Creating Hope Together

Scotland's Suicide Prevention Strategy 2022-2032

Effective interventions to prevent suicide: an umbrella review, 2002-2022

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Executive summary

The importance of a strategic approach to suicide prevention, grounded firmly in research evidence of interventions that mitigate or counteract risk factors and enhance protective factors for suicidal behaviour, has long been recognised. Among the many challenges of developing an effective strategy is the identification (and, subsequently, implementation) of interventions to prevent suicide for which there is a strong evidence base. The key source of knowledge about effective interventions is the systematic review, which seeks to answer a defined research question by collecting and summarising all empirical evidence that fits pre-specified eligibility criteria, with or without associated meta-analysis (i.e., use of statistical methods to summarise the results of these studies). This umbrella systematic review, focusing on evidence derived from different types of review and/or meta-analyses for each intervention, has been undertaken with a view to strengthening the comprehensiveness and reliability of the evidence base for suicide prevention. The typology of interventions largely follows the analytic framework used in Platt and Niederkrotenthaler (2020), supplemented with some additional intervention types. The aims of the review are twofold: first, to identify, systematically review and synthesise the research evidence on interventions to prevent suicide-related behavioural outcomes (suicide, attempted suicide and (non-fatal) self-harm) that are typically included in national suicide prevention strategies; and, second, to evaluate the evidence of effectiveness of these interventions.

Umbrella reviews, systematic reviews, rapid reviews, integrative reviews and meta-analyses, published during the period 2002-2022, were eligible for inclusion. Scoping reviews, protocols, non-peer reviewed journal articles, papers of theoretical discourse and modelling, editorials/ perspectives/opinions, and conference abstracts and proceedings were excluded. During 2022, we initially conducted a comprehensive literature search of 12 electronic bibliographic databases. Searches commenced on 11 May 2022 and were completed by 31 December 2022; subsequently, peer-reviewed journal articles, grey literature and PhD theses were also searched. The search was limited to terms related to (a) suicide-related behavioural outcomes (suicide, attempted suicide/suicide attempt, suicidal behaviour, and (non-fatal) self-harm; and (b) interventions commonly implemented in national suicide prevention programmes, as described in the analytic framework.

A total of 5271 records was generated from bibliographic databases, and a further 27 records were identified from a search of reference lists of included papers. After removal of duplicates (n=2836), 2462 titles and abstracts were screened, of which 2232 were excluded on the basis of established criteria. Of the 230 full-texts assessed for eligibility, 91 were excluded, leaving 139 available for synthesis. The methodological quality of reviews, assessed by means of an appropriate critical appraisal tool, was mixed. Findings, based on 79 reviews of moderate and high quality, can be summarised as follows:

- There is **strongly supportive evidence** concerning the effectiveness of the following suicide prevention interventions: Law and legislation reforms (relating, e.g., to firearms, alcohol, tobacco, access to means and mental health); physical barriers (e.g. at jump sites, railway stations); bans on hazardous pesticides; restrictions on access to medications that are toxic in overdose; removal of ligature points in institutional settings; interventions in community settings targeted at older people; cognitive behavioural therapy (CBT) for adults (to prevent repetition of self-harm);

dialectical behaviour therapy (DBT) for adults and adolescents (to prevent repetition of self-harm); and brief post-hospital contact.

- There is **weakly supportive evidence** concerning the effectiveness of the following suicide prevention interventions: multi-level programmes; public awareness-raising, when delivered as part of a multi-component strategy; interventions in schools, indigenous community settings, workplaces, prisons and armed forces; mentalisation-based therapy (MBT); group-based emotion regulation psychotherapy; psychoanalytic psychotherapy; CBT for adolescents (to prevent repetition of self-harm); and safety planning.

- There is **insufficient or conflicting evidence** concerning the effectiveness of the following suicide prevention interventions: public awareness-raising, when delivered as stand-alone campaign; adherence to media guidelines; telephone-based services; postvention; screening; pharmacological interventions (inconclusive evidence with regard to lithium prescribed for people with mood disorders, antidepressants prescribed for older people and prevention of recurrence of self-harm); other psychotherapeutic interventions; enhanced care/follow-up, excluding brief post-hospital contact and safety planning.

Key words: umbrella review, suicide prevention, suicide, suicide attempt, self-harm, systematic review, meta-analysis.

1. Introduction

The importance of a strategic approach to suicide prevention, grounded firmly in research evidence of interventions that mitigate or counteract risk factors and enhance protective factors for suicidal behaviour, has long been recognised (United Nations, 1996). Among the many challenges of developing an effective strategy is the identification (and, subsequently, implementation) of interventions to prevent suicide for which there is a strong evidence base. Platt and Niederkrotenthaler (2020) reviewed 13 different types of suicide prevention intervention and summarised evidence of their effectiveness through a narrative synthesis based on six umbrella reviews ("reviews of reviews": Guo & Harstall, 2004; Mann et al., 2005; Scott & Guo, 2012; Dillon et al., 2015; Bennett et al., 2015; Zalsman et al., 2016) and a small number of systematic reviews and primary studies, selected to address key gaps in the coverage of these intervention types in their main sources. In their review, Platt and Niederkrotenthaler (2020) recognised the limitations of their reliance on this relatively small and mixed evidence base.

The key source of knowledge about effective interventions is the systematic review, which seeks to answer a defined research question by collecting and summarising all empirical evidence that fits pre-specified eligibility criteria, with or without associated meta-analysis (i.e., use of statistical methods to summarise the results of these studies). There is a considerable and growing library of systematic reviews and umbrella reviews, based on an even more extensive and increasing number of primary studies, relating to potential suicide prevention interventions which have been used in the development and implementation of national suicide prevention programmes. These formed the foundation of guidance about evidence-based approaches to policy-making and programme development on suicide prevention in the World Health Organization's influential global report on suicide prevention (WHO, 2014). Despite this massive research effort, the existing evidence base is somewhat fragmentary and incomplete, and lacks authoritative synthesis. For example, in the much-cited overviews of the evidence (Mann et al., 2005, covering the period 1996-2005; and Zalsman et al., 2016, covering the period 2005-2014), methodological limitations (including mixing of findings from studies using different research designs; lack of a rigorous quality assessment of included publications; small number of databases searched; and failure to elaborate search terms in order to minimise omission of reviews of highly specialised interventions) restrict their potential value in providing robust evidence for the development and implementation of effective suicide prevention strategies. The present umbrella systematic review, focusing on systematic review-level evidence for each intervention, has been undertaken with a view to strengthening the comprehensiveness and reliability of the evidence base for suicide prevention. The typology of interventions largely follows the analytic framework used in Platt and Niederkrotenthaler (2020), supplemented with some additional intervention types.

The aims of this review are twofold:

1. To identify, systematically review and synthesise the research evidence on interventions to prevent suicide-related behavioural outcomes (suicide, attempted suicide and (non-fatal) self-harm that are typically included in national suicide prevention strategies.
2. To evaluate the evidence of effectiveness of these interventions.

We anticipate that the study findings will constitute a valuable corpus of knowledge about effective suicide prevention interventions, whether stand-alone or as part of a national strategy.

2. Methods

2.1. Rationale

We have followed the methodology described in the Cochrane Handbook of Systematic Reviews of Interventions to conduct an umbrella review (Higgins et al. 2024). The umbrella review, in which the unit of analysis is the systematic review and meta-analysis (not the primary study), "summarises the spread and strength of associations reported in previously conducted systematic reviews and meta-analyses" (Shi and Wallach, 2022), "compiling evidence … into one accessible and usable document … focus[ing] on broad condition or problem for which there are competing interventions and highlight[ing] reviews that address these interventions and their results" (Grant and Booth, 2009). "The principal aim of an umbrella review is to provide a summary of existing research syntheses related to a given topic or questions, not to synthesize, with meta-analysis or meta synthesis, the results of existing reviews or syntheses" (Aromataris et al., 2015).

Our choice of umbrella review was based on three key considerations. First, we recognised that the attempt to synthesise evidence on the range of interventions typically found in national suicide prevention strategies using a systematic and comprehensive approach is both ambitious and unprecedented. The traditional approach, namely undertaking new systematic reviews in each intervention area, would be neither realistic nor feasible, given the resources available, and would involve wasteful duplication, since a considerable amount of primary-level evidence has already been synthesised in systematic reviews of different interventions. Second, on the basis of prior scoping of the global literature on suicide prevention interventions, we were satisfied that there is sufficient relevant review-level evidence to warrant identifying the review (rather than the primary study) as the unit of analysis. Finally, we were satisfied that umbrella review methodology would be sufficiently robust and appropriate to address our research questions.

The protocol for this series of umbrella reviews was registered on the International Prospective Register of Systematic Reviews (PROSPERO: CRD42022343503)**.**

2.2. Eligibility criteria

We included reviews of reviews (umbrella reviews), systematic reviews, rapid reviews, integrative reviews and meta-analyses. This series of umbrella reviews was not limited to Cochrane reviews and used the Joanna Briggs Institute umbrella review methodology (Aromataris et al., 2015) in order to ensure inclusion of other published reviews and meta-analyses. If there were updated reviews on the same topic by the same authors, only the most recent review was included, provided the authors declared it to be an updated review. If there were several reviews published within a short timeframe, i.e., fewer than two years, on the same intervention and participant groups, but had differing and conflicting results, the similarities and differences were explored through an appraisal of their respective reference lists and included studies. The results from the comparison exercise and the rationale for exclusion or inclusion were recorded.

Excluded study types were scoping reviews, protocols, non-peer reviewed journal articles, papers of theoretical discourse and modelling, editorials/perspectives/opinions, and conference abstracts and proceedings.

2.3. Search strategy and selection criteria

The initial phase of the project comprised a two-stage search strategy, consistent with the Preferred Reporting Items for Systematic Review, reviews of reviews (umbrella), integrative, rapid, and meta-analyses (Page et al. 2021). Stage one was a comprehensive literature search using the following electronic bibliographic databases for the period 2002-2022: MEDLINE; PsycINFO; PUBMED; EPISTEMONIKOS; Johanna Briggs Institute (JBI) via OVID; COCHRANE Database of Systematic Reviews (CDSR); Database of Abstracts of Reviews of Effects (DARE); CINAHL; EMBASE; Scopus; WEB of SCIENCE; and Google Scholar. Searches commenced on 11 May 2022 and were completed by 31 December 2022. Initially, the search included all languages and the types of reviews listed above; where appropriate, we used filters for systematic reviews. Subsequently, the following sources were searched: peer-reviewed journal articles, grey literature and PhD theses.

The search was limited to terms related to (a) suicide-related behavioural outcomes (suicide, attempted suicide/suicide attempt, suicidal behaviour, and (non-fatal) self-harm; see Box 1 for definitions) and (b) interventions commonly implemented in national suicide prevention programmes, as described in the analytic framework (Platt and Niederkrotenthaler 2020) shown in Box 2.

Box 1: Definitions of suicide-related behavioural outcomes

Suicide-related behavioural outcome	Definition
Suicide	"An act resulting in death which is initiated and carried out by an individual to the end of the action, with the knowledge of a potentially fatal result, and in which intent may be ambiguous or unclear, may involve the risk of dying, or may not involve explicit intent to die."
Attempted suicide	"An act in which a person harms himself or herself, with the intention to die, and survives."
Suicidal behaviour	Covers suicide and attempted suicide
(Non-fatal) self-harm	"A non-fatal act in which a person harms himself or herself intentionally, with varying motives including the wish to die."

Source: De Leo et al. (2021), table 1, p.8.

Box 2: Analytic framework

Strategic level	Type of approaches
Multilevel programmes	1. National and community-based suicide prevention programmes combining different types of prevention and treatment interventions
Prevention: universal[1]	5. Restrictions on access to commonly used methods of suicide 6. Awareness-raising in the general public 7. Media reporting guidelines
Prevention: selective[2]	5. Settings-based programmes 5.1. Schools 5.2. Community (including suicide prevention centres) 5.3. Workplaces 5.4. Prisons 5.5. Armed forces (currently serving and veterans) 6. Substance misuse programmes
Prevention: indicated[3]	7. Education and training 7.1. Gatekeepers 7.2. Primary care physicians 8. Telephone-based suicide prevention services 9. Postvention
Treatment/ Maintenance	10. Screening 11. Pharmacological interventions 12. Psychotherapeutic interventions[4] 13. Enhanced care/follow-up[4]

1. Targeted at the general population
2. Targeted at groups with elevated risk of suicidal behaviour due to known risk factors
3. Targeted at individuals at high risk of suicidal behaviour, e.g., with history of self-harm/attempted suicide
4. It should be noted that there is overlap between the sections on psychotherapeutic interventions and enhanced care/follow-up due to the heterogeneity of intervention types included in the systematic reviews included in this umbrella review.

2.4. Screening and review

The next phase involved the screening and full-text review of records for eligibility. Extracted references were imported into EndNote X9 software and duplicates removed. Endnote was searched to find reviews by searching with the following terms: systematic review OR rapid review OR integrative review OR review of reviews OR umbrella review OR meta-analysis. Titles and abstracts were reviewed by the primary reviewer (MJ), with a random 10% sample screened by a second reviewer (ME). Full-texts were examined for eligibility according to inclusion and exclusion criteria, using a single reviewer (MJ), together with a 10% random sample (minimum three full-texts) appraised by a second reviewer (ME).

2.5. Data extraction

Data extracted from each review included the following study characteristics: first author name and date of publication; databases searched (with dates covered); study design and number of studies; participant characteristics (age, gender, socio-economic status, co-morbidities); location of studies; inclusion and exclusion criteria; and outcomes. Supplementary data extracted from each review comprised: first author name and date of publication; intervention(s), including enrolment/setting; follow-up and outcomes, including results from meta-analysis; and evaluation of outcome.

2.6. Methodological quality

Methodological quality was assessed using AMSTAR-2, a 16-item instrument which provides a critical appraisal of systematic reviews of (randomised and non-randomised) healthcare intervention studies (Shea et al. 2017). The instrument classifies the quality of systematic reviews as high (no or one non-critical weakness; no critical weakness), moderate (more than one non-critical weakness; no critical weakness), low (one critical flaw) or critically low (more than one critical flaw). In addition, we used the Joanna Briggs Institute Check List (Aromataris et al., 2015). At each stage of the review process (screening of abstracts and titles; full-text review; and quality review) we undertook a 10% random check; where there were fewer that 20 reviews in a category, we reviewed at least three papers. Inter-rater reliability, measured using Cohen's Kappa, was very high (k= 0.89 to 0.97) across all intervention areas.

2.7. Review synthesis

Due to the heterogeneity of identified populations, interventions, outcomes and measures, meta-analysis was not possible. This series of umbrella reviews therefore uses narrative synthesis to assess strength of evidence on the effectiveness of interventions on suicide-related outcomes.

3. Results

3.1. Identification of reviews in scope

A total of 5271 records was generated from bibliographic databases, and a further 27 records from a search of reference lists of included papers. After removal of duplicates (n=2836), 2462 titles and abstracts were screened, of which 2232 were excluded on the basis of established criteria (see section 2.2 above).

Of the 230 full-texts assessed for eligibility, 91 were excluded, leaving 139 available for synthesis. The methodological quality of the reviews was mixed. Findings reported below are restricted to the 79 reviews of moderate and high quality. Main findings are presented in the appendix (table A1).

3.2. Sample characteristics

Limited demographic details were reported, most reviews providing data on sex/gender and age range only. Ethnicity was reported mainly in reviews undertaken in the USA, Canada and Australia. Less than a third of reviews noted the country where studies had been undertaken. Under 10% of reviews reported studies conducted in Asia, South America and Africa.

3.3. Multilevel programmes: national and community-based suicide prevention programmes combining different types of prevention and treatment interventions

In an umbrella review published in 2011, van der Feltz-Cornelis et al. (2011) sought "to identify evidence-based interventions that might be included as key elements in multilevel strategies for suicide prevention, and to identify potentials for synergism between such elements" (p.328). Noting that this would be the first review to focus on positive synergistic effects (which "occur where the effects of the combined interventions are more than the sum of the two (or more) parts"), the authors argued that "[s]ynergism could be crucial to creating a critical impact in multilevel interventions" (p. 328). Based on a sample of six systematic reviews (published between 2005 and 2009), the authors were unable to find "firm evidence that multilevel interventions are more effective than single interventions" (p. 328), since none of the reviewed studies included relevant outcome measures. They highlighted some possibly effective proposals made by previous researchers, including the combination of interventions in specific geographical locations and the implementation of "complex interventions", but conclude that "more research … is urgently needed."

In a subsequent meta-analysis of 15 studies, Hofstra et al. (2020) tested the hypothesis that multilevel interventions (defined as "combined interventions by different providers in multiple domains", e.g., gatekeeper training combined with awareness raising and promotion of responsible media reporting) have synergistic effects, i.e. "the effect of the combined parts of the intervention might create a stronger effect than the sum of the individual effects of the interventions" (p. 128). They found that multilevel interventions were more effective than single level interventions. Additionally, there was a positive association between the number of levels of the intervention and effect size. In view of the "added value of multilevel interventions and the synergistic potential", the authors recommended "the implementation of multilevel suicide prevention interventions above one level" (p. 138).

More recently, Altavini et al. (2022) undertook an umbrella review of the effectiveness of primary suicide prevention strategies and programmes (e.g., means restrictions, media coverage of suicide, gatekeeper training, awareness raising and mental health promotion) targeted at adults. In addition to exploring the impact of single interventions on suicide-related outcomes, they took up the recommendation of van der Feltz-Cornelis et al. (2011) by examining the effect of multicomponent programmes (combining two or more interventions in a target population, typically gatekeeper training and education/ awareness interventions) compared to single interventions. There was some "weak" evidence of the benefit of multi-component programmes, although the effects tended to relate to improvements in skills and knowledge and capability rather than reducing suicide mortality. "Most of the multicomponent strategies with evidence of efficacy were delivered to specific populations and settings, especially when tailored accordingly to the specificities of the population/setting where it was applied" (Altavini et al., 2022: 651).

Empirical research on multilevel programmes remains very limited. It is unclear what are the most effective combinations of interventions within a multilevel programme and indeed what combination of interventions can be tailored to specific communities. On the basis of evidence from reviews of Indigenous populations, Altavini et al. (2022) suggest that it is important to take into account the

characteristics of the population and to assess the generalisability of findings by replicating effective intervention(s) in different populations.

