately after training	66	66	38.44 (11.93)	47.46 (7.77)	9.02 (5.59 to 12.45)	VERY LOW

Counselling on Access to Lethal means (CALM)- (population = geriatric case manager) knowledge about firearm assessment and safety (higher score indicates improved knowledge)												
1 (Pope et al 2016)	Experimental (before and after)	Serious[1]	N/A	No serious[2]	No Serious	Immediately after training	66	66	50.2 (7.14)	53.34 (7.81)	3.14 (0.59 to 5.69)	VERY LOW
Samaritans of New York Suicide Awareness and prevention programme-(population= school staff)												
1 (Clark et al 2010)	Experimental (before and after)	Serious[3]	NA	No serious[2]	No serious	Immediately after training	365	365	3.0 (0.9)	3.7 (0.7)	0.7 (0.58 to 0.82)	VERY LOW
Skill-based training on risk management (STORM)- (population = prison staff)												
1 (Hayes et al 2008	Experimental (before and after)	Serious[4]	NA	No serious[2]	No serious	Post-training was 6-month follow-up	161	161	7.15 (1.76)	8.22 (1.71)	1.07 (0.69 to 1.45)	VERY LOW
SafeTALK-(study population= Toronto subway staff)												
1 (Eynan 2011	Mixed	Serious[5]	N/A	No serious[2]	No serious	Post-training was 6-month follow-up	125	106	6.9 (2.3)	8.6(2.0)	1.70 (1.15 to 2.25)	VERY LOW

1. CALM was one of educational components.
2. Interventions, population and outcomes are in line with review protocol.
3. Selection bias, data only obtained from those who selected to participate.
4. Variation in the implementation of STORM training sessions.
5. Two interventions (safeTALK and suicideAWARE) were provided to participants.

F.2.5 Change in attitudes

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Before**	**After**	**Before**	**After**	**Mean difference (95%CI)**	
Skill-based training on risk management (STORM)- (population = community-based mental health professionals) (lower score indicates more positive attitudes)												
1 (Gask et al 2008)	Experimental (before and after)	No serious	NA	No serious[1]	No serious	Immediately after training	53	53	31.81 (4.49)	29.43 (4.53)	-2.38 (-4.10 to -0.66)	LOW
Skill-based training on risk management (STORM)- (population = prison staff)												
1 (Hayes et al 2008	Experimental (before and after)	Serious[2]	NA	No serious[1]	No serious	Post-training was 6-months follow-up	161	161	28.51 (6.06)	26.44 (5.31)	-2.07 (-3.31 to -0.83)	VERY LOW

1. Interventions, population and outcomes are in line with review protocol.
2. Variation in the implementation of STORM training sessions

F.2.6 Change in behaviours

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Before**	**After**	**Before**	**After**	**Mean difference (95%CI)**	
Samaritans of New York Suicide Awareness and prevention programme-(population= school staffs) (higher scores indicates improved ability to ask someone about suicide)												

1 (Clark et al 2010)	Experimental (before and after)	Serious[1]	NA	No serious[2]	No serious	Post-training was Immediately after training	365	365	3.3 (1.0)	3.7 (0.8)	0.40 (0.27 to 0.53)	VERY LOW
Samaritans of New York Public Education Suicide Awareness and prevention programme-(population= employee of city departmental organisation) (higher scores indicates improved self-efficacy to intervene with a person thought to be at risk for suicide)												
1 (Matthieu et al 2006)	Experimental (before and after)	Serious[1]	NA	No serious[2]	No serious	Post-training was immediately after training	59	59	15 (6.1)	25.7 (5.9)	10.70 (8.53 to 12.87)	VERY LOW

1. Selection bias, data only obtained from those who elected to participate.
2. Interventions, population and outcomes are in line with review protocol.

F.2.7 Change in beliefs

Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Before**	**After**	**Before**	**After**	**Mean difference (95%CI)**	
Connect- (population = community adults) (higher percentage indicates more preparedness to help youths)												
1 (Bean and Baber 2011)	Experimental (before and after)	Serious[1]	N/A	No serious[2]	No serious	Post-training was immediately after training	658	648	24.83 (11.69)	42.79 (6.62)	17.96 (16.93 to 18.99)	VERY LOW
Connect- (population = community youths) (higher percentage indicates more preparedness to help peer)												
1 (Bean and Baber 2011)	Experimental (before	Serious[1]	N/A	No serious[2]	No serious	Post-training was immediately after training	204	204	51.82 (31.51)	82.52 (25.92)	30.70 (25.10 to 36.30)	VERY LOW

	and after)											
Counselling on Access to Lethal means (CALM)- (population = geriatric case manager) (the higher percentage indicates more gatekeeper preparedness)												
1 (Pope et al 2016)	Experimental (before and after)	Serious[3]	N/A	No serious[2]	No Serious	Post-training was immediately after training	66	66	32.24 (9.78)	40.35 (6.85)	8.11 (5.23 to 10.99)	VERY LOW

1. Selection bias as the 2 intervention communities were selected through an application process
2. Interventions, population and outcomes are in line with review protocol.
3. Participants had QPR and CALM training

F.2.8 Change in skills

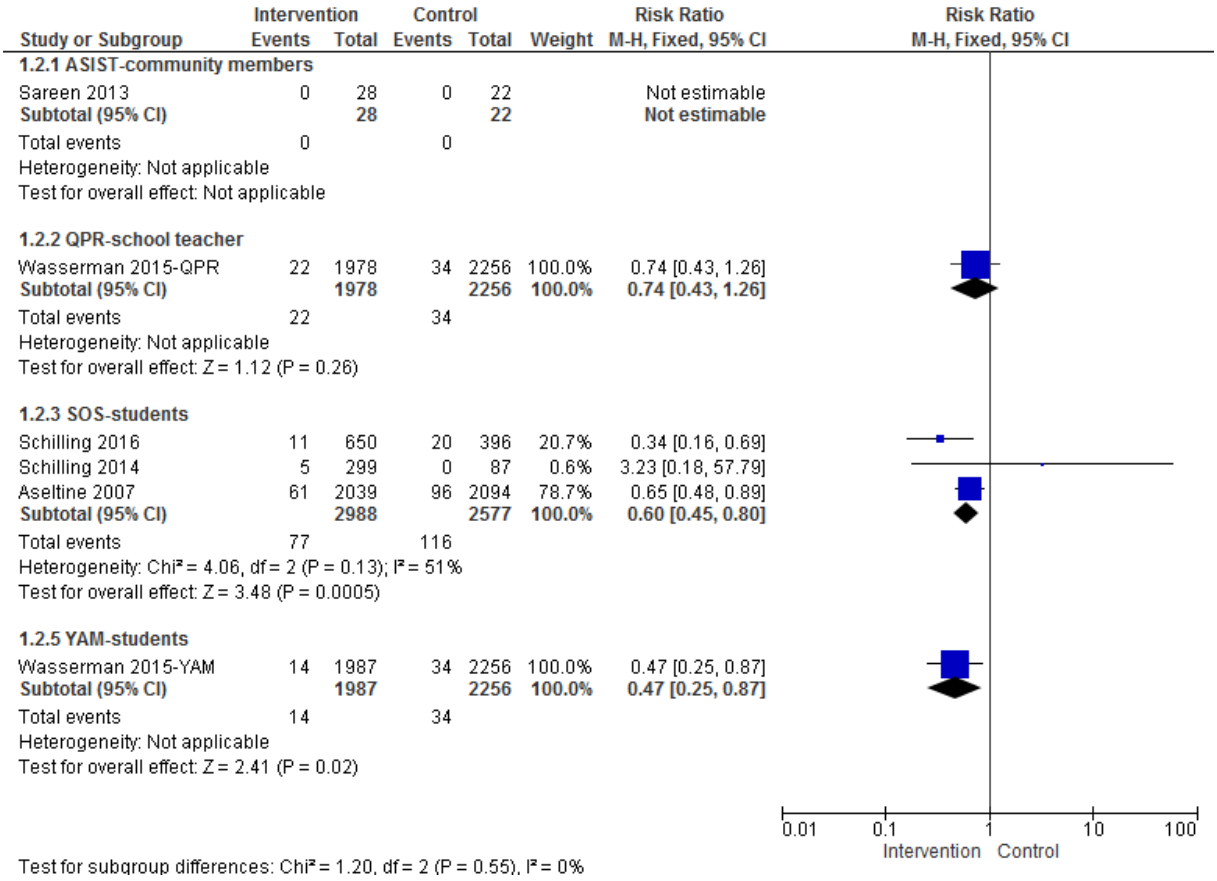
Quality assessment							Number of population (endpoint)		Mean score		Effect at the endpoint	Committee confidence
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other consideration**	**Before**	**After**	**Before**	**After**	**Mean difference (95%CI)**	
SafeTALK-(study population= Toronto subway staff) (higher score indicates better intervention skills)												
1 (Eynan 2011	Mixed	Serious[1]	N/A	No serious[2]	No serious	Post-training was 6-month follow-up	125	105	6.4 (2.5)	8.6 (2.2)	2.20 (1.58 to 2.82)	VERY LOW

1. Two interventions (safeTALK and suicideAWARE) were provided to participants.
2. Interventions, population and outcomes are in line with review protocol