3.4. Universal prevention

Ishimo et al. (2021) examined the effectiveness of national suicide prevention programmes in 17 high-income Organisation for Economic Co-operation and Development (OECD) member countries, during 1995-2003. The analysis focused on studies which explored the impact of universal interventions, targeted at the whole population. The association between universal interventions and reduced suicide mortality was found to vary by type of intervention. Law and legislation reforms (relating, e.g., to firearms, alcohol, tobacco, access to all means and mental health) were 70% effective, in reducing suicide mortality, although the effect appeared to be stronger for males than for females. In the specific case of preventing firearm suicide, Ishimo et al. (2021) reported that 19 of 45 firearm law and regulation reform studies reported a statistically significant effect on reducing suicide deaths, 11 studies reported mixed null and statistically significant effects on reducing suicide deaths, five studies reported null and statistically significant effects on both reducing and increasing suicide deaths, and 10 studies reported null findings. Overall, their findings support the proposition that restriction of *easy* access to firearms deserves serious consideration for inclusion in national suicide prevention strategies. Given the reach of these interventions (namely, the whole population), the authors highlighted the importance of their inclusion in suicide prevention at the universal level.

3.5. Restrictions on access to commonly used means (methods) of suicide

To date, one of the universal strategies that has shown the most consistent contribution to the prevention of suicidal behaviour is the restriction of access to lethal means. Examples of successful strategies include: controls on toxic medications, especially the restriction of the pack size of paracetamol (Mann et al. (2005), Zalsman et al. (2016), Hawton et al. (2011)), and the withdrawal of analgesics, especially co-proxamol (Sandilands & Bateman, 2008); the detoxification of the domestic gas supply (Kreitman 1976); the introduction of catalytic converters (Amos et al., 2001); and the removal of ligature points in secure places, such as prisons, police cells and hospitals (Appleby and Kapur, 2017). All of these restrictions of means required legislation or regulatory changes.

Eight high/moderate quality reviews of restrictions on access to means were identified. Ishimo et al. (2021) found that use of physical barriers (e.g., on bridges and railway platforms) were 100% effective, resulting in a significant reduction in suicide mortality in all 13 studies evaluating this intervention. In a meta-analysis of 11 primary studies conducted in Canada, New Zealand, Switzerland, the UK and USA, Pirkis et al. (2013) found that jump sites where an intervention (barrier, high wire fence) had been erected resulted in an 86% reduction in suicide by jumping per annum. Although there was a 44% increase in jumping suicides per annum at nearby sites, the overall net effect for all jump site interventions was a 28% reduction in suicide deaths by jumping per annum. A later study by Pirkis et al. (2015) went beyond the earlier study by adding a meta-analysis which assesses the relative effectiveness of interventions on suicide rates at suicide locations of concern ('hotspots'). Twenty-three articles representing 18 unique studies were identified. Interventions that were intended to restrict access to means, encourage help-seeking and increase the likelihood of intervention by a third party were associated with a reduction in the number of suicides per year. Including only those studies that assessed a particular intervention in isolation, restriction of access to means and encouragement of help-seeking were associated with a reduction in the risk of suicide.

These findings were more positive than those reported in the earlier narrative review by Cox et al. (2013) who examined and extended the range of means to restrict suicide, as well as structural barriers, by including help-seeking strategies, such as on-site telephones, posters with help-line numbers, leaflets, suicide patrols and media reporting. However, at that time the evidence base was too limited to reach any firm conclusions.

Okolie et al. (2020) found similar results for means restriction interventions for jumping (half of the sites were bridges) delivered in isolation. Although the evidence in support of means restriction is of a low quality, due to the methodological limitations of included studies, the directionality of effect favours means restriction. Bridge barriers were also shown to be cost-effective (Okolie et al., 2020).

On preventing rail suicide, Barker et al. (2017) and Ishimo et al. (2021) reviewed the same interventions (platform doors, suicide pits and blue lights) and concluded that the introduction of platform screen doors had reduced casualties from 202 during 1997-2001 to 67 during 2003-2007 in Hong Kong. The percentage of fatal incidents at stations without pits was 66% compared to 45% at stations with pits. Findings for blue lights were mixed.

Gunnell et al. (2017) focused on restricting access to hazardous pesticides in 16 countries (five low- or middle-income and 11 high-income). They concluded that "national bans on highly hazardous pesticides, that are commonly ingested in acts of self-poisoning, seem to be effective in reducing pesticide specific and overall suicide rates" (e1026). However, restrictions on sales were less promising.

In a review of community-based approaches to prevent suicidal behaviour through reducing access to pesticides, Reifels et al. (2019) reported weak evidence that three interventions (non-pesticide management, storing pesticides in central storage facilities and local bans of specific insecticides) reduced suicide attempts and suicides. However, the study that was most methodologically robust failed to demonstrate the effectiveness of providing lockable household storage boxes for pesticides.

3.6. Raising public awareness

Public awareness campaigns delivered through mass media have become an increasingly popular way to address risk factors for suicide prevention. To date, there has been limited evidence about their contribution to suicide prevention. Zalsman et al. (2016) commented that these campaigns often result in a significant increase in calls to helplines, but without any measurable reduction in overall suicidal behaviour. Torok et al. (2017) noted that studies tend to have insufficient statistical power to examine attempts or deaths as an outcome, while Van der Feltz-Cornelius (2011) highlighted the challenge of identifying the unique contribution of this intervention, given the multilevel nature of suicide prevention campaigns.

Torok et al. (2017) evaluated mass media campaigns that targeted the prevention of suicidal behaviour (deaths and attempts) or suicide literacy (knowledge, attitudes and help-seeking). With respect to behavioural outcomes, they found that mass media campaigns were most effective when delivered as part of multi-component suicide prevention strategy, while stand-alone campaigns were modestly useful for increasing suicide literacy. Overall, the mixed quality of included studies highlighted the need for increased quantity, consistency and quality of evaluations to advance the evidence base. Awareness campaigns should be considered as part of a suite of interventions that

might be used to prevent suicide, preferably delivered as one component of a multilevel approach (Torok et al., 2017; Pirkis et al., 2019).

3.7. Adherence to media reporting guidelines

Noting the limited availability of research on the effectiveness of adherence to media guidelines on preventing suicidal behaviour, Bohanna and Wang (2012) expanded the scope of their review to include a wide range of studies (in Austria, Australia, China, New Zealand, Switzerland, the UK and USA) focusing on a range of outcomes. Only two out of 11 studies (Niederkrotenthaler & Sonneck, 2007; Sonneck et al., 1994) examined suicide as the primary outcome. Both studies explored the implementation of media guidelines in response to high rates of suicide on the subway in Vienna. An analysis of Austrian suicides and Viennese subway suicides (Niederkrotenthaler & Sonneck, 2007) showed a decrease of 81 suicides annually since publication of media guidelines. The authors reported a reduction in total suicides across the country and change in suicide trend in those regions of the country with strong implementation. There was an immediate effect in the first year of implementation in the area with strong media collaboration (with other areas showing an effect subsequently). The recommendations to avoid the reporting or discussion of suicide methods, as well as to feature stories of hope and recovery from suicidal crises, appear to be of particular importance. “Positive” stories have been shown to reduce suicidal ideation in vulnerable audiences.

3.8. Settings

3.8.1. Schools

Schools are often considered to be an appropriate setting for delivery of suicide prevention programmes (Hawton et al., 2002). There are several types of school-based interventions, including: awareness/education curricula, using tools such as the Signs of Suicide; peer leadership using Signs of Strength; gatekeeper training of school peers and/or teaching and other school staff, using, e.g., Question, Persuade, Refer (QPR); skills training, e.g., Good Behaviour Game; and screening for children at risk. Five out of six reviews in schools (Breet et al., 2021; Gijzen et al., 2022; Katz et al., 2013; Miller et al., 2009; Robinson et al., 2018) focused on Signs of Suicide (Aseltine and DiMartino, 2004; Aseltine et al., 2007). Consequently, there is considerable overlap between reviews in the primary studies that have been included.

Harrod et al. (2014) and Breet et al. (2021) reviewed post-secondary education settings. Harrod et al. (2014) highlighted evidence that knowledge of suicide from classroom instruction increased short-term knowledge of suicide. However, there was no effect on participants’ suicide-related attitudes or behaviours. The authors found insufficient evidence to support the widespread implementation of any programmes or policies for primary suicide prevention in post-secondary education settings. Breet et al. (2021) reported that gatekeeper training, using brief psycho-education, was the most common intervention prevention on campuses. However, findings relating to SOS and QPR were contradictory, suggesting that the effectiveness of these interventions might be a function of extrinsic factors, such as the way the intervention is delivered and the setting or context of the intervention.

Meta-analyses of school-based interventions found evidence of a positive impact on non-fatal suicidal behaviour, although the pooled effect size was small. Pistone et al. (2019) reported a significant decrease in suicide attempts at three-month follow-up in three studies, and at 12-month follow-up in in two studies. The Saving and Empowering Young Lives in Europe (SEYLE) study, a

multicentre, cluster-randomised, controlled trial, recruited over 11,000 adolescent pupils, median age 15 years, from 168 schools in 10 European Union countries. Schools were randomly assigned to one of three interventions (QPR; the Youth Aware of Mental Health Programme (YAM), targeting pupils; and screening by professionals (ProfScreen), with referral of at-risk pupils) or a control group. At the 12-month follow-up, Wasserman et al. (2015) reported a significant reduction of suicide attempts among those exposed to YAM, compared with the control group. In a subsequent analysis of five studies, of which three were included in Pistone et al.'s (2019) meta-analysis, Gijzen et al. (2022) confirmed the finding of a small, but significant, effect in favour of school-based interventions on suicidal behaviour.

A review of suicide prevention targeted at youth identified specific interventions that reduced suicidal ideation and self-harm in school settings (Robinson et al., 2018). The Signs of Suicide programme identified students at risk, the Good Behaviour Game was found to develop behavioural skills in children aged 6 and older, and the Signs of Strength was considered to be promising as a peer-to-peer intervention. However, the effectiveness of these interventions in specific populations and settings is unknown. Multi-modal interventions (Pistone et al., 2019) appear to be effective, but the components that work best together are unknown.

3.8.2. Community

Four reviews of moderate/high quality evaluated suicide prevention interventions targeted at older persons and in indigenous communities. There were no reviews published within our date range that focused on suicide prevention centres.

Interventions for older people

Okolie et al. (2017) and LaFlamme et al. (2022) reviewed interventions targeted at older adults. Okolie et al. (2017) reported evidence derived from eight studies of community-based multilevel suicide prevention programmes in East Asian countries, showing that there were significant reductions in suicide incidence over time in intervention areas, significantly lower incidence of attempted suicide requiring admission to an emergency ward, and a significantly reduced suicide rate in an intervention group compared to controls. In two studies of community-based telephone counselling programmes, there were significantly fewer deaths among older service users than expected.

Laflamme et al. (2022) evaluated pharmacological interventions for depression in this age group; their findings are reported below (section 3.14: pharmacological interventions).

Interventions for indigenous people

Three types of suicide prevention interventions in indigenous communities in Australia, Canada, New Zealand and the USA were investigated by Clifford et al. (2013). Two of four community prevention interventions reported statistically significant reductions in rates of suicide and self-harm. Evidence of the effectiveness of gatekeeper training and education interventions on suicidal behaviour outcomes was lacking. The later study by Leske et al. (2020) reviewed 24 studies from Australia, Canada, New Zealand and the USA. There was some evidence of a reduction in suicide deaths associated with alcohol prohibition policies and comprehensive, multilevel interventions. There was insufficient evidence, however, to confirm the effectiveness of any single suicide prevention

intervention, due to the shortage of studies, risk of bias, and population and intervention heterogeneity.

3.8.3. Workplaces

Witt et al (2017a) reviewed multi-component programmes targeting persons working in emergency and protective services, including military personnel, police personnel and firefighters. (There were no eligible studies for correctional or ambulance personnel.) The majority of programmes were implemented in the USA and focused on the provision of secondary level suicide prevention activities, including: awareness training; gatekeeper training; establishing dedicated mental health/suicide surveillance procedures; establishing a crisis intervention team; implementing changes to personnel selection procedures; and establishing employee wellbeing programmes, alcohol and drug abuse treatment programmes, and peer support programmes. Out of 13 studies, six reported quantitative data on suicide. On average, these programmes were associated with an approximate halving of suicide rates over an average follow-up period of 5.25 years. Based on subgroup analyses, programmes targeting military or police personnel were associated with a significant reduction in suicide rates at postintervention. However, there was no evidence of a significant reduction in suicide incidence in a single programme targeting firefighting personnel. The authors draw attention to the paucity of workplace intervention initiatives that have been evaluated, and to the limitations of commonly used quasi-experimental or observational research designs in drawing causal inferences about the role of workplace interventions in reducing suicidality.

3.8.4. Prisons

A review of interventions to reduce suicidal thoughts and behaviours among people in contact with the criminal justice system (Carter et al., 2022) included 38 studies, 23 of which were conducted in adult custodial settings in high-income, Western countries. Interventions included models of care, art programmes, peer support and group programmes across all settings. Two out of seven studies investigating the impact of different models of care in custodial settings, forensic hospital settings, and community-based forensic settings concluded that their model of care reduced self-harm. One observational study reported lower rates of self-harm in a therapeutic community prison in England than in conventional UK prisons. One high-quality RCT out of 12 studies investigating group-based treatment programmes in adult correctional settings reported a reduction in self-injurious behaviours following completion of a 20-session cognitive behavioural suicide prevention (CBSP) course (compared to treatment as usual). Out of two studies investigating peer support programmes, one found that a peer-led problem-solving therapy (PST) skills intervention led to fewer self-harm episodes per month among participants who received PST skills training from mentors, while participants who did not receive the PST intervention reported no reduction. Most studies had considerable methodological limitations and very few interventions had been rigorously evaluated. The authors concluded that it would be difficult to draw robust general conclusions about the effectiveness of these interventions.

3.8.5. Armed Forces (currently serving and veterans)

The systematic review by Nelson et al. (2017) included eight studies of population-level interventions and 10 studies of individual-level healthcare interventions, targeting both serving personnel and veterans. Population-level interventions included education, awareness-raising, individual health and individual risk monitoring. In six observational studies suicide rates were lower after interventions,

while there was no significant effect in two studies of community programmes. Individual-level healthcare interventions included different types of psychotherapy. Statistically significant differences between treatment and usual care were found in only two out of 10 RCTs. Among outpatient active-duty soldiers with recent suicide attempts/ideation, those in a brief cognitive-behavioural therapy programme made fewer suicide attempts at two-year follow-up. Among women with borderline personality disorder, those receiving dialectical behaviour therapy had fewer suicide attempts at one-year follow-up. As a result of common methodological limitations (including differences between interventions, omission of potential confounders, non-comparability of groups and weak statistical power), the authors conclude that "[s]tudies of suicide prevention interventions provide inconclusive evidence to support their use…."

3.9. Substance misuse programmes

In a systematic review with meta-analysis, Padmanthan et al. (2020) evaluated evidence from six RCTs conducted in four countries (Australia, Iran, USA and UK) on the effectiveness of interventions to reduce suicide or self-harm in people with substance use disorder. Five trials investigated psychotherapeutic interventions (including CBT, DBT and dynamic deconstructive psychotherapy), while the sixth trial compared different high doses of buprenorphine targeted at men with severe opioid use disorder. The pooled estimate from random effects meta-analysis indicated weak evidence of a small positive effect of interventions on suicide and self-harm.

Witt et al. (2021a) identified 11 studies in their systematic review (of which nine were included in a meta-analysis) of the effect of alcohol-related psychological interventions on self-harm (non-suicidal self-injury [NSSI] and suicide attempt), suicidal behaviour and suicidal ideation. The authors note that, despite considerable variation between studies in methods and effect sizes, there was nevertheless some evidence that reducing alcohol use resulted in a reduction in self-harm and suicide attempt by the time of the final follow-up assessment. There was, however, no effect on suicide mortality, nor any significant difference in effect by therapeutic approach.

3.10. Gatekeeper training

Gatekeeper training (GKT) has been implemented in many populations, including military personnel, school staff, peer-helpers, clinicians and friends and families of individuals at risk. Isaac et al. (2009) reviewed evidence from six cohort studies, reporting a significant decrease in the suicide rate among the residents of a Swedish island following training of primary care physicians and a 33% relative risk reduction in suicide following a multi-component intervention (including GKT) among military personnel in US Air Force personnel. Overall, the authors conclude that GKT "holds promise as part of a multifaceted strategy to combat suicide."

Milner at al. (2017) undertook a meta-analysis on the effectiveness of interventions delivered by General Practitioners (GPs), either standing alone or as part of a multi-component programme, to prevent a range of suicide-related outcomes. Based on 14 studies, the authors reported that GP interventions were associated with a significant reduction in suicide rates using a pre-post evaluation design (using historical controls) but not when compared to a different comparator region. Findings from studies assessing suicide attempt and self-harm outcomes were mixed: some suggested beneficial effects, while others suggested harmful effects. Overall, the authors conclude that GP training interventions for suicide prevention "have produced equivocal results, which varied by study

design and outcome. Given these results, we cannot recommend the roll out of GP suicide prevention initiatives" (p. 294).

3.11. Telephone-based services

Hoffberg et al. (2020) identified 17 studies which explored "distal evidence of effectiveness" of crisis line services, with follow-up ranging between one week and four years. The sole RCT (Mishara et al., 2005) compared the effects of four suicide prevention programme arms for crisis line callers. At two- and six-month follow-ups, family and friends of high-risk suicidal men reported that their men had attempted suicide less frequently. However, the review authors call into question the study findings due to methodological deficiencies introducing a high risk of bias. The review also highlights a study by Chan et al. (2018) who conducted a retrospective cohort study analysis of suicide deaths among older adult users and non-users of a Hong Kong telephone helpline. The suicide rate among helpline users was far higher than the general Hong Kong older adult population. However, the review authors caution against assuming that the finding is evidence of a negative impact of service usage. Rather, they suggest that "the study confirmed that crisis line callers are at increased risk for suicide" (p. 11). Overall, Hoffberg et al. (2020) conclude that "[h]igh quality evidence demonstrating crisis line effectiveness is lacking. Moreover, most approaches to demonstrating impact only measured proximal [during/at conclusion of the crisis service] outcomes" (p. 1).

Noh et al. (2016) conducted a systematic review of five RCTs evaluating the effectiveness of telephone-delivered interventions following suicide attempt/self-harm. In three studies, people who had attempted suicide were contacted by telephone after treatment, while in two studies patients following a self-harm episode were provided with 'green' (crisis) cards which offered 24-hour crisis telephone consultation with a psychiatrist for up to 6 months after the self-harm episode. According to the findings of two meta-analyses, telephone contact did not significantly reduce the proportion of those repeating suicide attempts and deaths by suicide, and provision of a crisis card did not reduce the recurrence of self-harm, in the year following the index episode (compared with no telephone intervention).

3.12. Postvention

Postvention is defined by Andriessen (2009: 43) as "those activities developed by, with, or for suicide survivors, in order to facilitate recovery after suicide, and to prevent adverse outcomes including suicidal behaviour." Szumilas and Kucher (2011) identified 16 studies (using a variety of designs) that met inclusion criteria for evidence of effectiveness of postvention programmes (interventions targeted at individuals recently bereaved by the suicide death of a loved one). According to the available (methodologically limited) evidence, it was not possible to identify a protective effect of any postvention programme (school-based, family-focused or community-based) on suicidal behaviour.

3.13. Screening

Seven studies of screening were identified: six systematic reviews (Cervantes et al., 2022; Gould et al., 2018; O'Connor et al., 2013; Scudder et al., 2022; Randall et al., 2011; Stewart and Lees-Deutsch, 2022) and one systematic review and meta-analysis (Oyama et al., 2008). Four reviews evaluated evidence on suicide risk screening tools for suicidal behaviour in persons presenting at Emergency

Departments (EDs): two reviews focused on children, adolescents and young people (Cervantes et al., 2022; Scudder et al., 2022) and two reviews focused on adults (Randall et al., 2011; Stewart and Lees-Deutsch, 2022). Based on 11 studies, conducted in the USA, Cervantes et al. (2022) noted considerable variation in participation rates and in positive screen rates, with the latter depending, to some degree, on the type of presenting concern (psychiatric versus non-psychiatric). In their review Scudder et al. (2022) located several screening tools for suicidality in paediatric ED patients. They observed that most of the tools were brief and feasible to implement in routine care. They uncovered suicide risk in up to 20% of medical/surgical patients and about half of psychiatric samples. Positive screens were more likely to be female and older than negative screens and they were more likely to be assessed and admitted.

With regard to the screening of adults, Randall et al. (2011) identified 12 cohort studies which assessed the recurrence of self-harm. The three screening tools (out of 15) which were found to have some predictive value had psychometric limitations, including poor sensitivity (ability to correctly identify "true" positive "cases"), poor specificity (ability to correctly identify "true" negative "cases"), and lack of relevant data. The authors conclude: "Overall, while many methods used in the ED to assess suicidal and parasuicidal patients have strong psychometric properties, there is little clinical evidence supporting their use…. The available tools remain clinically unhelpful in determining self harm risk in isolation." In their review based on nine studies, Stewart et al. (2022) identified two risk assessment tools with good predictive ability for suicide ideation and self-harm, while one tool showed modest predictive ability for patients requiring admission. Overall, however, the review "found no strong evidence to indicate that any particular risk tool has a superior predictive ability to identify repeat self-harm, suicide attempts, or death by suicide…. [S]uch tools should not be used in isolation from clinical judgment and experience to evaluate patients at risk."

In primary care, a meta-analysis of screening older adults with depression, coupled with health education, was found to be associated with a reduced suicide incidence (Oyama et al., 2008). However, this review included other components, such as follow up by a psychiatrist and/or GP. It is, therefore, difficult to ascertain which components made a significant contribution to the overall effect. In the other review of screening instruments for adults in settings relevant to primary care (O'Connor et al., 2013), there was minimal evidence to suggest that screening tools can identify those at increased risk of suicide, but precision was lower in studies of adults >65 years, and there was minimal evidence to recommend screening adolescents. In the case of incarcerated offenders, Gould et al. (2018) managed to identify only eight candidate screening tools, none of which could be considered sufficiently robust for use in the prison setting.

3.14. Pharmacological interventions

Ten reviews of moderate or high quality were identified. Five reviews focused on lithium (Baldessarini et al., 2006; Del Matto, 2020; Nabi et al., 2022; Smith and Cipriani, 2017; Wilkinson et al., 2022). With one exception (Nabi et al., 2022 – see below), the findings of these reviews concur with the conclusion reached by Zalsman et al. (2016: 648) that "there is reasonably strong evidence that lithium is effective in reducing the risk of suicidal behaviours in people with mood disorders." Based on RCT evidence, Smith et al. (2017) suggest that lithium should be the treatment of choice for persons with bipolar disorder who are at risk of suicide.

The findings of a later review by Nabi et al. (2022), which examined the effects of lithium on suicide and non-fatal suicidal behaviour (including attempted suicide and suicidal ideation) among participants with a diagnosis of bipolar and /or major depressive disorder, were at odds with this consensus. Their review included studies in which some participants had previously used lithium. Failing to uncover significant differences in any subgroup analysis, the authors concluded that evidence derived from RCTs is inconclusive and does not support the proposition that lithium prevents suicide and suicidal behaviour. They account for the different findings and conclusions between their review and previous meta-analyses on three main grounds: first, the availability of additional data; second, the inclusion of data that were previously excluded in trials with zero events; and, third, exclusion of trials published before 2000 (due to less rigorous reporting standards).

Laflamme et al. (2022) conducted an umbrella review of anti-depressant use in older people. The association between suicidal behaviour and antidepressant use treatment was investigated in two reviews (O'Connor et al., 2009; KoKoAung et al., 2015). O'Connor et al. (2009), exploring the effect of second-generation antidepressants, particularly selective serotonin reuptake inhibitors (SSRIs), reported a significantly lower odds ratio with antidepressants compared to placebo for both suicide attempt and serious self-harm. It was not possible to assess the association with suicide due to the absence of reports of suicide deaths in approximately 233 RCTs. On the other hand, the later review by KoKoAung et al. (2015), examining the effect of SSRIs compared to other antidepressant use or placebo, found no lower odds of suicide attempt in experimental studies or of suicide in two observational studies, while long-term use of SSRIs was associated with an increased risk of suicide attempt compared to no treatment in observational studies. Laflamme et al. (2022) conclude: "The results of this review of reviews find the evidence inconclusive towards use of antidepressants for the prevention of suicidal behavior in older people."

Witt et al. (2021b) undertook a review to assess the effects of pharmacological agents or natural products to prevent the recurrence of self-harm episodes over a maximum follow-up period of two years (primary outcome) compared to comparison types of treatment (e.g., placebo or alternative pharmacological treatment) among adults aged 18 years and older who engage in self-harm. Based on findings from seven trials, there was no clear evidence that the risk of repeated self-harm is reduced by newer generation antidepressants or mood stabilisers or natural products (compared to placebo). There was weak evidence that antispychotics may reduce the risk of self-harm compared to placebo, but not compared to another comparator drug/dose. The authors conclude: "Given the low or very low quality of the available evidence, and the small number of trials identified, there is only uncertain evidence regarding pharmacological interventions in patients who engage in SH [self-harm]."

3.15. Psychotherapeutic interventions

Seventeen reviews of moderate/high quality explored the impact of different psychotherapeutic interventions, including (but not restricted to) cognitive therapy (CT), cognitive behavioural therapy (CBT), dialectical behavioural therapy (DBT), mentalisation therapy (MBT), psychoanalytic and psychodynamic psychotherapies, group-based psychotherapy and family interventions, among adults.

3.15.1. Overviews

Crawford et al. (2007) undertook a systematic review and meta-analysis based on 18 RCTs to assess the impact of additional psychosocial interventions (including CBT, DBT, problem-oriented counselling/problem-solving, crisis telephone consultation, domiciliary visits, group psychotherapy, telephone-based follow-up) following an episode of self-harm on subsequent suicide. Combining data from all psychosocial interventions, the rate of suicide in the intervention arm of the trial was not significantly different to the suicide rate in the control arm. While the authors conclude that the study findings undermine the view that "enhanced treatment following an episode of self-harm substantially reduces the likelihood of subsequent suicide", they also draw attention to the weak statistical power of the meta-analysis and therefore the need for cautious interpretation of these findings.

Tarrier et al. (2008) conducted a systematic review and meta-analysis to examine the effectiveness of cognitive-behavioural therapies on suicidal behaviour (covering completed suicides, suicide attempts, suicide intent and/or plans, and suicide ideation) in the short term (up to three months post-completion of treatment). Based on the 28 included studies, CBT (10 studies) and DBT (eight studies) were the most frequently used therapies. The authors report a highly significant treatment effect among adults (but not adolescents) for individual-level (plus or minus group-level) delivery (but not for group-level alone) and compared to minimal treatment or treatment as usual (but not another active treatment). The treatment effect was reduced, but still statistically significant, over the medium term (up to two years). Treatment directly targeting a reduction in suicidal behaviour was effective, whereas treatment indirectly targeting a reduction in suicidal behaviour via relief of other symptoms (such as depression or distress) was not effective.

A later systematic review and meta-analysis focused on a comparison of the effectiveness of direct versus indirect psychosocial and behavioural interventions (mostly CBT- or DBT-based, but also including case management, social skills training and supportive telephone calls/letters) to prevent suicide and suicide attempts (Meerwijk et al., 2016). Based on 29 RCTs with follow-up data and control group, the authors found that psychosocial and behavioural interventions that directly address suicidal behaviour are effective immediately post-treatment and in the longer term (mean duration = 13.6 months), whereas treatments indirectly addressing those components are effective only in the longer term. Differences between direct and indirect approaches were not statistically significant. However, the difference in favour of direct interventions was clinically important, with large and medium improvements identified post-treatment and longer-term, respectively.

Witt et al (2021c) undertook a systematic review of 76 RCTs comparing interventions of specific psychosocial treatments versus treatment as usual (TAU), routine psychiatric care, enhanced usual care (EUC), active comparator, or a combination of these, in the treatment of adults with a recent (within the previous six months) episode of self-harm (defined as "intentional self-poisoning or self-injury regardless of degree of suicidal intent or other types of motivation") resulting in presentation to hospital or clinical services. The primary outcome was the occurrence of a repeated episode of self-harm over a maximum follow-up period of two years. There was some evidence that individual cognitive behavioural therapy (CBT) reduces repetition of self-harm by the end of the intervention and at longer follow-up (six and 12 months). There also appeared to be a slightly lower rate of repetition of self-harm following standard dialectical behaviour therapy (DBT). A single trial of

mentalisation-based therapy (MBT) reported reduced repetition of self-harm and frequency of self-harm at follow-up, while two trials found some evidence that group-based emotion regulation psychotherapy may reduce repetition of self-harm at follow-up. Evidence of an effect on absolute repetition of self-harm was lacking or unclear for several other psychosocial treatments, including different variants of DBT, psychodynamic psychotherapy, the provision of information and support, case management, general practitioner (GP) management, remote contact interventions (e.g. emergency ("green") cards, postcards, telephone-based psychotherapy) and other multimodal interventions.

Yiu et al. (2021) carried out a systematic review and meta-analysis of 10 RCTs which examined the effectiveness of psychosocial interventions (the majority of which were CBT and DBT) for reduction of suicide risk among psychiatric inpatients. Compared to control treatments, psychosocial interventions were no more effective in reducing suicide attempts post-therapy and at follow-up.

In a systematic review and meta-analysis of 12 RCTs assessing the effectiveness of psychoanalytic and psychodynamic psychotherapeutic interventions (using core methods aimed at increasing awareness and self-reflection; managing, regulating or containing emotions; and bringing about change through the therapeutic relationship), Briggs et al. (2019) found evidence of a significant treatment effect for both attempted suicide (reduced number of patients at three month follow-up) and repetition of self-harm (reduced number of *patients* at 6-month follow-up). In respect of self-harm, no treatment effect was found for self-harm *episodes* or at 12-month follow-up. Control treatments included treatment-as-usual, routine psychiatric care and enhanced usual care. The authors conclude tentatively that "psychoanalytic psychotherapy is potentially effective in the treatment of suicidal and self-harming behaviours", while highlighting the methodological limitations of their review, including the small number of studies, evidence of publication bias, and inconsistency in the measurement of outcomes.

Sobanski et al. (2021) carried out a systematic review and meta-analysis of the effectiveness of psychotherapeutic treatments following attempted suicide in preventing future suicide re-attempts and completed suicide. Based on findings from 18 RCTs, psychotherapeutic interventions were generally more effective than control treatments in reducing the risk of future suicidal behaviour by nearly one-third. CBT, brief psychodynamic interpersonal therapy and MBT were all found to be more effective than control treatments, while interventions based on DBT and problem-solving therapy were not found to offer any advantage over control treatments.

3.15.2. Cognitive Behavioural Therapy (CBT) and Dialectical Behaviour Therapy (DBT)

Most review-level evidence suggests that CBT has a beneficial effect in reducing the risk of future suicide attempt and self-harm (Gøtzsche and Gøtzsche, 2017; D'Anci et al., 2019; Meerwijk et al., 2016; Sobanski et al., 2021; Tarrier et al., 2008; Hetrick et al., 2016; Witt et al., 2021c).

One exception is a meta-analysis of published RCTs that targeted a reduction in self-injurious thoughts and behaviours (SITBs; a broad term covering suicide, self-injury, self-directed violence, self-harm, self-mutilation, self-cutting, self-burning, self-poisoning and suicidal ideation) (Fox et al., 2020). Fox et al. (2020) report that cognitive therapy (CT)/cognitive behavioural therapy (CBT) reduced the combined SITB outcome (a wide range of SITB-related outcomes, possibly including

ideation; measured on a scale, not the binary version) but did not significantly reduce suicide attempts or completed suicides. It was not possible to estimate the effects of CT/CBT on self-harm, NSSI or SITB-related hospitalisation. Reviewing evidence for RCTs about the effectiveness of DBT, Fox et al. (2020) found that the intervention significantly reduced the severity/intensity of the combined SITB outcome and self-harm and marginally reduced the occurrence of SITB-related hospitalisations. However, DBT did not significantly reduce suicide attempts or NSSI, and no trial had targeted completed suicide as a primary outcome. The review by D'Anci et al. (2019) also failed to find differences between DBT and treatment as usual or other psychotherapeutic interventions for suicide attempts or completed suicide.

3.15.3. Digital interventions

Three reviews described mobile- and internet-based digital interventions using a variety of psychological approaches (including CBT, DBT, emotion-regulation therapy and therapeutic evaluative conditioning). Arshad et al. (2020) undertook a systematic review of 22 "trials" (comprising "single arm" trials [no control group], case series and RCTs). One RCT reported fewer NSSI episodes in the treatment group (game-like intervention based on behavioural conditioning) compared to control condition at one-month follow-up but the treatment effect was not maintained at two-month follow-up. The other RCT found no significant differences between intervention (autobiographical self-enhancement training) and control conditions at the end of treatment or at one- or two-month follow-up. Three RCTs were unable to identify any effect of therapeutic interventions on the incidence of attempted suicide, but were probably insufficiently powered to do so. A similar finding (based on two RCTs) was reported by Torok et al. (2020). Witt (2017b) reported findings from two studies. One study, covering three inter-related RCTs, assessed the impact of digital interventions on the frequency of self-cutting or NSSI. No treatment effect was found at post-intervention or one-month follow-up. Another RCT which assessed the effectiveness of a digital intervention found no evidence of a reduction in the proportion of participants who engaged in self-harm or attempted suicide during a two-year follow-up period.

3.15.4. Children and adolescents

Ougrin et al. (2015) published the first meta-analysis of RCTs specifically focused on evaluating the impact of pharmacological, social and psychological therapeutic interventions on suicidal behaviour and non-suicidal self-harm in adolescents (up to 18 years of age) who have self-harmed at least once. The analysis covered 19 RCTs which reported the effects of a wide variety of individual and group therapeutic interventions, including CBT, DBT, MBT, home-based and attachment-based family therapy, psychotherapy and emotion regulation training. There was a significantly lower proportion of adolescents who self-harmed during the follow-up period in the intervention groups than in the control groups. The largest effect sizes were found for CBT, DBI and MBT. No treatment effect was evident in respect of future suicide attempts or NSSI.

In an updated review by the same team, Iyengar et al. (2018) conducted a meta-analysis of RCTs reporting findings from an analysis of therapeutic interventions (as defined in Ougrin et al., 2015) for suicide attempts and self-harm among adolescents. Of 21 eligible studies, 16 explored self-harm, including NSSI and suicide attempts (SAs), as the primary outcome. Thirteen of these 16 studies were also included in the meta-analysis by Ougrin et al. (2015). Unsurprisingly, the findings of this meta-

analysis largely replicate the findings of the earlier meta-analysis, although expressed somewhat differently. Five studies found significant differences between intervention and control groups for the primary outcomes across all types of treatments. Classifying DBT for Adolescents (DBT-A) as a type of CBT and merging different versions of CBT, the authors conclude that "CBT is the only intervention with replicated positive impact on reducing self-harm in adolescents." With regard to the efficacy of MBT, the authors note that preliminary evidence of efficacy in reducing overall self-harm needs further replication.

Harris et al. (2022) conducted a meta-analysis of RCTs to assess treatment effects on self-injurious thoughts and behaviours (SITBs) among children and adolescents. Interventions covered in the review included CT/CBT, DBT, family-based therapy, interpersonal psychotherapy, mindfulness/ meditation, parenting skills training, psychoanalysis and safety planning. Based on an analysis of findings in 112 articles, the authors reported non-significant treatment effects in respect of all behavioural outcomes, including suicide, attempted suicide, NSSI and non-fatal self-harm (with or without suicidal intent), "despite ample power to detect even very small effects." Overall, participants in the intervention group were no more likely to have suicidal thoughts or engage in suicidal behaviours at post-treatment follow-up than participants in the control group. Moreover, "[f]indings were largely consistent across various SITB outcomes, types of interventions, treatment targets, sample severity, and nearly all other potential moderators. Despite increased research in recent years, intervention efficacy has not significantly improved."