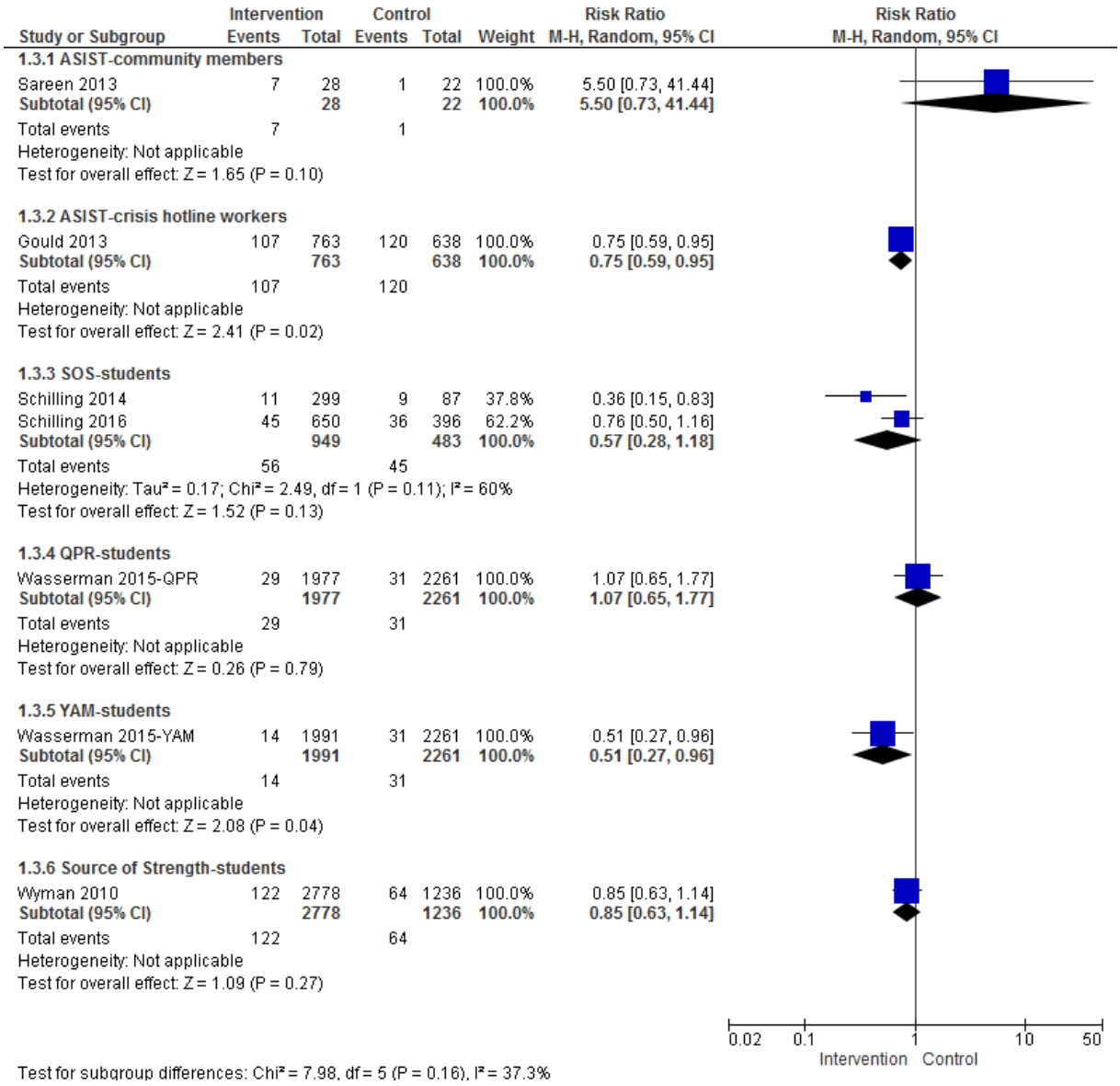
Appendix G: Forest plot

G.1 RCT

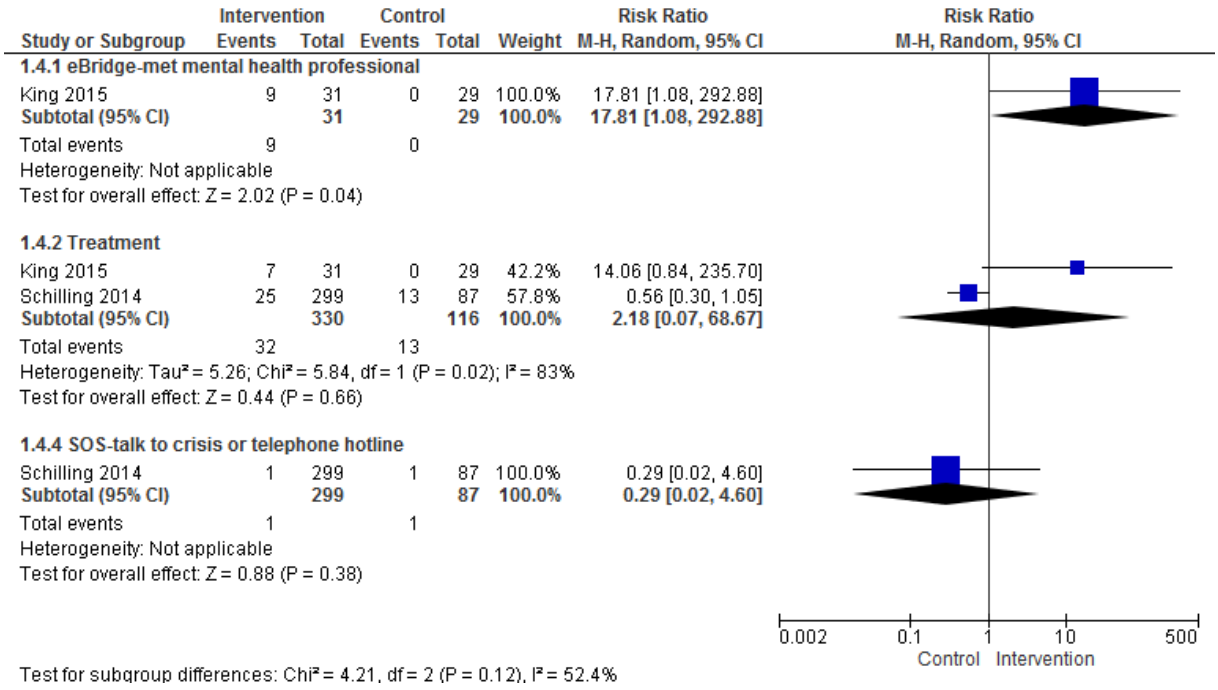
G.1.1 Suicide attempt



G.1.2 Suicide ideation



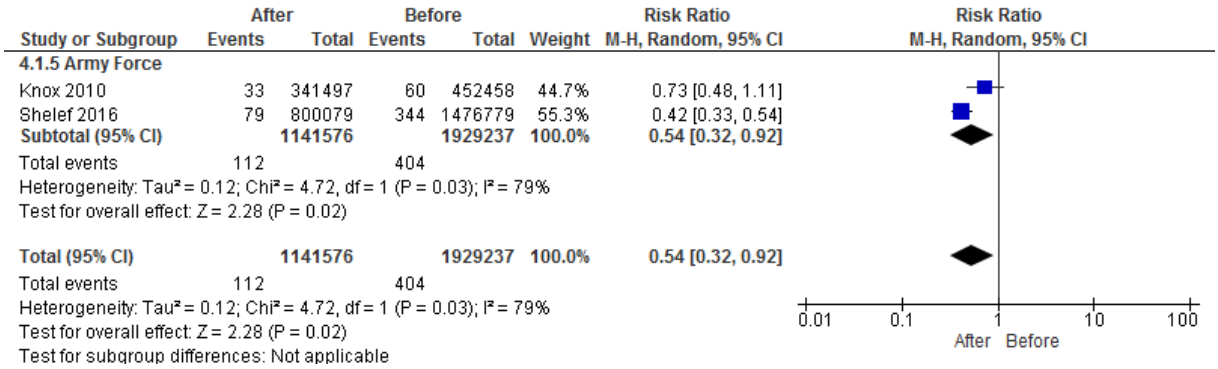
G.1.3 Service update



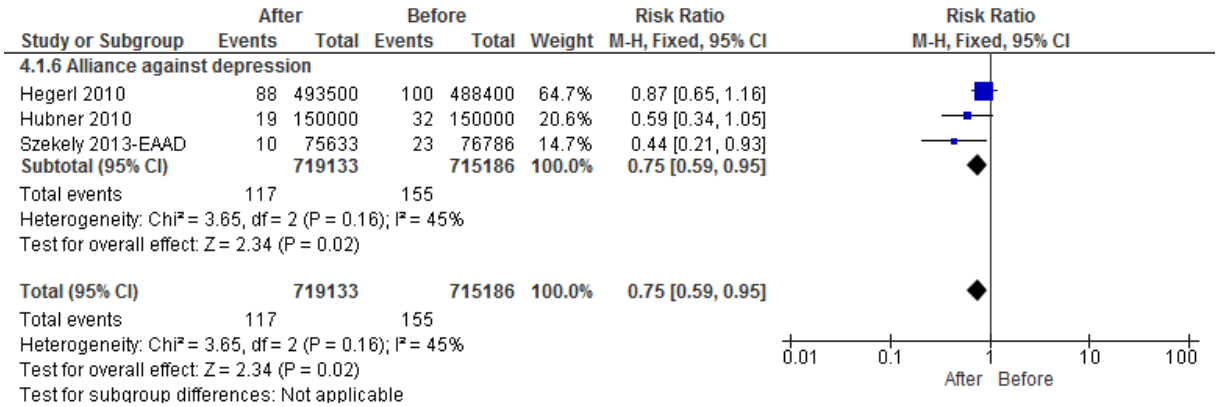
G.2 Non-RCT

G.2.1 Suicide rate

Military-based suicide prevention



Alliance against depression



Appendix H: Expert testimonies

H.1 Expert testimony 1

Section A: Developer to complete	
Name:	**Alys Cole-King**
Role: Practitioner	[practitioner]
Institution/Organisation (where applicable): **Contact information:**	Connecting with People Ashdown House, Riverside Business Park, Benarth Road, Conwy LL32 8UB
Guideline title:	Preventing suicide in community and custodial settings
Guideline Committee:	PHAC A
Subject of expert testimony:	Advice, education and training interventions
Evidence gaps or uncertainties:	Non-clinical interventions in the community
"Are information, advice, education or training interventions effective and cost effective at increasing the ability of staff and the public to recognise and respond to someone who may be contemplating suicide?" and 'What are the most effective and cost effective non-clinical interventions to support people who are at risk of suicidal acts?'	