Itzhaky et al. (2022) undertook a systematic review and meta-analysis of 30 RCTs, published over the period 1995-2020, with a view to determining the overall effectiveness of psychosocial interventions, in reducing suicidal ideation, self-harming behaviours (excluding NSSI) and suicide attempts among adolescents aged 10-18 years. Treatment approaches included CBT (most common), DBT, interpersonal therapy, attachment-based therapy, motivational interviewing, mindfulness and safety-planning. The overall effect size for reducing self-harming behaviours in the experimental group versus the control group (based on findings from 25 RCTs) was not statistically significant. In an analysis of the subset of 18 RCTs that explored suicide attempts as the outcome measure, the same (non-significant) treatment effect was found. While outcomes were found to improve (at follow-up compared to baseline) in both experimental and control groups, "[p]sychosocial interventions for suicide risk in adolescents showed little effectiveness compared with control treatments."

Witt et al. (2021d) undertook a systematic review to assess the effects of psychosocial interventions for self-harm compared to comparison types of care for children and adolescents (up to 18 years of age) who self-harm. The authors report confidence in the finding of a lower rate of repeat self-harm for DBT for adolescents (DBT-A) post-intervention in four trials. However, they express lack of confidence or uncertainty in the available evidence that other interventions, including individual CBT-based psychotherapy, MBT for adolescents (MBT-A), family therapy, compliance enhancement approaches, group-based psychotherapy, therapeutic assessment or a remote contact intervention (emergency cards) led to a reduction in repeat self-harm at different follow-up assessments.

3.16 Enhanced care/follow-up

3.16.1. Definition

Enhanced care refers to a range of interventions that aim to provide more intensive care and support to persons at risk of future suicidal behaviour or non-fatal self-harm following contact with a

healthcare service (typically a visit to an Emergency/Accident & Emergency Department or admission to hospital) as a result of an episode of self-harm/attempted suicide. Eleven reviews explored a range of these interventions, including: safety planning (co-production by patient and clinician of a plan to help the patient from acting on suicidal urges); brief post-hospital contact (also referred to as "distance-based" and "active outreach") via phone calls, letters, postcards and handwritten notes, to enquire after the welfare of ex-patients and provide support and reminders about their follow-up outpatient (mental health) appointments; coordination of care and helping at-risk patients in scheduling an appointment with a mental health professional and reducing the barriers to treatment adherence; and other brief therapies intended to prevent repeat suicidal behaviour (including functional analysis, therapeutic assessment and techniques informed by motivational interviewing).

3.16.2. Combinations of enhanced care interventions

Doupnik et al. (2020) undertook a systematic review and meta-analysis of brief suicide prevention interventions, delivered in a single personal encounter, with a view to reducing subsequent suicide attempts and promoting ongoing mental health care. The main components considered were: brief contact; care coordination; safety planning; and other brief therapies intended to prevent repeat suicidal behaviour. Interventions consisting solely of a brief follow-up contact, previously reviewed by Milner et al. (2015), were ineligible for inclusion. Fourteen relevant clinical trials were identified, of which seven examined subsequent suicide attempts as an outcome. In a meta-analysis, the pooled effect size was statistically significant: these enhanced care interventions (comprising two or three of the main components listed above) were associated with a reduction in subsequent suicide attempts.

3.16.3. Safety planning

The effectiveness of safety planning was explored in one systematic review and one meta-analysis.

Nuij et al. (2021) conducted a meta-analysis of studies that evaluated the effectiveness of "safety planning-type interventions" (SPTIs) in reducing suicidal behaviour and suicidal ideation among adults. Six studies (four RCTs, one non-randomised controlled trial and one interrupted time series design) were included in the meta-analysis. The risk of "suicidal behaviour," defined as "suicide attempts, fatal suicides or both combined … as defined by the original authors of the included studies," was significantly reduced in the group receiving a SPTI compared to the control group.

Ferguson et al. (2022) undertook a systematic review in order to assess the effectiveness of the "safety planning intervention" (SPI) for adults experiencing "suicide-related distress." Twenty-six studies, the majority quantitative and with general adult or veteran samples, were eligible for inclusion. One eligibility criterion was that the SPI had to be based on the Stanley and Brown (2012) intervention. In half the studies, the SPI was a stand-alone intervention ("SPI-only"); in the other half, the SPI was examined in combination with other interventions ("SPI-plus"). The sole study exploring suicide mortality as an outcome, using a quasi-experimental design with a refugee sample, reported a non-significant decrease in the intervention group ("SPI-plus"). Five studies explored the impact of the SPI on "suicide behaviour" (comprising attempts and deaths). There were statistically significant decreases in suicide attempts in the SPI-plus studies covering the general population and refugees and in suicide behaviour among veterans during the post-intervention period.

The concordance of findings reported in Nuij et al. (2021) and Ferguson et al. (2022) is partly explained by the overlap in included studies (three studies are common to both publications).

3.16.4. Brief post-hospital contact

Three reviews (Meerwijk, 2016; Milner et al., 2015; Schmeckenbecher, 2022) explored the impact of distance-based interventions. Among indirect interventions, only active outreach (intended to show support or promote adherence to treatment, e.g., telephone calls, home visits, postcards) was beneficial in reducing suicidal behaviour (suicide and suicide attempt) immediately after treatment and at follow-up (Meerwijk, 2016). No evidence of a direct impact of active outreach on suicidal behaviour was found. The findings reported by Meerwijk et al. (2016) were similar to those reported by Milner et al. (2015). In their meta-analysis of 12 RCTs using brief contact interventions (telephone contacts, emergency/crisis cards and postcard/letter contacts), Milner et al. (2015) reported a non-significant effect for suicide and pooled measures of self-harm and suicide attempt; there was, however, a significant reduction in the number of repetitions of suicide attempt/self-harm per person. Schmeckenbecher et al. (2022) conducted a systematic review and meta-analysis of 35 RCTs on distance-based interventions ("least-restrictive treatments", including telephone calls, postcards, crisis hotlines and email follow-ups, telehealth approaches and online programs). There was a small but significant positive effect on suicidal behaviour (e.g., suicide planning, suicide attempt, suicide), although the effectiveness of the intervention appeared to depend on the control group selected in the trial.

Riblet et al. (2017) and D'Anci et al. (2019) reported the findings of three RCTs that compared the World Health Organization's Brief Intervention and Contact method (WHO-BIC) with an active control condition. The intervention, tested in low- and middle-income countries as part of the Multisite Intervention Study on Suicidal Behaviours (SUPRE-MISS), comprised an educational session on suicide prevention followed by regular contact by telephone or in person with a trained provider for up to 18 months. There was a difference in the incidence of suicide in the two groups, with significantly fewer deaths among those who received the WHO-BIC intervention.
In their investigation of the effectiveness of brief psychological interventions on "suicide presentations", McCabe et al.'s (2018) study identified four eligible studies (two RCTs, one pilot RCT and one quasi-experiment; three were conducted with adults, one with adolescents). The components of the interventions were early therapeutic engagement, provision of information, safety planning and follow-up contact for at least 12 months. The only study to investigate suicide as an outcome found significantly fewer suicides in the intervention group, while the only two studies investigating suicide attempts as an outcome found significantly fewer suicide attempts in the intervention group.

Inagaki et al. (2019) undertook a meta-analysis of studies exploring the effectiveness of interventions initiated when suicidal patients were admitted to the Emergency Department (ED). The authors identified 11 RCTs relating to Active Contact and Follow-up, which comprised five intervention modalities: intensive care plus outreach; brief intervention and contact; letter or postcard intervention; telephone; and composite of letter/postcard and telephone. In a meta-analysis of nine Active Contact and Follow-up RCTs, the authors found a positive effect on preventing a repeat suicide attempt within 12 months; however, the effect was not confirmed at 24 months. A meta-

analysis of five RCTs did not uncover a statistically significant effect on suicide deaths within 12 months.

Skopp et al. (2023) undertook a systematic review of the effectiveness of "caring contacts" (sending periodic and personalised text-based communications, e.g., letters, postcards, emails, text messages, that express interest and concern for the recipient's well-being) on suicide, suicide attempts and ED presentations/hospitalisations. Thirteen publications, comprising six RCTs, met the inclusion criteria. Participants were recruited from crisis care settings and considered by medical or behavioural health services to be at an elevated risk of suicide. While no strong evidence was found to support the effectiveness of the caring contacts intervention in reducing suicide mortality or ED presentations/ hospitalisations, there was a protective effect for suicide attempts at one year follow-up.

4. Strengths and limitations

To our knowledge, this is the first comprehensive umbrella review of interventions recommended for incorporation into national suicide prevention strategies. The review followed PRISMA and JBI guidelines, used a comprehensive search strategy (customised for each intervention) and undertook rigorous assessments of methodological quality. In this review, we have concentrated on reporting findings from reviews that were of a moderate to high methodological quality. The majority of included reviews are from 2015 onwards.

In assessing the evidence presented in our review, several limitations associated with the umbrella review approach should be noted. First, the reviews available for inclusion in our umbrella review are limited by the breadth, depth, quality and availability of the underlying primary evidence. Second, it is difficult to compare findings and outcomes across and within reviews because of inconsistent definitions of non-fatal suicidal behaviour and of suicide prevention interventions. Third, compared with studies with negative findings, studies with positive findings are more likely to be published, to be published earlier, and to be published in journals with a high impact factor. As a result of such 'publication bias,' systematic review evidence that is based exclusively on published studies can be unbalanced and therefore give rise to misleading conclusions. Fourth, the differentiation between intervention types in our analytic framework (box 2) is more difficult to maintain in the case of the psychotherapeutic interventions and enhanced care/follow-up (compared to other sections). This results from the heterogeneity of intervention types and the lack of standardised descriptions/ definitions of interventions found in the systematic reviews which we have included in our umbrella review. Further development of our analytic framework is needed to support the translation of findings from these broadly 'psychosocial' interventions into practical guidance for service commissioners and frontline practitioners. Finally, the methodological quality of reviews eligible for inclusion in our umbrella review is variable. Our decision to exclude reviews of low or critically low quality is intended to provide a safer foundation on which to make key operational decisions about which interventions to prioritise in a national suicide prevention strategy.

8. Discussion

Suicide-related behavioural outcomes (defined here as suicide, attempted suicide and non-fatal self-harm) are complex and multifaceted, resulting from a wide range of interacting biological, genetic, psychological, psychiatric, social, economic and cultural risk factors. An effective national suicide prevention strategy recognises the need to intervene at different levels (individual, family,

community/network, and societal), taking a coordinated multisectoral approach involving a range of governmental and nongovernmental agencies working in collaboration both nationally and locally. The strategy should be grounded firmly in research evidence of interventions that are likely to contribute significantly to the prevention of, and reduction in, suicide-related behaviour. In this report, we identify 17 such interventions and summarise evidence of their effectiveness through a narrative synthesis based on 79 reviews and meta-analyses of moderate/high methodological quality. In Table 1 we assign a level of confidence to each intervention, grading evidence supporting its inclusion in a national suicide prevention strategy on a three-point scale (strongly supportive evidence, weakly supportive evidence, and insufficient or conflicting evidence; see Table 2 for descriptors).

Table 1 Effectiveness of interventions commonly found in national suicide prevention strategies

Type of intervention	Strength of evidence		
	Strongly supportive	**Weakly supportive**	**Insufficient or conflicting**
Multi-level programmes		• "Synergistic effects"	
Universal interventions	• Law and legislation reforms (relating, e.g., to firearms, alcohol, tobacco, access to means and mental health)		
Restrictions on access to commonly used means (methods) of suicide	• Physical barriers (e.g., jump sites, railway platforms). • Bans on hazardous pesticides. • Restrictions on access to medications that are toxic in overdose. • Removal of ligature points in institutional settings.		
Raising public awareness		• When delivered as part of multi-component strategy	• Stand-alone campaigns
Adherence to media reporting guidelines			√
Settings: schools		√	
Settings: community	• Older people	• Indigenous communities	
Settings: workplaces		√	
Settings: prisons		√	
Settings: armed forces		√	
Substance misuse programmes		√	

Table 1 (continued)

	Strength of evidence		
Type of intervention	**Strongly supportive**	**Weakly supportive**	**Insufficient or conflicting**
Gatekeeper training		√	
Telephone-based services			√
Postvention			√
Screening			√
Pharmacological interventions			√ (Inconclusive evidence with regard to: • Lithium: earlier consensus of effectiveness for people with mood disorders undermined in recent review • Antidepressants in older people • Prevention of recurrence of self-harm)
Psychotherapeutic interventions	• CBT-based interventions (adults) • DBI-based interventions (adults and adolescents)	• MBT • Group-based emotion regulation psychotherapy • Psychoanalytic psychotherapy • CBT (adolescents)	• Other interventions
Enhanced care/ follow-up	• Brief post-hospital contact	Safety planning	• Other interventions

Table 2 Strength of evidence scale

Strength of evidence	Description
Strongly supportive	Methodological quality of included studies/reviews is high AND findings are highly consistent across studies
Weakly supportive	Methodological quality of included studies/reviews is moderate-to-high AND findings are reasonably consistent across studies
Insufficient or conflicting	Methodological quality of included studies/reviews is poor AND/OR findings are inconsistent across studies AND/OR there are insufficient studies to rate strength of evidence

Source: Platt and Niederkrotenthaler (2020), table 3, p.S115.

9. Conclusion

Based on the analysis of 79 systematic reviews and meta-analyses, we conclude that there is:

- **Strongly supportive evidence** concerning the effectiveness of the following suicide prevention interventions: Law and legislation reforms (relating, e.g., to firearms, alcohol, tobacco, access to means and mental health); physical barriers (e.g. at jump sites, railway stations); bans on hazardous pesticides; restrictions on access to medications that are toxic in overdose; removal of ligature points in institutional settings; interventions in community settings targeted at older people; CBT for adults (to prevent repetition of self-harm); DBT for adults and adolescents (to prevent repetition of self-harm); and brief post-hospital contact.

- **Weakly supportive evidence** concerning the effectiveness of the following suicide prevention interventions: multi-level programmes; public awareness-raising, when delivered as part of a multi-component strategy; interventions in schools, indigenous community settings, workplaces, prisons and armed forces; MBT; group-based emotion regulation psychotherapy; psychoanalytic psychotherapy; CBT for adolescents (to prevent repetition of self-harm); and safety planning.

- **Insufficient or conflicting evidence** concerning the effectiveness of the following suicide prevention interventions: public awareness-raising, when delivered as stand-alone campaign; adherence to media guidelines; telephone-based services; postvention; screening; pharmacological interventions (inconclusive evidence with regard to lithium prescribed for people with mood disorders, antidepressants prescribed for older people and prevention of recurrence of self-harm); other psychotherapeutic interventions; and enhanced care/follow-up, excluding brief post-hospital contact and safety planning.

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References

Altavini CS, Asciutti APR, Solis ACO, Wang YP (2022). Revisiting evidence of primary prevention of suicide among adult populations: a systematic overview. *Journal of Affective Disorders* **297**: 641-656. doi: 10.1016/j.jad.2021.10.076.

Amos T, Appleby L., Kiernan K (2001). Changes in rates of suicide by car exhaust asphyxiation in England and Wales. *Psychological Medicine* **31(5)**: 935-939. doi: 10.1017/s0033291701003920.

Andriessen K (2009). Can postvention be prevention? *Crisis* 2009; **30(1)**: 43–47. doi: 10.1027/0227-5910.30.1.43.

Appleby L, Hunt IM, Kapur N. (2017). New policy and evidence on suicide prevention. *Lancet Psychiatry* **9**: 658-660. doi: 10.1016/S2215-0366(17)30238-9

Aromataris E, Fenandez RS, Godfrey C, Holly C, Khalil H and T. P. (2015). Summarising systematic reviews: methodological development, conduct, and reporting of an umbrella review approach. *International Journal of Evidenced-Based Health* **13(3)**: 132-140. doi: 10.1097/XEB.0000000000000055

Arshad U, Farhat-Ul-Ain, Gauntlett J, Husain N, Chaudhry N, Taylor PJ (2020). A systematic review of the evidence supporting mobile- and internet-based psychological interventions for self-harm. *Suicide & Life-threatening Behavior* **50(1)**: 151-179. doi: 10.1111/sltb.12583.

Aseltine RH, DiMartino R (2004). An outcome evaluation of the SOS suicide prevention program. *American Journal of Public Health* **94**: 446–451. doi: 10.2105/ajph.94.3.446

Aseltine RH, James A, Schilling EA, Glanovsky J (2007). Evaluating the SOS suicide prevention program: a replication and extension. *BMC Public Health* **18**:7:161. doi: 10.1186/1471-2458-7-161.

Baldessarini RJ, Tondo L, Davis P, Pompili M, Goodwin FK, Hennen J (2006). Decreased risk of suicides and attempts during long-term lithium treatment: a meta-analytic review. *Bipolar Disorders* **8(5 Pt 2)**: 625-639. doi: 10.1111/j.1399-5618.2006.00344.x

Barker E, Kolves K, De Leo D (2017). Rail-suicide prevention: systematic literature review of evidence-based activities. *Asia-Pacific Psychiatry* **9(3)**: e12246. https://doi.org/10.1111/appy.12246.

Bennett K, Rhodes AE, Duda S, Cheung AH, Manassis K, Links P, Mushquash C, Braunberger P, Newton AS, Kutcher S, Bridge JA, Santos RG, Manion IG, Mclennan JD, Bagnell A, Lipman E, Rice M, Szatmari P (2015). A youth suicide prevention plan for Canada: A systematic review of reviews. *Canadian Journal of Psychiatry* **60(6)**: 245–257. https://doi.org/10.1177/070674371506000603

Bohanna I, Wang X (2012). Media guidelines for the responsible reporting of suicide: a review of effectiveness." *Crisis* **33(4)**: 190-198. doi: 10.1027/0227-5910/a000137.

Breet E, Matooane M, Tomlinson M, Bantjes J (2021). Systematic review and narrative synthesis of suicide prevention in high-schools and universities: a research agenda for evidence-based practice. *BMC Public Health* **21**: 1116. Doi: 10.1186/s12889-021-11124-w

Briggs S, Netuveli G, Gould N, Gkaravella A, Gluckman NS, Kangogyere P, Farr R, Goldblatt MJ, Lindner R (2019). The effectiveness of psychoanalytic/psychodynamic psychotherapy for reducing

suicide attempts and self-harm: systematic review and meta-analysis. *British Journal of Psychiatry* **214(6)**: 320-328. doi: 10.1192/bjp.2019.33.

Carter A, Butler A, Willoughby M, Janca E, Kinner SA, Southalan L, Fazel S, Borschmann R (2022). Interventions to reduce suicidal thoughts and behaviours among people in contact with the criminal justice system: a global systematic review. *EClinicalMedicine* **44**: 101266. doi: 10.1016/j.eclinm.2021.101266.

Cervantes PE, Seag DEM, Baroni A, Gerson R, Knapp K, Tay ET, Wiener E, Horwitz SM (2022). Universal suicide risk screening for youths in the Emergency Department: a systematic review. *Psychiatric Services* **73(1)**: 53-63. doi: 10.1176/appi.ps.202000881.

Chan CH, Wong HK, Yip PS (2018). Exploring the use of telephone helpline pertaining to older adult suicide prevention: a Hong Kong experience. *Journal of Affective Disorders* **236**:75–79. doi: 10.1016/j.jad.2018.04.093.

Clifford A, Doran CM, Tsey K. (2013). A systematic review of suicide prevention interventions targeting indigenous peoples in Australia, United States, Canada and New Zealand. *BMC Public Health* **13**: 463. doi: 10.1186/1471-2458-13-463.

Cox GR, Owens C, Robinson J, Nicholas A, Lockley A, Williamson M, Cheung YTD, Pirkis J (2013). Interventions to reduce suicides at suicide hotspots: a systematic review. *BMC Public Health* **13(1)**: 214. doi: 10.1186/1471-2458-13-214.

Crawford MJ, Thomas, O, Khan N, Kulinskaya E (2007). Psychosocial interventions following self-harm: systematic review of their efficacy in preventing suicide. *British Journal of Psychiatry* **190**: 11-17. doi: 10.1192/bjp.bp.106.025437.

D'Anci KE, Uhl S, Giradi G, Martin C (2019). Treatments for the prevention and management of suicide: a systematic review. *Annals of Internal Medicine* **171(5)**: 334-342. doi: 10.7326/M19-0869.

De Leo D, Goodfellow B, Silverman M, Berman A, Mann J, Arensman E, Hawton K, Phillips MR, Vijayakumar L, Andriessen K, Chavez-Hernandez A-M, Heisel M, Kolves K (2021). International study of definitions of English-language terms for suicidal behaviours: a survey exploring preferred terminology. *BMJ Open* **11**:e043409. doi:10.1136/bmjopen-2020-043409

Del Matto L, Muscas M, Murru A, Verdolini N, Anmella G, Fico G, Corponi F, Carvalho AF, Samalin L, Carpiniello B, Fagiolini A, Vieta E, Pacchiarotti I (2020). Lithium and suicide prevention in mood disorders and in the general population: a systematic review. *Neuroscience and Biobehavioral Reviews* **116**: 142-153. doi: 10.1016/j.neubiorev.2020.06.017.

Dillon L, Guiney C, Farragher L, McCarthy A, Long J (2015). *Suicide prevention: An evidence review*. Dublin, Ireland: Health Research Board. Retrieved (4 November 2024) from https://www.drugsandalcohol.ie/24168/1/Suicide_Prevention_An_evidence_review_2015.pdf

Doupnik SK, Rudd B, Schmutte T, Worsley D, Bowden CF, McCarthy E, Eggan E, Bridge JA, Marcus SC (2020). Association of suicide prevention interventions with subsequent suicide attempts, linkage to follow-up care, and depression symptoms for acute care settings: a systematic review and meta-analysis. *JAMA Psychiatry* **77(10)**: 1021-1030. 10.1001/jamapsychiatry.2020.1586.

Ferguson M, Rhodes K, Loughhead M, McIntyre H, Procter N (2022). The effectiveness of the safety planning intervention for adults experiencing suicide-related distress: a systematic review. *Archives of Suicide Research* **26(3)**: 1022-1045. doi: 10.1080/13811118.2021.1915217.

Fox KR, Huang X, Guzmán EM, Funsch KM, Cha CB, Ribeiro JB, Franklin JC (2020). Interventions for suicide and self-injury: a meta-analysis of randomized controlled trials across nearly 50 years of research. *Psychological Bulletin* **146(12)**: 1117-1145. doi: 10.1037/bul0000305.

Gijzen MWM, Rasing SPA, Creemers DHM, Engels RCM, Smit F (2022). Effectiveness of school-based preventive programs in suicidal thoughts and behaviors: a meta-analysis. *Journal of Affective Disorders* **298(Pt A)**: 408-420. doi: 10.1016/j.jad.2021.10.062.

Gøtzsche PC, Gøtzsche PK (2017). Cognitive behavioural therapy halves the risk of repeated suicide attempts: systematic review. *Journal of the Royal Society of Medicine* **110(10)**: 404-410. doi: 10.1177/0141076817731904.

Gould C, McGeorge T, Slade K (2018). Suicide screening tools for use in incarcerated offenders: a systematic review. *Archives of Suicide Research* **22(3)**:345-364. doi: 10.1080/13811118.2017.1334611.

Grant, M. J. and A. Booth (2009). A typology of reviews: an analysis of 14 review types and associated methodologies: A typology of reviews. *Health Information and Libraries Journal* **26(2)**: 91-108. doi: 10.1111/j.1471-1842.2009.00848.x

Gunnell D, Knipe D, Chang S-S, Pearson M, Konradsen F, Lee WJ, Eddleston M (2017). Prevention of suicide with regulations aimed at restricting access to highly hazardous pesticides: a systematic review of the international evidence. *Lancet Global Health* **5(10)**: e1026-e1037. doi: 10.1016/S2214-109X(17)30299-1.

Guo, B., & Harstall, C. (2004). *For which strategies of suicide prevention is there evidence of effectiveness?* Retrieved (4 November 2024) from https://iris.who.int/handle/10665/363870

Harris LM, Huang X, Funsch KM, Fox KR, Ribeiro JD (2022). Efficacy of interventions for suicide and self-injury in children and adolescents: a meta-analysis. *Scientific Reports* **2(1)**:12313. doi: 10.1038/s41598-022-16567-8.

Harrod CS, Goss CW, Stallones L, DiGuiseppi C (2014). Interventions for primary prevention of suicide in university and other post-secondary educational settings. *Cochrane Database of Systematic Reviews* **10(10)**: CD009439. doi: 10.1002/14651858.CD009439.pub2.

Hawton K, Rodham K, Evans E, Weatherall R (2002). Deliberate self-harm in adolescents: self report survey in schools in England. BMJ **325** (7374): 1207-1211. doi: 10.1136/bmj.325.7374.1207

Hawton K, Bergen H., Simkin S, Arensman E, Corcoran P, Cooper J, Waters K, Gunnell D, Kapur N (2011). Impact of different pack sizes of paracetamol in the United Kingdom and Ireland on intentional overdoses: a comparative study. *BMC Public Health* **11**: 460. doi: 10.1186/1471-2458-11-460.

Hetrick SE, Cox GR, Witt KG, Bir JJ, Merry SN (2016). Cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in children and adolescents. *Cochrane Database of Systematic Reviews* **8**: CD003380.

doi: 10.1002/14651858.CD003380.pub4.

Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors) (2024). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.5 (updated August 2024). Cochrane, 2024. Available from www.training.cochrane.org/handbook.

Hoffberg AS, Stearns-Yoder KA, Brenner LA (2020). The effectiveness of crisis line services: a systematic review. *Frontiers in Public Health* **7**: 399. doi: 10/3389/fpubh.2019.00399.

Hofstra E, van Nieuwenhuizen C, Bakker M, Özgül D, Elfeddali I, de Jong SJ, van der Feltz-Cornelis CM (2020). Effectiveness of suicide prevention interventions: a systematic review and meta-analysis. *General Hospital Psychiatry* **63**: 127-140. doi: 10.1016/j.genhosppsych.2019.04.011

Inagaki M, Kawashima Y, Yonemoto N, Yamada M (2019). Active contact and follow-up interventions to prevent repeat suicide attempts during high-risk periods among patients admitted to emergency departments for suicidal behavior: a systematic review and meta-analysis. *BMC Psychiatry* **19(1)**: 44. doi: 10.1186/s12888-019-2017-7.

Isaac M, Elias B, Katz LY, Belik SL, Deane FP, Enns MW, Sareen J, Swampy Cree Suicide Prevention Team (2009). Gatekeeper training as a preventative intervention for suicide: a systematic review. *Canadian Journal of Psychiatry* **54(4)**: 260-268. doi: 10.1177/070674370905400407.

Ishimo MC, Sampasa-Kanyinga H, Olibris B, Chawla M, Berfeld N, Prince SA, Kaplan MS, Orpana H, Lang JJ (2021). Universal interventions for suicide prevention in high-income Organisation for Economic Co-operation and Development (OECD) member countries: a systematic review. *Injury Prevention* **27(2)**: 184-193. doi: 10.1136/injuryprev-2020-043975.

Itzhaky L, Davaasambuu S, Ellis SP, Cisneros-Trujiilo S, Hannett K, Scolaro K, Stanley BH, Mann JJ, Wainberg ML, Oquendo MA, Sublette ME. (2022). Twenty-six years of psychosocial interventions to reduce suicide risk in adolescents: systematic review and meta-analysis. *Journal of Affective Disorders* **300**: 511-531. doi: 10.1016/j.jad.2021.12.094.

Iyengar U, Snowden N, Asarnow JR, Moran P, Tranah T, Ougrin D (2018). A further look at therapeutic interventions for suicide attempts and self-harm in adolescents: an updated systematic review of randomized controlled trials. *Frontiers in Psychiatry* **9**: 583-583. doi: 10.3389/fpsyt.2018.00583.

Katz C, Bolton SL, Katz LY, Isaak C, Tilston-Jones T, Sareen J (2013). A systematic review of school-based suicide prevention programs. *Depression and Anxiety* **30(10)**: 1030-1045. doi: 10.1002/da.22114.

KoKoAung E, Cavenett S, McArthur A, Aromataris E (2015). The association between suicidality and treatment with selective serotonin reuptake inhibitors in older people with major depression: a systematic review. *JBI Database of Systematic Reviews & Implementation Reports* **13(3)**: 174 – 205. doi: 10.11124/jbisrir-2015-2272.

Kothgassner OD, Goreis A, Robinson K, Huscsava MM, Schmahl C, Plener PL (2021). Efficacy of dialectical behavior therapy for adolescent self-harm and suicidal ideation: a systematic review and meta-analysis**.** *Psychological Medicine* **51(7)**: 1057-1067. doi: 10.1017/S0033291721001355.

Kreitman N (1976). The coal gas story. United Kingdom suicide rates, 1960-71. *British Journal of Preventive & Social Medicine* **30(2)**: 86-93. doi: 10.1136/jech.30.2.86.

Laflamme L, Vaez M, Lundin K, Sengoelge M (2022). Prevention of suicidal behavior in older people: a systematic review of reviews. *PLoS One* **17(1)**: e0262889. https://doi.org/10.1371/journal.pone.0262889.

Leske S, Paul E, Gibson M, Little B, Wenitong M, Kolves K (2020). Global systematic review of the effects of suicide prevention interventions in Indigenous peoples. *Journal of Epidemiology and Community Health* **74(12)**: 1050-1055. doi: 10.1136/jech-2019-212368.

Mann JJ, 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, Hendin H (2005). Suicide prevention strategies: a systematic review. *Journal of the American Medical Association* **294(16)**: 2064-2074. doi: 10.1001/jama.294.16.2064.

McCabe R, Garside R, Backhouse A, Xanthopoulou (2018). Effectiveness of brief psychological interventions for suicidal presentations: a systematic review. *BMC Psychiatry* **18**: 120. doi: 10.1186/s12888-018-1663-5.

Meerwijk EL, Parekh A, Oquendo MA, Allen IE, Franck LS, Lee KA (2016). Direct versus indirect psychosocial and behavioural interventions to prevent suicide and suicide attempts: a systematic review and meta-analysis. *Lancet Psychiatry* **3(6)**: 544-554. doi: 10.1016/S2215-0366(16)00064-X.

Miller DN, Eckert TL, Mazza JJ (2009). Suicide prevention programs in schools: a review and public health perspective. *School Psychology Review* **28(2)**: 168-188. doi: 10.1080/02796015.2009.12087830.

Milner A, Witt K, Pirkis J, Hetrick S, Robinson J, Currier D, Spittal MJ, Page A, Carter GL (2017). The effectiveness of suicide prevention delivered by GPs: a systematic review and meta-analysis. *Journal of Affective Disorders* **210**: 294-302. doi: 10.1016/j.jad.2016.12.035.

Milner AJ, Carter G, Pirkis J, Robinson J, Spittal MJ (2015). Letters, green cards, telephone calls and postcards: systematic and meta-analytic review of brief contact interventions for reducing self-harm, suicide attempts and suicide. *British Journal of Psychiatry* **206**, 184–190. doi: 10.1192/bjp.bp.114.147819.

Mishara BL, Houle J, Lavoie B (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 Behavior* **35**:329-342. doi: 10.1521/suli.2005.35.3.329.

Nabi Z, Stansfield I, Ploderl M, Wood L, Moncrieff J (2022). Effects of lithium on suicide and suicidal behaviour: a systematic review and meta-analysis of randomised trials. *Epidemiology and Psychiatric Sciences* **31**: e65. doi: 10.1017/S204579602200049X.

Nelson HD, Denneson LM, Low AR, Bauer BW, O'Neil M, Kansagara D, Teo AR (2017). Suicide risk assessment and prevention: a systematic review focusing on veterans. *Psychiatric Services* **68(10)**: 1003-1015. doi: 10.1176/appi.ps.201600384.

Niederkrotenthaler T, Sonneck G (2007). Assessing the impact of media guidelines for reporting on suicides in Austria: interrupted time series analysis**.** *Australia & New Zealand Journal of Psychiatry* **41(5):** 419-428. doi: 10.1080/00048670701266680.

Noh D, Park YS, Oh EG (2016). Effectiveness of telephone-delivered interventions following suicide attempts: a systematic review. *Archives of Psychiatric Nursing* **30(1)**: 114-119. doi: 10.1016/j.apnu.2015.10.012.

Nuij C, van Ballegooijen W, de Beurs D, Juniar D, Erlangsen A, Portzky G, O'Connor RC, Smit JH, Kerkhof A, Riper H (2021). Safety planning-type interventions for suicide prevention: meta-analysis. *British Journal of Psychiatry* **219(2)**: 419-426. doi: 10.1192/bjp.2021.50.

O'Connor E, Gaynes BN, Burda BU, Soh C, Whitlock EP (2013). Screening for and treatment of suicide risk relevant to primary care: a systematic review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine* **158(10)**: 741-754. doi: 10.7326/0003-4819-158-10-201305210-00642.

O'Connor EA, Whitlock EP, Beil TL, Gaynes BN (2009). Screening for depression in adult patients in primary care settings: a systematic evidence review. *Annals of Internal Medicine* **151(11)**: 793–803. doi: 10.7326/0003-4819-151-11-200912010-00007.

Okolie C, Wood S, Hawton K, Kandalama U, Glendenning AC, Dennis M, Price SF, Lloyd K, John A (2020). Means restriction for the prevention of suicide by jumping. *The Cochrane Database of Systematic Reviews* **2(2)**: CD013543. doi: 10.1002/14651858.CD013543.

Okolie C, Dennis M, Thomas ES, John A (2017). A systematic review of interventions to prevent suicidal behaviors and reduce suicidal ideation in older people. *International Psychogeriatrics* **29(11)**: 1801-1824. doi: 10.1017/S1041610217001430

Ougrin D, Tranah T, Stahl D, Moran P, Asarnow JR (2015). Therapeutic interventions for suicide attempts and self-harm in adolescents: systematic review and meta-analysis. *Journal of the American Academy of Child and Adolescent Psychiatry* **54(2)**: 97-107.e2. doi: 10.1016/j.jaac.2014.10.009.

Oyama H, Sakashita T, Ono Y, Goto M, Fujita M, Koida J (2008). Effect of community-based intervention using depression screening on elderly suicide risk: a meta-analysis of the evidence from Japan. *Community Mental Health Journal* **44(5)**: 311-320. doi: 10.1007/s10597-008-9132-0.

Padmanathan P, Hall K, Moran P, Jones HE, Gunnell D, Carlisle V, Lingford-Hughes A, Hickman M (2020). Prevention of suicide and reduction of self-harm among people with substance use disorder: A systematic review and meta-analysis of randomised controlled trials. *Comprehensive Psychiatry* **96**: 152135. doi: 10.1016/j.comppsych.2019.152135.

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hrobjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuiness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D **(2021).** The PRISMA 2020 statement: an updated guideline for reporting systematic reviews**.** *BMJ* **372**: n71. doi: 10.1136/bmj.n71.

Pirkis J, Spittal MJ, Cox G, Robinson J, Cheung YTD, Studdert D (2013). The effectiveness of structural interventions at suicide hotspots: a meta-analysis*. International Journal of Epidemiology* **42(2)**: 541-548. doi: 10.1093/ije/dyt021.

Pirkis J, Too LS, Spittal MJ, Krysinska K, Robinson J, Cheung YTD (2015). Interventions to reduce suicides at suicide hotspots: a systematic review and meta-analysis. *Lancet Psychiatry* **2(11)**: 994-1001. doi: 10.1016/S2215-0366(15)00266-7.

Pirkis, J., A. Rossetto, A. Nicholas, M. Ftanou, J. Robinson and N. Reavley (2019). Suicide prevention media campaigns: a systematic literature review. *Health Communication* **34(4)**: 402-414. doi: 10.1080/10410236.2017.1405484.

Pistone I, Beckman U, Eriksson E, Lagerlöf H, Sager M (2019). The effects of educational interventions on suicide: a systematic review and meta-analysis. *International Journal of Social Psychiatry* **65(5)**: 399-412. doi: 10.1177/0020764019852655.

Platt S, Niederkrotenthaler T (2020). Suicide prevention programs: evidence base and best practice. *Crisis* **41(S1)**: S99-S124. doi: 10.1027/0227-5910/a000671.

Randall JR, Colman I, Rowe BH (2011). A systematic review of psychometric assessment of self-harm risk in the emergency department. *Journal of Affective Disorders* **134 (1-3)**: 348-355. doi: 10.1016/j.jad.2011.05.032.

Reifels L, Mishara BL, Dargis L, Vijayakumar L, Phillips MR, Pirkis J (2019). Outcomes of community-based suicide prevention approaches that involve reducing access to pesticides: a systematic literature review. *Suicide & Life-threatening Behavior* **49(4)**: 1019-1031. doi: 10.1111/sltb.12503.