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250–1000 words. Continue over page if necessary]

Key principles for effective education and training interventions

Suicide is preventable, but a significant culture change is needed. I believe that the following principles should be at the heart of successful suicide prevention education and training interventions:

- Moving away from a pre-occupation with characterising, quantifying and managing suicide risk, towards a greater focus on compassion, safeguarding and safety planning;
- Taking a proactive 'whole-system' approach to the prevention of suicide and self-harm, where everyone in society has a role;
- Every person experiencing suicidal thoughts and/or self-harming, being taken seriously and supported to co-produce a safety plan, with strategies, contacts for support and explicit reference to the removal or mitigation of access to lethal means;.
- Recognising that equipping people to respond safely and effectively to someone else at risk of suicide, is itself an emotional journey, as well as a process of developing the right attitudes, knowledge, skills and confidence.
- Embedding up to date research evidence into daily practice across all sectors.

Connecting with People training programme

'Connecting with People' (CwP) is a training programme, with characteristics of a quality improvement initiative, built on the above principles. It is designed to tackle the unconscious barriers to safe identification and intervention with a person at risk of suicide, and to improve knowledge, skills and confidence. The training includes a suite of clinical frameworks, some of which have been adapted for non-mental health settings.

Training is delivered both on a Direct to Participant basis and also via in-house trainers in larger organisations by staff who have attended a Train the Trainer programme. There are seven different 'bite sized' modules of 2 to 2.5 hours duration, designed for different sectors, including a module specifically designed for young people over the age of 13. A robust safety protocol for delegates is followed during the training, as delegates can often become distressed given the sensitivity of the subject matter

For the last decade, CwP training has been delivered in several countries and to many different sectors including third sector, education, police and secure services, health and social care students, community members, carers.

The SAFETool

The Suicide Assessment Framework E-Tool (the SAFETool) combines the clinical tools and frameworks developed to ensure latest research and best practice implemented. The CwP modules support the development of a common language and approach, promoting consistent documentation and a more integrated response across statutory services, third sector providers and communities.

A web-based app version of the SAFETool is available and can be integrated securely with NHS IT systems in addition to a paper based version. A shorter version - The SAFETool Triage - was developed for primary care, the general hospital, triage assessments by a first point of contact or by a first responder professional (PHE & HEE, 2016). It facilities a low

level intervention at the point people become distressed, potentially even *before* they develop suicidal thoughts or plans.

The SAFETool Triage was shaped by an Expert Reference Group which included international suicide prevention academics, practitioners, and people with lived experience). SAFETool is not intended to replace judgment, but to provide valuable guidance to a front line practitioner on key aspects to cover, and ensuring the assessor co-produces an appropriate safety plan and helps the distressed person build wellbeing, resilience and resourcefulness.

Evaluations and impact

Numerous in–house audits and evaluations of the CwP training programme have been undertaken. Below is a summary of external evaluations.

Bangor University

An independent evaluation by Bangor University in an Emergency Department showed post training improvements in attitudes, self-reported knowledge in assessing patients, and documentation of compliance with NICE Guidelines. (Knipe M., *et* al 2010).

Feedback from ED staff post-training

(103 participants, 99% response rate):

- **100%** of respondents now believed they had a role in suicide prevention
- **97%** thought the training had increased their understanding of self-harm and suicidal thoughts.
- **85%** agreed they would now be able to show more empathy with patients attending ED following self-harm and/or with suicidal thoughts.

STORM Skills CIC

An independent evaluation of CwP training by STORM Skills CIC showed post training improvements in attitudes, self-reported knowledge and confidence (Parker C., Green G. 2016)

University of Wolverhampton

The University of Wolverhampton (UOW) pioneered a whole system approach to student self-harm and suicide, and won the 2017 Times Higher Educational Supplement Award for their student support due to this innovative whole university approach. So far they have trained about 800 people. According to an internal audit by UOW:

- January 2015 (before CwP training) **25 students** were referred to the well-being coordinator for suicide ideation
- 2015 staff received CwP training (academics, counselors, security staff, catering, housekeeping, cleaners)
- January 2016 – 5 student referrals for suicide ideation
- January 2017 – 0 student referrals for suicide ideation