Riblet NBV, Shiner B, Young-Xu Y, Watts BV (2017). Strategies to prevent death by suicide: meta-analysis of randomised controlled trials. *British Journal of Psychiatry* **210(6)**: 396–402. doi: 10.1192/bjp.bp.116.187799

Robinson J, Bailey E, Witt K, Stefanac N, Milner A, Currier D, Pirkis J, Condron P, Hetrick S (2018). What works in youth suicide prevention? A systematic review and meta-analysis. *EClinicalMedicine* **4-5**: 52-91. doi: 10.1016/j.eclinm.2018.10.004.

Sandilands EA, Bateman DN (2008). Co-proxamol withdrawal has reduced suicide from drugs in Scotland. *British Journal of Clinical Pharmacology* **66(2)**: 290-293. doi: 10.1111/j.1365-2125.2008.03206.x

Schmeckenbecher J, Rattner K, Cramer RJ, Plener PL, Baran A, Kapusta ND (2022). Effectiveness of distance-based suicide interventions: multi-level meta-analysis and systematic review. *BJPsych Open* **8(4)**: e140. doi: 10.1192/bjo.2022.526.

Scott A, Guo B (2012). *For which strategies of suicide prevention is there evidence of effectiveness?* World Health Organization: Geneva. Retrieved (4 November 2024) from https://iris.who.int/handle/10665/36452

Scudder A, Rosin R, Baltich Nelson B, Boudreaux ED, Larkin C. (2022). Suicide screening tools for paediatric emergency department patients: a systematic review. *Frontiers in Psychiatry* **13**: 916731. doi: 10.3389/fpsyt.2022.916731.

Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, Moher D, Tugwell P, Welch V, Kristjansson E, Henry DA (2017). AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ **358**: j4008.

doi: 10.1136/bmj.j4008.

Shi X, Wallach JD (2022). Umbrella reviews: a useful study design in need of standardisation. *BMJ* 378: o1740. doi: 10.1136/bmj.o1740.

Skopp NA, Smolenski DJ, Bush NE, Beech EH, Workman DE, Edwards-Stewart A, Belsher BE (2023). Caring contacts for suicide prevention: A systematic review and meta-analysis. *Psychological Services 20***(1)**: 74–83. doi: 10.1037/ser0000645.

Smith KA, Cipriani A (2017). Lithium and suicide in mood disorders: updated meta-review of the scientific literature. *Bipolar Disorders* **19(7)**: 575-586. doi: 10.1111/bdi.12543.

Sobanski T, Josfeld S, Peikert G, Wagner G (2021). Psychotherapeutic interventions for the prevention of suicide re-attempts: a systematic review. *Psychological Medicine* **51(15)**:2525-2540. doi: 10.1017/S0033291721003081.

Sonneck G, Etzersdorfer E, Nagel-Kuess S. (1994). Imitative suicide on the Viennese subway. *Social Science & Medicine 38***(3):** 453–457. doi: 10.1016/0277-9536(94)90447-2.

Stanley B, Brown GK (2012) Safety planning intervention: a brief intervention to mitigate suicide risk. *Cognitive and Behavioral Practice* **19(2)**: 256-264.

Stewart I, Lees-Deutsch L (2022). Risk assessment of self-injurious behavior and suicide presentation in the emergency department: an integrative review. *Journal of Emergency Nursing* **48(1)**: 57-73. doi: 10.1016/j.jen.2021.10.002.

Szumilas M, Kutcher S (2011). Post-suicide intervention programs: a systematic review. *Canadian Journal of Public Health* **102(1)**: 18-29. doi: 10.1007/BF03404872.

Tarrier N, Taylor K, Gooding P (2008). Cognitive-behavioral interventions to reduce suicide behavior: a systematic review and meta-analysis. *Behavior Modification* **32(1)**: 77-108. doi: 10.1177/0145445507304728.

Torok M, Calear A, Shand F, Christensen H (2017). A systematic review of mass media campaigns for suicide prevention: understanding their efficacy and the mechanisms needed for successful behavioral and literacy change. *Suicide & Life-threatening Behavior* **47(6)**: 672-687. doi: 10.1111/sltb.12324.

Torok M, Han J, Baker S, Werner-Seidler A, Wong I, Larsen ME, Christensen H (2020). Suicide prevention using self-guided digital interventions: a systematic review and meta-analysis of randomised controlled trials." *Lancet Digital Health* **2(1)**: e25-e36. doi: 10.1016/S2589-7500(19)30199-2

United Nations (1996) *Prevention of suicide: guidelines for the formulation and implementation of national strategies*. United Nations: New York (NY).

van der Feltz-Cornelis CM, Sarchiapone M, Postuvan V, Volker D, Roskar S, Grum AT, Carli V, McDaid D, O'Connor R, Maxwell M, Ibelshäuser A, Van Audenhove C, Scheerder G, Sisask M, Gusmão R, Hegerl U (2011). Best practice elements of multilevel suicide prevention strategies: a review of systematic reviews. *Crisis* **32(6)**: 319-333. doi: 10.1027/0227-5910/a000109.

Wasserman D, Hoven CW, Wasserman C, Wall M, Eisenberg R, Hadlaczky G, Kelleher I, Sarchiapone M, Apter A, Balazs J, Bobes J, Brunner R, Corcoran P, Cosman D, Guillemin F, Haring C, Iosue M, Kaess M, Kahn J-P, Keeley H, Musa GJ, Nemes B, Postuvan V, Saiz P, Reiter-Theil S, Varnik A, Varnik P, Carli V (2015). School-based suicide prevention programmes: the SEYLE cluster-randomised, controlled trial. *Lancet* **385**: 1536–44. doi.org/10.1016/S0140-6736(14)61213-7.

Wilkinson ST, Trujillo Diaz D, Rupp ZW, Kidambi A, Ramirez KL, Flores JM, Avila-Quintero VJ, Rhee TG, Olfson M, Bloch MH (2022). Pharmacological and somatic treatment effects on suicide in adults: a systematic review and meta-analysis. *Depression and Anxiety* **39(2)**: 100-112. doi: 10.1002/da.23222.

Witt K, Milner A, Allisey A, Davenport L, LaMontagne AD (2017a). 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. doi: 10.1002/ajim.22676.

Witt K, Spittal MJ, Carter G, Pirkis J, Hetrick S, Currier D, Robinson J, Milner J (2017b). Effectiveness of online and mobile telephone applications ('apps') for the self-management of suicidal ideation and self-harm: a systematic review and meta-analysis. *BMC Psychiatry* **17**:297. doi: 10.1186/s12888-017-1458-0.

Witt K, Chitty KM, Wardhani R, Varnik A, de Leo D, Kolves K (2021a). Effect of alcohol interventions on suicidal ideation and behaviour: a systematic review and meta-analysis. *Drug & Alcohol Dependence* **226(5)**: 108885. doi: 10.1016/j.drugalcdep.2021.108885

Witt KG, Hetrick SE, Rajaram, G Hazell P, Taylor Salisbury TL, Townsend E, Hawton K (2021b). Pharmacological interventions for self-harm in adults. *Cochrane Database of Systematic Reviews* **1(1)**: CD013669. doi: 10.1002/14651858.CD013669.pub2.

Witt KG, Hetrick SE, Rajaram G, Hazell P, Taylor Salisbury TL, Townsend E, Hawton K (2021c). Psychosocial interventions for self-harm in adults. *Cochrane Database of Systematic Reviews* **4(4)**: CD013668. doi: 10.1002/14651858.CD013668.pub2.

Witt KG, Hetrick SE, Rajaram G, Hazell P, Taylor Salisbury TL, Townsend E, Hawton K (2021d). Interventions for self-harm in children and adolescents. *Cochrane Database of Systematic Reviews* **3(3)**: CD013667. doi: 10.1002/14651858.CD013667.pub2.

World Health Organization (WHO) (2014). *Preventing suicide. A global imperative*. World Health Organization: Geneva. Available at https://www.who.int/publications/i/item/9789241564779

Yiu HW, Rowe S, Wood L (2021). A systematic review and meta-analysis of psychosocial interventions aiming to reduce risks of suicide and self-harm in psychiatric inpatients. *Psychiatry Research* **305**: 114175. doi: 10.1016/j.psychres.2021.114175.

Zalsman G, Hawton K, Wasserman D, van Heeringen K, Arensman E, Sarchiapone M, Carli V, Höschl C, Barzilay R, Balazs J, Purebi G, Kahn JP, Saiz PA, Lipsicas CB, Bobes J, Cozman D, Hererl U, Zohar J (2016). Suicide prevention strategies revisited: 10-year systematic review. *Lancet Psychiatry* **3(7)**: 646-659. doi: 10.1016/S2215-0366(16)30030-X.

Appendix

Table A1. Characteristics of eligible moderate- and high-quality systematic reviews and meta-analyses on the prevention of suicide

First author (date)	Study design and databases searched	N included studies	Population	Outcomes	Interventions	Controls/ Comparators	Results (effect size) Quality assessment
Altavini (2022)	Systematic review Databases: PubMed, EMBASE, PsycINFO, Scopus, Cochrane Library. Date range: from inception to July 2021.	32	General population	Changes in the number of suicide deaths or suicide behaviours	Suicide primary prevention programs, policies and interventions. Four main types: awareness and education campaigns; gatekeeper training; improving media reporting of suicidal behaviour; and restricted access to means of suicide. Studies evaluated single intervention types or multi-component programmes (two or more intervention types).	None stated	A small reduction of suicide-related outcomes was detected. **Effect:** Means restriction was the one individual intervention that showed some evidence of efficacy in reducing suicide. **Quality**: Included studies were rated using AMSTAR-2 and he Risk of Bias In Systematic Review (ROBIS) tool.
Arshad (2020)	Systematic review & meta-analysis Databases: PsychoINFO, Web of Science, Medline. Date range: from inception to January 2019.	22	2016 Adults and Adolescents. 16/22 samples were adults, all had self-injurious thoughts and behaviours (STB); 2 included studies were of military veterans PTSD was a common diagnosis in these groups. One study participant were psychiatric adult inpatients. Mean age in adults 39,2; Adolescents mean age 15.7. Twenty-one studies from high income countries, USA, UK, China, Denmark, Australia, Sweden. Netherlands, Japan, Belgium & France. One study was from Sri Lanka.	Review the efficacy of web and mobile based interventions (CBT & DBT) in reducing STB and suicidal ideation in adults and young at risk of STB;	Mobile phone /Computer application. Therapeutic evaluative conditions (TEC) Game like intervention pairing self-harm related stimuli with aversive stimuli. Over 1 month. Text messages to mobile phone or smart phone over 4 weeks encouraging help seeking. Internet web site 8 modules drawing on CBT & DBT over 6 weeks. Face to face therapy supplemented with mobile phone CBT&DBT with skills training& safety planning interventions. Supportive text messages over 6 months Mobile phone: Psychoeducation, safety planning and self-help exercises; over 4 months. Mobile phone: series of components to help during suicidal crises including coping strategies (based on CBT) safety & crisis planning support in accessing social networks over 1 week.	8 studies did not describe a control. Controls in remainder include wait list; Waitlist /usual care; treatment as usual; Expressive writing / journaling; Access to web site providing information suicide; 6 week living programme focused on general health & wellbeing.	Self-injury behaviours not otherwise specified, 2 trials investigated effect of therapeutic intervention, with psychiatric outpatients, supportive text messaging was associated with a significant decline in the frequency of SB (from N=8, 27.6% to N=2, 6.9% p-.03) over 6 months. For young people with history of STB, SB declined 78.8% to 66.7% & for those who reported SB 68.2%. Non suicidal self-injury (4 trials) reduction in NSSI over 6 months (69% over 6 months, d=1.36, 95% CI: 1.12, 1.63), however, no controls groups means that the effect cannot be attributed to the interventions. Meta analysis suggested positive treatment effect on suicidal ideation k=8, g=-0.26 (95% CI: -0.48, -0.03) I^2. =35%. with TAU as comparator g=-0.26 (95% CI: -0.48, to -0.05) leading to significant effect on suicidal ideation when compared to treatment as usual, but not when trials with active controls were also considered. Meta analysis on outcomes at 3-6 months follow up (k=5) did not identify a beneficial effect on Suicidal ideation, g- -0.18 (95% CI: -0.49, 0.12, i^2 = 37%) **Quality**:Bias was assessed for the included studies noting high levels of bias for detection, small samples, and attrition. Heterogeneity ranged from low to moderate. Overall internet and mobile based interventions show promise, but further trials are warranted, focusing on behavioural outcomes.

					Text messages re: coping skills support and signposting posts and face to face & telephone intervention over 12 months. Suicide prevention application signposting & coping - no time frames stated. Mobile phone toolbox CBT & DBT; over 12 weeks. Mobile phone: suicide prevention skills: mindfulness and acceptance-based techniques & emergency signposting 3 modules over 6 weeks.		
Baldess-arini (2006)	Meta-analysis Databases searched: Medline and PubMed. Date range: from inception to 2005.	45	85229 person years of exposure no specific participant numbers or data given	Suicide and suicide attempts	Diagnosis was Major affective disorder or bipolar, or mixed with outcomes of suicide, and/or attempted suicide. Lithium was the intervention, exposure time was undefined, and a minimal value applied, although treatment typically continued for several years.	Non lithium. Before lithium (n=14) and discontinuation (n=5) 11% of all studies.	In the 31 studies suitable for meta-analysis involving a total of 85,229 person years risk exposure the overall risk of suicides and attempts was five times less lithium treated such a person in among those not treated with lithium (RR =4.91, 95% CI 3.82-6.31, p<0.0001). similar effects refined with completed versus attempted suicide as well as for completed versus attempted suicide for bipolar versus major mood disorder patients. **Quality**: the authors stated there was no indication of bias toward reporting positive findings, nor where outcomes significantly influenced by publication year or study size.
Barker (2017)	Systematic review. Databases: Scopus, Medline and ProQuest. Date range: January 1990 to April 2015.	9	General population.	Suicide attempts, rates and deaths	Structural (barriers, pits blue lights)interventions on rail systems & media reports.	N/A	Structural barriers reduced suicide. Suicide pits reduced the death rate for suicide attempts. Media guidelines may be helpful in preventing suicide. **Quality:** none reported
Bohanna (2012)	Systematic review Databases: Medline, Scopus, CINAHL Plus, PsycINFO. Also searching of WWW; article reference list and government and non-governmental organizational reports. Date range: not given.	11	General population. Studies were located in: USA, Austria (3), Australia(2), New Zealand, Switzerland	Rates of suicide.	Media coverage of suicide		Critical factors for a success that might have influenced the positive impact of guidelines on suicide prevention: media participation in development of guidelines Active dissemination strategy for guidelines Ongoing training for the media in the use of a need for guidelines. Ongoing monitoring of the application of media guidelines. **Quality not reported.**

Breet (2021)	Systematic review. Databases: PubMed, Medline, Cochrane library trials, CINAHL Plus, DARE, African wide information, IMSEAR; Korea med; Eurasia Health, SciELO; the Latin American social medicine database; Eastview information services; MedIndia.net; and African journals online. Date range: inception to August 2019.	43 interven-tions (35 studies)	24270 participants. (61% female, 38% male, 0.4% transgender, 1.0% non-binary). 24 interventions were conducted on high school campuses and 19 on university campuses. Studies conducted in North America (n=26); East Asia and the Pacific region(n=7), Europe and Central Asia (n=1), Latin America and the Caribbean (n=1). Most studies (n=33) were conducted in high income countries.	Non-fatal suicide behaviour (NFSB; "including suicidal ideation, plan, attempt or suicide")	**Signs of Suicide (SOS):** reduce suicide attempts (3 studies).	RCT (wait list control with follow up at 3 months.)	Significant reduction in suicide attempts in 2007 study (effect size small: d=0.26) and in 2016 study (effect size large: d=0.72).
					Suicide planning 2016 study	As above	Significant reduction in suicide plan: effect size large (d=1.05)
					Question, Persuade, Refer (QPR): reduce suicidal behaviour.	Cluster RCT (control group exposed to 6 educational posters in classroom)	No significant reduction in suicidal behaviour at 3 month follow-up. Effect size small (d= -0.26) No significant reduction in suicidal behaviour at 12 month follow-up. Effect size small (d= -0.20)
					ProfScreen: reduce suicide attempts	As above	No significant reduction in suicide attempt at 3 month follow-up. Effect size small (d= -0.14) Significant reduction in likelihood of suicide attempts at 12 month follow-up. Effect size large (d= -0.44)
					Youth Aware of Mental Health Programme (YAM): reduce suicide attempts.	As above	No significant reduction in suicide attempt at 3 month follow-up. Effect size: small (d= -0.14)
					Cognitive Therapy group programme (high risk group)	RCT Cognitive therapy control group with a 4- 8- 20- and 32-week follow-up.	Significant reduction in suicide attempts at 4 week follow-up (effect size small: d=0.32); at 8 weeks (effect size small: d= 0.23); at 20 weeks (effect size small: d= 0.18) and at 32 weeks (effect size small: d=0.14).
					Dialectical Behaviour Therapy group programme (high risk group)	RCT control same as Cognitive Therapy group.	Identical results to those reported for Cognitive Therapy group programme. **Quality:** Assessed by Cochrane risk of bias tool for RCTs and the ROBINS-I tool for assessing risk of bias in nonrandomised studies of interventions. Quality of most studies were compromised by lack of methodological rigour, small samples, and moderate to high risk of bias.