Nightline Student Association The Nightline Student Association (student listening service) adopted CwP in 2013 and delivers the training to their volunteers. An evaluation of the first two years confirmed the positive impact and cost-effectiveness of CwP with a module cost of £27 per head. (Nightline 2014)) . In 2015, they won the coveted 'Helpline of the Year' award despite other large well known national helplines also being shortlisted.
References to other work or publications to support your testimony' (if applicable):
Dickens C, Evaluation of a whole system approach to suicide and self-harm mitigation in Wolverhampton University. In process Knipe M, Thornton C, Cole-King A, Slegg G, Hughes H, Peake-Jones G C. 2010 Emergency Department professionals' compliance with nice guidelines for patients presenting with suicidal thoughts or self-harm. Accepted *Royal College of Psychiatrists, Faculty of Liaison Psychiatry, Annual Residential Conference Cardiff* Parker C., Green G. 2016 A Formal Evaluation of *Connecting with People* Programme. In process PHE & HE 2016. Mental health promotion and prevention training programmes. PHE publications gateway number: 2016283 Nightline Association Trustees Annual Report 2014 https://drive.google.com/file/d/0Bziwbyi_v7bgNFVxTHlqTFQ5UU0/view [last visited 20/11/17]

H.2 Expert testimony 2

Section A: Developer to complete	
Name:	**Sarah Anderson**
Role:	**Founder of the Listening place**
Institution/Organisation (where applicable):	The Listening place
Contact information:	Sarah.anderson@listeningplace.org.uk
Guideline title:	Preventing suicide in community and custodial settings
Guideline Committee:	PHAC A
Subject of expert testimony:	Non-clinical intervention to support people with suicidal thoughts

Evidence gaps or uncertainties:	Non-clinical interventions in the community

Section B: Expert to complete

Summary testimony:	[Please use the space below to summarise your testimony in 250–1000 words. Continue over page if necessary]

The Listening Place – A New Model of Support for the Suicidal

The consistently significant rates of suicide in the UK are well known (between 17: recorded and 30: including likely suicides per day in the UK). The starting point for the founders of TLP, after many decades of experience at Central London Samaritans, was that there appeared to be a gap in the support available for the chronically and profoundly suicidal: whilst A&E and psychiatric liaison units can admit the most unwell to secure units, or recommend and refer the suicidal to GPs and talking therapies, there is little or no consistent on-going face to face support for those with serious suicidal thoughts who are waiting for, or not receiving, treatment. Many, burdened by their suicidal state, end up bouncing round the system as hard pressed professionals try to find the best support for them and help in an overstretched mental health system.

After consulting with a range of mental health professionals it was clear that all believed that consistent on-going support with appropriate well trained listeners, supervised and supported by mental health professionals, would help many of those with suicidal thoughts talk about and manage those feelings, and reduce the likelihood of them killing themselves. The experience of many charities – Samaritans, Maytree and others has shown that trained volunteers, with some healthcare professional support can support the suicidal effectively. But these contacts with listening volunteers elsewhere are one-off or short term. TLP set out to provide face-to-face sustained consistent support, by appointment, with the same volunteer, with some phone or text contact in between (if necessary) and a commitment to not give up if Visitors (as they are known at TLP) find it difficult to be reliable in attendance and contact.

The majority of Visitors to TLP suffer from depression, anxiety, drug or alcohol addiction and/or Personality Disorders; the minority suffer from some form of psychosis. All are suicidal and lacking support.

The Model

The TLP model is that Visitors will be seen for an initial appointment by an experienced, specially trained Supervising Volunteer to assess whether TLP is the appropriate support for this Visitor in their current situation. If they fit the criteria they will usually be given fortnightly appointments with the same Listening Volunteer. Whilst the length of support is open ended, from the start Visitors are informed that there will be a review after three months (and every 3 months thereafter) usually by the same Supervising Volunteer to discuss and appraise whether it is appropriate for support to continue.

In between appointments most Visitors receive text reminders which are helpful to those with difficult and chaotic lives and reassure them that TLP and the Volunteer have them in mind between appointments. If Visitors do not show up for appointments they will be telephoned. If they cancel appointments they will receive texts offering telephone support

at their appointment time. In a small minority of 'high risk' cases Visitors are seen weekly by two different Listening Volunteers – despite some apprehension about how this split support would work it has been seen to be very positive by both Visitor and volunteers.

Measurement and Evaluation

At the initial meeting all Visitors are asked to fill in the internationally recognized Columbia Suicide Scale and a simple three question 'thermometer' feeling survey and to fill them in again at every three month review. Additionally after the first three months a 'Visitor Experience questionnaire' is completed by the visitor. The evaluation system was put together by Professor Steven Platt (Edinburgh University) and Dr Sarah Davidson (Tavistock and Red Cross).
The initial data, in some cases from those having had up to 12 months of support, are very positive about reducing suicidal feelings however this data is only just reaching a sample size large enough to conduct robust analysis. TLP intend to publish the data in a peer-review journal.

To date, the model that TLP have evolved, of supporting people regularly and consistently, over time, via a trusting relationship, which conveys empathy and acknowledgement reduces their distress and self-reported suicidal feelings in a 3 month period.

In its first 14 months of operation TLP has received just under 600 referrals of which just under 200 continue to be seen regularly, and the current referral rate is approximately 80 per month.

Referrers and Referrals

From the start TLP has not sought direct self-referrals but concentrated on contacting, and in some cases partnering with those organizations who come into contact with suicidal people: NHS (59% of referrals) e.g. psychiatric liaison services, GPs, IAPT services etc.; charities (35%) e.g. Maytree, Hestia, British Red Cross; housing associations & self-referrals etc. (6%). Most referrals are via our website, emailed or telephoned in with contact details. TLP attempt to contact all referrals within 24 hours and appointments offered within a week.

Volunteer Training and Development

Recruiting, selecting and training volunteers is a continuing challenge but utilizing the considerable experience of Samaritans, Maytree and professional advisers, TLP has so far recruited, trained and accepted over 200 volunteers, in 14 months. A system of review supervision and support has been put in place. Volunteers once selected also get on-going training and weekly 'supervision' from our professional advisors. There is good diversity in volunteers who are aged from 19 to 82.

Cost of Service

The current cost of running TLP is around £140,000 annually. In a full year of operation at capacity, this would make the cost per Visitor around £140 per year. As TLP has no paid staff at the moment, the principal cost is accommodation: which needs to be central and have good transport access, sufficient interview rooms, meeting and training room space and be in an area that Visitors feel comfortable walking through. This is currently in Westminster, between Victoria and Vauxhall near Pimlico Underground Station. Other costs include telephones, IT, marketing, stationery, training and some Visitor travel expenses.

Future Considerations

The Listening Place has only been operating for a little over a year and the following issues will need to be tackled if the service is to improve and grow. • Difficulty of communicating with relevant parties in the NHS • Filling the gaps of the limitations of IAPT services for suicidal people due to risk aversion • Confidentiality vs safeguarding • Financial sustainability • Managing demand, growth or replication • To remain not part of statutory institution • Difficulty of referral back to NHS
References to other work or publications to support your testimony' (if applicable):

H.3 Expert testimony 3

Section A: Developer to complete	
Name:	**Liz Scowcroft**
Role:	Senior Research and Evidence Manager/PhD
Institution/Organisation (where applicable):	Samaritans/Nottingham Trent University
Contact information:	e.scowcroft@samaritans.org
Guideline title:	Preventing suicide in community and custodial settings
Guideline Committee:	PHAC A
Subject of expert testimony:	Non-clinical interventions to support people who are at risk of suicidal acts
Evidence gaps or uncertainties:	Non-clinical interventions in custodial settings

Section B: Expert to complete

Summary testimony

Samaritans' prison Listener scheme is a peer-support service coordinated by Samaritans within prisons in the United Kingdom and Republic of Ireland. Two recent systematic reviews into peer-support in prisons have shown a seemingly large body of evidence in relation to the scheme (Griffiths & Bailey, 2015; South et al., 2014). However, these reviews also highlight a paucity of good quality, robust evidence of the effectiveness, impact or outcomes of the scheme.

A large-scale evaluation of the scheme is currently underway, with the aim of addressing this gap in evidence. In order to inform this evaluation, a further systematic review has been undertaken building on the previous reviews. While others focused on peer-support more broadly, and include findings not directly related to outcomes and of varying quality; the current review focuses solely on the outcomes of Samaritans' Listener scheme and critically evaluates findings in relation to study quality. It extracts and synthesises only findings of perceived or actual outcomes of the scheme from studies of sufficient empirical quality. The review identified three such studies, which provide findings related to the impact of the scheme on service-users (Foster & Magee, 2011; Jaffe, 2012; Liebling, Tait, Durie, Stiles, & Harvey, 2005). It supports findings from the previous reviews, highlighting a lack of good quality evidence, but seeks to extract the best available evidence from the wider body of literature.

Best available evidence on the impact of the Listener scheme on service-users
The systematic review recently undertaken, described above, finds a limited amount of evidence relating to outcomes of the scheme on service-users, from three studies of adequate quality.

Some findings suggest prisoners (as service-users), Listeners and prison staff believe the Listener scheme has a positive impact on service-users. Some service-users report that Listener support allows them the opportunity to vent and calm down, get things off their chest, relieve stress, and prevents them from reaching mental tipping points (Foster & Magee, 2011; Jaffe, 2012; Liebling et al., 2005). They also report the concept of peer-ness is important in support being effective, not merely the act of Listening (Jaffe, 2012). Some Listeners report they were motivated to join the scheme because of (effective) support they had received in the past (Liebling et al., 2005). Some prison staff report a belief that Listeners are helpful in reducing suicide and self-harm (Foster & Magee, 2011; Liebling et al., 2005). Also, that Listener schemes can help to create calmer prisoners, which also leads to a reduction in their own workload; problems between prisoners are thought to be less likely to escalate, since prisoners are able to talk to Listeners (Foster & Magee, 2011; Jaffe, 2012).