Briggs (2019)	Systematic review and meta-analysis. Databases: PubMed, Embase, PsychoINFO, Psycharticles, CINAHL, Cochrane Central Register of Controlled Trials. Date range: 1970-2017.	12 trials in 17 papers	939 participants; 9 studies adults, 3 on adolescents aged <18 years. All studies bar one, had most females, one study only recruited females. Female participants ratio to males was 4:1. Studies were conducted in outpatients and community settings, A&E, and patients' homes. Studies were in: the UK (6) USA (2) Europe (4) Australia (1).	Primary outcome was the occurrence of repeated self-harm, including assessment for both suicide attempts and self-injuries, with follow up at intervals up to 18 months post treatment. Secondary outcomes were depression, anxiety, psychosocial functioning, and hospital admissions.	The intervention was therapy that was psychoanalytic or psychodynamic in nature, of any duration, aimed at reducing or preventing repetitions of suicide attempts, self-harm and self-injury, and reducing suicidal intent, ideation and thoughts. All the interventions needed to apply psychoanalytic principles to improve awareness, emotion regulation, and relationships. and to effect change through the therapeutic relationship.	Treatment as usual (TAU) includes routine psychiatric care, enhanced usual care, placebo or any other comparison, including a different psychological therapy.	Psychoanalytic and psychodynamic therapies were effective in reducing the number of patients attempting suicide at 12 month follow-up (pooled OR = 0.469, 95%CI 0.274-0.804). There was no significant treatment effect for psychoanalytic psychotherapy on the number of suicide attempts (episodes) at 12-month follow-up (SMD = −0.235; 95% CI −0.502 to 0.033) There was evidence of significantly reduced repetition of self-harm at 6 months in the treatment group (OR = 0.27; 95% CI 0.109–0.668) but not at 12-month follow-up (OR = 0.581; 95% CI 0.236–1.426). There was no evidence of significant treatment effect on self-harm episodes (rather than the number of patients who repeated self-harm) at 12-month follow-up (SMD = −0.149; 95% CI 0.388–0.089). **Quality**: Overall, the majority of the 12 studies were judged to be at low risk of bias. Applying the GRADE system, quality of evidence rated as moderate overall.
Carter (2022)	Systematic review. Databases: Embase, PsycINFO, Medline. Date range: January 2000 to June 2021.	38	33 studies of adults, 5 studies of youths. Studies conducted in the UK (n=16), USA (n=13), Australia (n=4), Canada (n=2), and Austria, Pakistan and Slovenia (one study in each country). Majority (n=27) of interventions were in adult prisons, 5 in youth detention	Suicide and/or "related outcomes (including self-harm, suicidal ideation, and suicide attempts)"	Interventions comprised: different models of care in custodial settings, forensic hospital settings, and community-based forensic settings; group-based treatment programs in adult correctional settings; peer support programs; individual treatment /tailored programs; multi-component programs (including screening, crisis intervention and detention in forensic care); and changes in legislation or policy.	Treatment as usual	Two out of seven studies of models of care concluded that the model reduced self-harm; the other five studies reported conflicting or non-significant findings. Group-based treatment programmes: one high-quality RCT reported a reduction in self-injurious behaviours. Peer support programmes: results from two studies unreliable due to low base frequencies of the main outcomes (one study) and absence of control group (second study). Multi-component programmes: one study reported a reduction in prison suicide numbers between 2005 and

			settings, 3 in forensic hospitals, 3 in other settings.				2015 following the implementation of a prison-wide suicide prevention plan 2004. Methodological limitations included lack of control group, observational design and low base frequencies of suicide. Changes in legislation/policy: one study aimed to identify factors associated with a sustained reduction in suicide rate in a London prison from 2008-2011 following implementation of the National Suicide Prevention Strategy (1991–2008) in male prisons, and a Local Suicide Prevention Strategy (multi-agency and cultural change) in 2009. Neither the national strategy nor the local plan was described in detail; the contribution of the individual components to suicide reductions are unclear. **Quality**: The Joanna Briggs Institute (JBI) Critical Appraisal Tools were used to assess the methodological quality of included studies. Two-thirds of studies (n=26) were assessed as medium quality, 11as high quality, and one as low quality. “Most had considerable methodological limitations and very few interventions had been rigorously evaluated; as such, drawing robust conclusions about the efficacy of interventions was difficult.” A seemingly protective effect of interventions reported by authors in 29 of the included studies suggests the possibility of publication bias.
Cervantes (2022)	Systematic review. Databases: PubMed, Medline, CINAHL, PsycINFO, Web of Science. Date range: inception to January 2020.	11	Total 15,003; selective (Psychiatric only) 4666. universal (psychiatric + non psychiatric Age Range 8-24 years. Mean age 16 years. 6/9 studies reported race ethnicity, samples primarily white, i.e., > 50%, 3 studies had primarily black samples. Representation across other races	Identify those young people at risk for suicide in the emergency department.	Screening all on arrival to ED. Universal suicide risk screening for youth in the emergency department, all presenting patients were screened for suicidal behaviour / thoughts. Screening instruments used: Ask suicide screening questions (ASQ). Behavioural health screening-emergency department (BHS-ED) Colombia suicide screen (CSS); Risk of suicide questionnaire (RSQ).	none	Participation was variable with rates of 17% -86%. Positive screen rates were 4.1% - 50.8%. Positive screening rates were influenced by the presenting condition (psychiatric versus non psychiatric). Those presenting with a psychiatric concern reported ranged from 13.2% to 100%. The post-screen rate for use with non-psychiatric key complaints ranged from 3.1% to 46.3. The main ages to detect positive were between 13.9 and 15.1; Women accounted for between 63.8% and 79.2% of positive tests. Screening results showed that 83.3% of youths who screened positive in the study were on public assistance. Only three studies examined barriers to screening.

			and ethnicities was low. Males accounted for 28.2% - 49.7%, of the participants. Insurance type rarely reported. Youth on public assistance represented the minority in 2/3 studies. Almost every study had more girls than boys (n= 37) in its sample ranging from 39% female to 73% female, and, and, and most studies had a majority of white participants, 10 studies had samples with predominantly black African-American participants. 38 studies were located in the USA three in Canada, one each in the United Kingdom and Australia.		Suicidal ideation questionnaire (SIQ). Suicidal ideation / suicide attempt (SI/SA).		**Quality** Strobe (strengthening the reporting of observational studies in Epidemiology) was used in reporting quality, this ranged from 51.9% to 87.1%; three studies were rated as well reported, that is ratings over 80. Most studies were cross-sectional. There was no bias assessment undertaken as most included studies were not interventional.
Clifford (2013)	Systematic review. Databases: Project Cork; NDARC Library catalogue; DRUG; Indigenous Australia; Indigenous Studies Bibliography: AIATSIS; ATSIHealth; APAIS-ATSIS; FAMILY-ATSIS; Campbell Library; Cochrane	9	Studies with Indigenous peoples: Native Americans: 5 Studies. 2 studies (n= 128, & 800) age 10-19 and 20-24 years Rural Alaska: all persons, experimental 29,000, control 21, 000.	Suicide and suicidality	Community based Multi modal intervention		Community based and culturally appropriate, interventions reduced suicidality and diminished risk factors. Culturally specific programmes delivered in a culturally competent way are promising. School-based training interventions significantly reduced suicidal ideation and suicide attempts in youths. Gatekeeper training showed no significant effect on suicide attempts or on gatekeeper skills.

	Library; PsycINFO; PsycEXTRA; Medline; Embase; CINAHL; Global Health. Subsequently, 13 websites and clearing houses related to Indigenous peoples of Australia, New Zealand, Canada and/or the USA. Date range: 1981-2012.		Native American: college students (n=90) Alaskan Indigenous youth (n=61) age range 12-17 years mean age 14 yrs, 30% male. Australian Aboriginal Community Members (3 Studies) (n=31; 48; 769). Age range 15-55 years plus Community informants First Nation Canadians healthcare providers, teachers, students &Elders (n=24).				These were multi-modal interventions and which interventions had best effect is unknown, conversely a multi -modal approach seems to have some effect. Quality: was measured by EPHPP quality assessment tool.
Cox (2013)	Systematic review. Database: Medline. Date range: from inception to April 2012.	19	General population	Suicides, suicide attempts.	14 interventions: Structural barriers, help seeking aided by: signs , telephone helplines, and interventions by others.	N/A	Physical barriers are effective. Barriers are most effective in reducing suicides. Help seeking may be linked to a reduction in suicide rates in all three studies. Telephone hot lines, gatekeeper training and suicide patrols (3 studies) may be associated with reduced suicide rates. Appropriate Media reporting may contribute to suicide reduction. **Quality :**none reported.
Crawford (2007)	Systematic review and meta-analysis Databases: Embase, (1969-Feb 2005), Medline (1966 to Feb 2005), PsycINFO (1967 to Feb 2005).	18	3918 persons who had harmed themselves in the period prior to entry to the trial. No other demographic data stated.	To examine whether additional psychosocial interventions following an episode of self-harm reduce the likelihood of subsequent suicide.	Therapy was DBT, CBT and Suicidality was measured by suicidal thoughts (4), Self-harm (6) Suicide attempts (6) Several studies used composite measures: thoughts & self-harm; (2), self-harm & attempts ()I ; suicidality, self-harm & attempts (4). Six of the papers used interviews with patients to assess suicidality treatment outcomes.	Returned to GP care. treatment as usual (9 studies) outpatient follow-up; standard care. Psychiatric clinician judges whether patient	Results of this meta-analysis do not provide evidence that additional psychosocial interventions following self-harm have a marked effect on the likelihood of subsequent suicide. 18 suicides occurred, among people offered active treatment, & 19 in those offered standard care. (Pooled root difference 0.0, 95% CI -.0.03to 0.03) No quality or heterogeneity stated by authors.

					Patient logs or daily diaries were also used. In nine studies patients rated alliance measures, there were 2 therapist alliance measures and 1 observer rated alliance measure used by the 12 papers. Primary care setting of CBT 2-4 sessions if in mild to moderate distress more sessions dependent on patient need; Care delivered by a mental health team or a care coordinator instead of a therapist. 4 papers described a model specific DBT to a psychodynamic informed control group. Therapy in the community up to one year. Outpatient problem orientated Counselling; Problem solving approach 5 sessions at home; DBT plus CBT: 18 therapy session tailored individually, psychotherapy, review of medication, psychosocial and behavioural therapies. Green cards 24h telephone access& right to request input admission. 5 x1hour session problem solving skills training. Community nurse visits, re: adherence and treatment. Hospital admission 1-4 days; short term home programme to improve family functioning. Self-help manual +2-5 therapist appts for CBT.	requires inpatient stay or outpatient care, routine outpatient care. All currently available treatment.	

					Homebased psychodynamic interpersonal therapy. 6 sessions group psychotherapy; 2 telephone calls in year after attempt; nurse led case management. CBT x 10 sessions. Most of the interventions involved a limited number of (2-50) sessions of individual psychotherapy.		
D'Anci (2019)	Systematic review. Databases: Medline Embase, PsycINFO, Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects, Cochrane Central Registry of Controlled Trials, clinicaltrials.gov. Date range: November 2011 to May 2018. Clintrials.gov to February 2019.	8 systematic reviews and 15 RCTs	Various populations	Suicide, suicide attempt	**Non-pharmacological**: CBT, eCBT, DBT, crisis response planning (CRP, eCRP), brief intervention, other. **Pharmacological**: lithium, other.	Various, including: TAU, other versions of intervention, placebo, other medications,	**Non-pharmacological interventions**: CBT reduced suicide attempts RR 0.47 (95% CI, 0.30-0.73; P=0.0009). Strength of evidence was moderate. CBT did not appear to reduce or prevent suicide. Strength of evidence was low. Internet Delivered CBT: modest benefit compared to non-directive controls, but not against TAU or face-to-face CBT. No differences were found between DBT and TAU or other psychotherapeutic interventions for suicide attempt or suicide. WHO Brief Intervention & Contact (WHO-BIC) reduced incidence of suicide compared to control condition (OR, 0.20, 95% CI 0.09-0.42; P<0.001). There was a difference in the number and proportion of suicide attempts that favoured CRP/eCRP versus TAU (hazard ratio, 0.24 [CI, 0.06 to 0.96]; P = 0.028) but no difference between E-CRP and standard CRP. There was no difference between other interventions and control conditions. **Pharmacological interventions**: Rates of suicide were significantly lower with lithium than with placebo (OR. 0.13, CI 95% 0.03 to 0.66 among

							patients with unipolar or bipolar mood disorders There were no differences between lithium and other active treatments. Two additional studies of pharmacologic treatments were identified but were not used to inform any recommendations because of concerns about very low certainty of the evidence, **Quality: risk-of-bias in RCTs rated via USPSTF quality criteria:** 4/12 poor; 6/12 fair and 2 Good. SRs were rated good. Heterogeneity not stated.
Del Matto (2020)	Systematic review. Databases: MEDLINE, PubMed, Index Medicus, Cochrane CENTRAL, clinicaltrials.gov. Date range: inception to July 2019.	44	18 prospective n= 153786 10 retrospective n= 61088 16 ecological n= 2062	Long term lithium use effect on suicide.	Lithium (18 prospective studies, 10 retrospective and 16 ecological). Long term lithium use.		Most observational studies reported a reduction in suicide in patients with mood disorders. All studies noted that long term (>2years) lithium gave more benefits than short term lithium in suicide risk. The evidence seems to attribute an intrinsic anti-suicidal property of lithium, independent of its proven efficacy as a mood stabiliser. **Quality:** authors discussed heterogeneity, dropout in long term studies and adherence. There is a paucity of RCTs on long term lithium intake.
Doupnik (2020)	Systematic review Databases: OVID Medline, Scopus, CINAHL, PsycINFO and EMBASE. Date range: Jan 2020-December 2019.	14	4270 Participants. Adults =3571, of whom 1273 were military personnel or veterans; 1 group were adults + adolescents= 226; and adolescents only =568. 12 studies were situated in the USA, in a mixture of Military EDs and Clinics (10) 5 urban hospitals with a psychiatric service; 2 specific Psychiatric ED and 1 Paediatric ED; In the UK it was 4 general hospitals	Subsequent suicide attempts; 2. linkage to follow-up care and: 3. depression symptoms at follow-up.	Brief contact interventions: telephone calls, post cards, and letters, brief contact was included in 6 of 14 studies. In 5 studies the brief contact also included handwritten notes plus telephone calls. The schedule and focus for the follow-up calls varied from 1 appointment reminder to calls at 1, 2, 4, & 8 weeks. One study used text messaging to provide brief caring contacts at 1 day, 1 week and 9 other times over 12 months. Care coordination was between the clinical team and the receiving team for follow-up care. O the 14 studies, 3 included care coordination, which entailed scheduling an outpatient mental	Usual care.	Suicide attempts and linkage to follow up care were measured using validated patient self- reports measures and medical record review. Depression symptoms were measured 2 to 3 months after the encounter using self-reported measures. Pooled effect estimates showed that brief suicide prevention interventions were associated with reduced subsequent suicide attempts (pooled odds ratio 0.69; (5% CI 0.53 -0.89) increased linkage to follow up (pooled odds ratio 3.04; 95% CI 1.79-5.17) but were not associated with reduced depression symptoms (hedges g+ 0.28[95% CI -0.02 to 0.59). Suicide prevention interventions delivered in a single in person encounter may be effective in reducing subsequent suicide attempts ensuring that patients engage and follow-up mental health care.

			and community based mental health teams; 1 urban hospital in Malaysia. Age range: adolescents 12-19 years, no age range stated for adults. No other data available.		health appointment, mobile crisis response teams appt or collaborating with family to reduce barriers. Attending Appts. Brief therapeutic interventions, of the 14 studies all but 1 provided a brief therapeutic intervention, Safety Planning Intervention was delivered in 5 studies. !0 studies delivered brief therapeutic interventions other than safety plans these used functional analysis, implementation of intentions, as well as motivational interviewing, and therapies with problem solving skills. These interventions also used techniques to increase the likelihood of outpatient mental health engagement. Many studies included a combination of interventions, 3 included brief therapeutic intervention plus brief contact; 3 others used Safety planning plus brief therapeutic intervention such as treatment engagement.		**Quality**: Studies were assessed for risk of bias using the Cochrane risk of bias tool. Small study effects including publication bias were assessed .
Ferguson (2022)	Systematic review. Databases: Cochrane Trials, Embase, EMCARE, Medline, PsycINFO, Web of Science Date range: January 2000 to May 2020.	26	20 studies were USA based, 3 in Europe, 1 each in India and Australia and one multi-country study. The majority of studies include adults (n=10) or veterans(n=1). The remaining studies included Clinicians or service providers (n=4) both veterans and significant other, (n=1) College students (n=1) & refugees(n=1) .	Primary outcomes: measures that focused on suicidality (ideation, behaviour and deaths), suicide related outcomes (depression and hopelessness), and treatment outcomes (hospitalizations' and treatment adherence). Secondary outcomes: acceptability , feasibility, usability and perceived	In 12 studies SPI was the sole intervention, the remaining 14 studies incorporated SPI with adjunct interventions: mindfulness cognitive therapy over 9 weeks; (n=2) psychotherapy (n=2) therapy and follow up letters (n=1) and additional contact and /or follow-up support In 2 studies. by telephone (n=4) face to face (n=1) or both (n=2) in 2 studies using a mobile /web-based application, this also included other suicide prevention tools and treatment as usual. Where reported studies varied in who completed the	Usual care; Information posters containing support service contact details. E-Care - enhanced care as usual; Treatment as usual with universal screening.	Suicidality: 10 quantitative studies: Suicidal ideation in 1 general adult app study, there was a significant decrease in ideation intensity and severity pre/post app use (p= .05) . Similar decreases were found in SPI plus general adult and veterans' studies. Suicide behaviour SPI plus studies showed significant decreases in suicide attempts among intervention participants compared to controls. Suicide deaths only 1 study explored SPI with refugees, it revealed a non-significant decrease in among the intervention group. Suicide related outcomes Four SPI plus studies found significant decreases in participant depression and /depressive symptoms pre/post intervention for general adults and veterans between group over time for refugees' overtime but not between groups for general adults.