However, findings from service-users also suggest the perceived positive impact of Listener support is not universal. Service users have different experiences, and their views can vary depending on their perception and experience of both the scheme and individual Listeners (Foster & Magee, 2011; Jaffe, 2012). This is unsurprising, as it is not expected any one model of support would have the same impact on all individuals. However, the existing literature does not explore how and why effectiveness/impact differs depending on different factors. This requires further exploration in order to understand who the scheme does, and does not work well for, and why.

All findings described here relate to perceptions of the impact or outcomes of the scheme; none relate to actual, measurable, outcomes. The current review also revealed potential bias

in the existing literature and a lack of objective exploration of impact. Findings are often presented in a positive light with little exploration of any negative perceptions or experiences from service-users. The large-scale evaluation currently underway, therefore, aims to fill these gaps in the current evidence base. It will robustly measure the actual impact of the Listener scheme on service-users, in relation to suicide risk.

The current research aims to measure the actual psychological outcomes of the Listener scheme on prisoners. Two main research objectives are:

a) *Provide evidence of the impact of Samaritans' Listener scheme on service-users; evaluating whether the scheme delivers its expected outcome of reducing the risk of suicide.*
b) *Explore the utility of the Integrated Motivational Volitional (IMV) model of suicidal behavior (O'Connor, 2011) in a prison population.*

The outcome measures of this study are based on the Integrated Motivational-Volitional (IMV) model of suicidal behaviour (O'Connor, 2011). The IMV is a multidisciplinary, theoretical model of suicidal behaviour. The key pathway within this model involves psychological components such as defeat, entrapment, and suicidal ideation/intent leading to suicidal behaviour. The current study aims to test the impact of the scheme, primarily on this key psychological pathway, through the analysis of robust quantitative data collected from a large, national, prisoner sample.

Data collection for the research is currently underway and due to completed in November 2017. Thus far, data has been collected from a large sample of male prisoners, from prison establishments of various types/security categories in England.

Expected results

[Interim results relating the current sample, the degree of self-reported self-harm and suicidal thoughts/behaviours in prison, and exposure to others' self-harm/suicidal behaviours were presented confidentially to the committee]

Following completion of data collection in the coming months, analyses will seek to establish the following:

- Does the Listener scheme reduce suicide risk in those who use it, in relation to the IMV model of suicidal behaviour?
  - For those who use Listeners, can a reduction in risk be seen over time depending on use?
- What are the differences in key psychological characteristics related to suicide risk (defeat, entrapment, etc.)?
  - Are there differences between those who do, and do not, use Listeners;
  - What does this show about those who use the scheme?
- What effect do other factors have on the impact/effectiveness of the Listener scheme, such as:
  - History of mental illness/self-harm/suicidal behaviors
  - Exposure to others' self-harm and suicidal behaviors
  - Sentence length and type
  - Treatment for mental illness
  - Thinking styles (e.g. rumination)
  - Resilience appraisal styles
- How useful is the IMV in explaining the development of suicidal behaviour in prison?
- How does this large sample of prisoners compare with the general population; for example:
  - Do they have a higher prevalence of self-harm and suicidal feelings?

- Are they more likely to know others who self-harm?
- Are they more likely to, be impulsive, be less resilient, feel hopeless?
- More importantly, why?

➢ What can we do to ensure services like the Listener scheme impact in the right way on these different factors, and ultimately reduce suicide in prisons?

This large-scale, unique study will add considerably to the existing evidence base around the impact of the Listener scheme on service users. It will generate practical recommendations about how to reduce suicide risk in prisoners, both through the Listener scheme and more generally. Results are expected in 2018.

References to other work or publications to support your testimony' (if applicable):

Foster, J., & Magee, H. (2011). *Peer support in prison health care: An investigation into the listening scheme in one adult male prison*. University of Greenwich, School of Health & Social Care.
Griffiths, L., & Bailey, D. (2015). Learning from peer support schemes–can prison listeners support offenders who self-injure in custody? *International Journal of Prisoner Health, 11*(3), 157-168.
Jaffe, M. (2012). *Peer support and seeking help in prison: a study of the listener scheme in four prisons in England.* (Unpublished PhD). Keele University, Keele, United Kingdom.
Joiner, T. (2005). *Why people die by suicide* Harvard University Press.
Liebling, A., Tait, S., Durie, L., Stiles, A., & Harvey, J. (2005). An evaluation of the safer locals programme. *A Summary of the Main Findings. Cambridge Institute of Criminology Prisons Research Centre. Cambridge.*
O'Connor, R. C. (2011). Towards an integrated motivational–volitional model of suicidal behaviour. *International Handbook of Suicide Prevention: Research, Policy and Practice.* 181-198.
South, J., Bagnall, A., Hulme, C., Woodall, J., Longo, R., Dixey, R., Wright, J. (2014). A systematic review of the effectiveness and cost-effectiveness of peer-based interventions to maintain and improve offender health in prison settings. *Health Serv Deliv Res, 2*(35)