			Sample sizes ranged from n=10 to n= 1640 in quantitative studies and n=8 to n=100 in qualitative studies. where reported there was an approximate even number of studies with male- (n=11; range 55-89% and female majority (n=12 studies; range 54% -83%). Participants means age ranged from 20 - 51 years where reported. No other demographic data was reported.	benefits / limitations of the SPI.	safety plan, participant self-administered (n=4) or with a clinician or significant other (n=21). Most intervention were experienced in person, (n=20) and 3 studies examined SPI in group delivery.		Hopelessness: 2 SPI Plus studies revealed significant decrease in hopelessness among general adults. Hospitalisations: Changes in hospitalisations rates varied across studies. At 12 month follow up significantly fewer days in the intervention groups. Treatment engagement explored in 6 studies. Increased in participant attendance at outpatient appts. especially for veterans, but not those in groups. In qualitative studies, staff perceptions of safety planning saw increased coping strategies and increased self-efficacy in veterans. SPI is a valuable indicated intervention for general adult and veteran populations experiencing suicide related distress, primarily in face-to-face clinical settings. Quantitative findings indicate associations between SPI and improvements in suicidal ideation and behaviour, deceases in depression and hopelessness along with reductions in hospitalisations and improvements in treatment attendance. Qualitative studies suggest the SPI is acceptable and feasible with areas for development. SPIs are adaptable to the clinical setting in its modality, digital or paper based, delivery and facilitation and multiplicity as standalone or combined interventions. **Quality :** Findings are limited by the heterogeneity of interventions and study designs, making the impact of the SPI difficult to determine and generalise.
Fox (2020)	Meta-nalysis of RCTS. Databases: Pubmed, PsychINFO, Google Scholar, Clinical Trials.gov.	591 RCT	290292 participants. All ages: <18 years and adults 8-65 years. mean age was 33.6 years	The effects of intervention on the occurrence, frequency, and severity of SITBs.	Psychiatric services, case management services, Cognitive Therapy/ Cognitive Behavioural Therapy (CT/CBT) , Dialectical Behaviour Therapy, (DBT) Eclectic psychotherapy (i.e. Interventions that used a broad range of therapeutic modalities) family-based therapy, HIV prevention, Interpersonal Psychotherapy, medication only, mindfulness/	1. no treatment /waitlist 2. placebo. 3. active treatment No further detail.	Most effect sizes (78.89%) were obtained from sample sizes were that were less than five hundred persons. Most effect sizes were from interventions targeting psychopathology (n=887) followed by medication only (n= 816). The overall effects on SITBs were small in binary analysis, there was 9 % reduction (95% CI 6%, 12 %) in the number of people reporting any SITBs in active groups compared to control groups. In continuous analyses, there was a small standardised mean difference (Hedges g= -0 .17; 95% CI -0.22, -0.12) The effect size reduction is not absolute. Reductions in SITBs

	Date range: 1970 to January 2018.				meditation, psychiatric medication combination treatment, (i.e., concurrent psychosocial and pharmacological treatment) parenting skills training, partial hospitalization, psychoanalysis/insight-based therapy, psychoeducation, safety planning / means restriction and suicide prevention programs.		across the course of the studies. They instead refer to the relative SITBS across active intervention groups compared to control intervention groups. Therefore the (9% reduction is a 9% reduction in the active group compared to the control group. It is not a 9% reduction across SITBs from the beginning of the study to the end of the study. No quality measure nor heterogeneity stated.
Gijzen (2022)	Meta-analysis. Databases: Medline, PsycINFO, Cochrane Central Register of Controlled Trials, EMBASE. Date range: January 1990 to February 2020.	11	23,230 participants Studies were in: schools: in the USA Australia, Taiwan , Israel ,Europe with students aged between 6-16 years. Female students accounted for 46-65.7%, No other demographic data was stated.	Suicidal ideation and suicidal behaviours (STBs). This included: suicide attempt; suicidal behaviour; self-harm; suicidal ideation; and suicide risk.	Eleven studies were included in the meta-analysis: Interventions were: Signs of suicide (SOS1) included in 3 studies. SOS1 targeting STBs delivered by teacher /video Mindfulness delivered by teacher. Distress prevention programme, experienced school counsellor or psychologist. Good Behaviour Game (GBG)+ mastery learning (ML) x 2 studies delivered by teachers. HeadStrong delivered by teacher. SOS1 delivered by teacher. SOS1 delivered by teacher. Programme of intensive interpersonal psychotherapy for depressed adolescents with suicidal risks (IPT-A) delivered by school counsellors. Question, Persuade, Refer. (QPR) delivered by trainer and ProfScreen delivered by Health Professional and: Youth Aware of Mental Health (YAM) delivered by teacher.	Non active Active Active non active Usual care non-Active Waitlist	This meta- analysis for prevention of STBs was associated with small effect sizes for suicidal ideation pooled Hedges' (g=0.15 , p=0.001) and suicidal behaviours (g=0.30, p,0.001) post-test. Multi -variate analysis with studies focused solely on STBs had a significantly lower effect for suicide attempts (Pooled Hedges g= 0.23, p<.001). At 2- 12 months follow up, the effects of school-based prevention were slightly higher f or suicidal ideation (g=0.30, p<0.001) Most studies did not include a longer term follow up.

					Good Behaviour Game (GBG)+ mastery learning (ML) x 2 studies delivered by teachers. Sources of Strength (SOS2) delivered by peers and adult supervisors.	usual care non-Active Waitlist	School based prevention of STBs show promising results within 3 months post intervention.
Gøtzsche (2017)	Systematic review and meta-analysis Databases: Cochrane Common Mental Disorders specialised Register, Cochrane Library Central register of Controlled Trial (CENTRAL) Cochrane database of Systematic reviews, MEDLINE, OVID EMBASE, PSYCINFO, PUBMED. Date range: to February 2017.	10	1241 Patients who had engaged in any type of suicide attempt in the 6 months prior to trial entry. Age range 15-66 years, mean age across eight trials 29.3 years, women accounted for more than 65% of all participants in 9/10 RCTs, 1 RCT was male soldiers with 12% women. All had attempted to die, by poisoning, overdose, laceration, or gunshot,	Suicide attempts	1. 10 sessions of CBT plus TAU specific to suicide attempt prevention. 2. Psychotherapy 5 sessions in first month 3. Crisis orientated task centred social work at home for 3 months with problem solving for relationships and emotional distress. 4. Four sessions of psychodynamic interpersonal therapy. 5 . Session 1 narrative interview, 2nd identified thoughts emotions and behaviour, the 3rd warning signs. Regular personalised letters for 24 months 6. 6 Sessions Culturally adapted Problem-solving therapy with CBT.	1.TAU: Patients contacted weekly to monthly and offered referrals to community mental health, addiction treatments and social services. 2.TAU involving an assessment by Clinical psychologist and follow up by a psychiatrist or psychologist. 3.TAU interview by	CBT compared to treatment as usual reduced the risk of a new suicide attempt; risk ratio: 0.47; 95% CI 0.30-0.73; p=0.0009 I^2= 57% If the trial with a large effect is excluded the results is RR=0.61 (0.46-0.80) and heterogeneity is nil percent. There were seven suicides reported. **The conclusion is that CBT reduces not only repeated self-harm but also repeated suicide attempts. They advise that it should be the preferred treatment for patients with severe depression**. **Quality:**Bias: Noted issue re blinding , which was a high risk of bias in included studies.. Heterogeneity was assessed.

					7.12 sessions CBT+TAU 8. 5 sessions CBT. 9. 4 Sessions CBT or 7 sessions Problem solving therapy 10. 10 CBT sessions.	psychiatrist, 54% referred to GP, 33% psychiatric referral and 13% unspecified referral. 4.TAU most were assessed by doctor and thereafter either became psychiatry outpatients or were referred to their GP. 5. TAU included a clinical interview. A structured suicide risk assessment sent to health professionalresponsible for patient's clinical care. 6. TAU: initial assessment by doctor. Local medical, psychiatric and primary care services provided standard routine care. 7. TAU including psychotherapy	

						, psychiatric medication, substance abuse treatment and / or support groups. 8. TAU 9.TAU involving treatment by the hospital acute care team 10. TAU involved a suicide attempt interview..	
Gould (2018)	Systematic review. Databases: PsychINFO, Medline, the Cochrane database, Prospero, The Campbell Collaboration. Grey literature, and govt site: NICE, National Offender Management Service, and Department of Health. Date range: January 2000 to February 2016.	8	Incarcerated Offenders; 4245, plus 232 sentenced only. 5 studies entirely males, the rest were both male and female with a 55/45 ratio on average. Age range 14-65 mean age 28.2 years. Location of studies, Prisons in Canada (n= 3 + 1 remand centre), UK (n=12) Austria (n= 28) Pretrial detention setting in Germany (n = 1) and Netherlands (n=1)	Effectiveness of suicide screening tools that have been implemented or validated in an adult prison population. **Secondary**: To expand the knowledge base on suicide prevention tools in prisons and contribute to the discussion on reducing prisoner suicide.	Screening Incarcerated Offenders: Appraisal of 8 screening tools to determine the screening tools that are most effective in identifying those at risk and reducing suicide and /or self-harm behaviour. Scales were: Suicide Risk Assessment scale (x2). Suicide Probability Scale. Depression, hopelessness, and suicide scale. Prison specific suicide screening tools: Dutch suicide screening(x2).	Screened vs not screened	Evidence suggests that the VISCI and Dutch Screening tools are most effective in identifying those at risk and reducing suicide and/or self-harm behaviours. Authors noted variance in methodological quality. Overall, there is very limited evidence to support screening on admission in prisons. **Quality:** The authors noted that the review was limited by the quality of available research papers and the methods employed in the review.

					Viennese instrument for suicidality in correctional institutions. Suicide and self-harm concerns about offenders in prison environment (SCOPE).		
Gunnell (2017)	Systematic review Databases searched: Medline PsycINFO, Embase. Date range: January 1960 to December 2016.	27	General populations in: 16 countries, five low income or middle-income countries: and in 11 high income Studies focused on samples either whole countries or districts within countries.	Reduction of self-poisoning with pesticides and suicide deaths by ingesting pesticides.	Means restriction by pesticides Interventions were national or small area bans, and sales or import restrictions on the availability of one or more pesticides.	N/A	National bans on highly hazardous pesticides which are commonly ingested in acts of self-poisoning seem to be effective in reducing pesticide specific and overall suicide rates, evidence is less consistent for sales restriction. **Quality**: Authors used a modified version of risk of bias for interrupted time series as per Cochrane Effective Practice and Organisation of Care. Included studies were as assessed as being high, low, or unclear risk, only 3 studies rated as unclear, the rest were a low risk of bias.
Harris (2022)	Meta-analysis. Databases: PubMed, PsycINFO, Google Scholar, Clinical Trials.gov Date range: from inception to December 2021.	112	Adolescents <18 years, mean age 13.56 Male to female 52.6%; Treatment duration: weeks Av. 12.76: White 69.04%, Black 18.41%, Asian 6.65%; Indigenous 10.35%, Other/multiple 10.94%. No other demographic data stated.	Primary outcome: to advance the knowledge of the efficacy of youth SITB interventions. Secondary outcomes: to achieve clarity of the conditions under which the best treatment outcomes may be achieved. Additionally, to shed light on opportunities for improvements in the way that SITB interventions are developed and implemented in child	Psychiatric services, case management services, Cognitive Therapy/ Cognitive Behavioural Therapy (CT/CBT), Dialectical Behaviour Therapy, (DBT) Eclectic psychotherapy (i.e. Interventions that used a broad range of therapeutic modalities) family-based therapy, HIV prevention, Interpersonal Psychotherapy, medication only, mindfulness/ meditation, psychiatric medication combination treatment, (i.e. concurrent psychosocial and pharmacological treatment) parenting skills training, partial hospitalization, psychoanalysis/insight-based therapy, psychoeducation, safety	Control groups were designated as either: 1. no treatment waitlist, 2. Placebo, or 3. Active treatment. No descriptions given.	The authors found that SITB treatment efficacy of youth continues to fall short of even the weak treatment effects detected in the broader literature. This may be because most interventions were not originally intended to target SITB but rather psychopathology. There may be too few studies of SITBs as an intended treatment target to detect meaningful treatment effects. The most common outcome was suicidal ideation, for binary outcomes RR=1,03 (95%CI 0.92, 1.14, p= 0.65) for continuous outcomes (g = - 0.03[-0.12,0.06] , p=0.53.) Heterogeneity across studies was high (i= 55.92%). Suicide attempts non-significant Suicide death non-significant treatment effect 0.77 (95% CI 0.47, 1.26, p=0.30). NSSI. Non-significant effect 1.18 95% CI 0.89, 1.57, p=0.30). Self-harm regardless of intent: Non-significant effect of 0.99(95% Ci 0.80, 1.212, p= 0.90). Continuous outcomes: non-significant treatment effect (g=0.12 _0.07, 0.32, p= 0.22) Hospitalizations: Non-significant effect of 1.11 (95%CI 0.89, 1.39, p=0.33),

				and adolescent populations	planning / means restriction and suicide prevention programs.		treatment effect of 1.21 (95% CIs [0.95, 1.55], p=0.13) For binary SITB outcomes: a non-significant treatment effect was detected RR=1.06 (95%CI 0.99, 1,14). Other combined SITBs: binary analyses yielded a non-significant treatment effect 1.16 (95% 0.99, 1.36, p= 0.49). The non-significant results were largely consistent across SITB outcomes, regardless of intervention type, treatment components, sample and study characteristics and publication year. **Quality:** Overall, heterogeneity was low and no significant publication biases were detected.
Harrod (2014)	Systematic review and meta-analysis. Databases: Specialised Registers of two Cochrane Groups, Cochrane Central Register of Controlled Trials, and nine other databases, trial registers, conference proceedings, and websites of national and international organizations. Date range: from inception to 2011.	8	7 studies had 866 participants, of whom 47 were faculty members (age range 27-66 years);. Participants were post-secondary students, (i.e., College, University, Academy, vocational, or any other post-secondary educational institution) without known mental illness previous suicide attempt to self-harm or suicidal ideation. Age range 18-77 years. More females than males but difference small. Students could be full time or part time in any year of study, and live either on or off campus. Students were generally in their third or fourth year of study. Studies were in: Australia (n-1) and all others were in the USA (n=7)	Primary outcomes: Completed suicide; and Suicide attempt, defined by the authors as self- injury with intent to die as opposed to non-suicidal self -injury. **Secondary outcomes:** Suicidal ideation, changes in knowledge and attitudes (that is knowledge of suicide or suicide prevention, suicide prevention self-efficacy/ self-expectation, and attitudes toward suicide), changes in behaviour including help seeking	Multi component programmes: **Classroom instruction**,. **Institutional policies**: to restrict access to poison cyanide Enabling help seeking and support those who attempt suicide. **Gate keeper training**	No intervention policy	The Authors found insufficient evidence to support the widespread of implementation of any programmes or policies for primary suicide prevention in post-secondary education settings. **Quality:** the authors noted that the quality of evidence was moderate for short term knowledge of suicide and suicide prevention. For suicide prevention self- efficacy, the quality of evidence was low. Quality of evidence was reduced because the results were not similar across studies and there were not enough data. Heterogeneity was assessed using CHI^2 test. To reduce reporting bias the authors searched for studies without language or publication restrictions. Given small numbers of studies, funnel plots were not used to assess bias.

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Hetrick (2016)	Systematic review, meta-analysis and meta-regression Databases: Medline Embase, PsychoINFO Date range: january 1996 to June 2016.	36	7354 adult (>18) Participants, 3638 in intervention group, and 3716 in control group. Age not reported in four studies; age and gender not reported in three studies. Gender not reported in one study. Age range across studies was 17- 66, average age 32.8 in those studies that reported age. Most participants are assumed to be female as only male % was reported Av 36.7%. Studies located in: UK 9; Ireland 3; NZ 3; USA 7; Australia 2; France 2; Denmark 3; Netherlands 2; Canada; Japan; Sri Lanka; Belgium; China; Finland; Germany; Malaysia; Norway; Taiwan.	Primary outcome was any repeat episode of self-harm. Secondary outcome was self-rated severity of suicidal ideation, depression and hopelessness measured on standardised scales. These secondary outcomes have been shown to be associated with self-harm and were considered important.	Problem solving Group x2. Problem orientated CBT 1; Brief problem counselling; Problem focused case management; Problem solving skills training Problem solving therapy; + cognitive mentoring Problem solving approach; CBTx6; behaviour therapy; Psychodynamic therapy. Complex intervention with Outreach Intervention: Brief problem solving at home; telephone intervention psych support and problem solving; compliance enhancement treatment; Psychotherapy; Other psychological: Psychotherapy; case management therapy. Psychosocial: emergency card, future appointment with specialist; Structured GP sessions; Monitoring at home; Teachable moment Brief intervention; Coping cards; hospital admission.	Treatment as usual (TAU), alternative controlled intervention, no treatment and waitlist control	Meta-analysis showed significant benefit for all psychological and psychosocial interventions combined (RR=0.84, 95% CI 0.74 to 0.96); number need to treat =33) however, this benefit was non-significant when restricted to a limited number of high-quality studies. Meta regression showed that the type of intervention did not modify the treatment effects. Consideration of a psychological or psychosocial intervention over treatment as usual is worthwhile. However, the specific type and nature of the that should be delivered is not yet clear. CBT or interventions with an interpersonal focus and targeted on the participants who self-harm may be the best candidates on the current evidence. **Quality:** Risk of bias was rated high . Heterogeneity ranged from 33 % - 57%.
Hoffberg (2020)	Systematic review. Databases: Medline, EMBASE, PsychINFO, Web of Science, CINAHL, Cochrane library and Google Scholar. Date range: January 1970 to May 2018.	33	Crisis line studies were in: USA (13) Canada (8) includes 1 Indigenous crisis service; UK (3); the Netherlands (2) &1 each in Australia, Israel, Belgium, Hong Kong, India, China, & Spain. There were five adults-only samples, which included three US	All health and use-related effectiveness outcomes both immediate proximal and longer-term distal, including suicide attempts and outcomes, client mood, satisfaction compliance, and service use, as well as responder responses	Crisis lines are concerned with upstream prevention efforts to prevent suicide. During the interactions with clients, responders address the crisis at hand with the aim of reducing crisis states, psychological distress, and risk of suicide. This may include facilitating evaluation of imminent risk by local first responders, or they may provide resources and strategies		Although the evidence was low, there is support. for these types of services. From uncontrolled studies, calls on immediate proximal outcome. measures (changes in distress over the course of the call) were positive effects and short-term. distal effects were positive uptake of resources. There was a significant dropout at follow-up, so distal effects are unreliable and have an increased level of bias due to attrition. The approaches to outcome measurements were varied in all included studies, including reviewing monitored calls. Significantly less evidence was available to review.

			veteran studies and four studies in which age was not stated. There were 331456 calls, predominately women 65/35 ratio with an age range of 11-65+ with a variety of calls, not all directly suicidal, but a crisis for the caller.	(e.g., referrals, intervention styles).	to facilitate treatment, referral, and engagement in care.		crisis chat, and no studies had been conducted. to evaluate text related services. There was. considerable variability in what outcomes were. measured and in the timing of the measurement. High losses to follow-up were also concerning, but that may well require cultural shift as anonymity has long been a value of such services. **Quality**: Risk of bias as stated by the authors: In this review, the risk of bias was high, and the level of evidence was rated at four (low) on the Oxford level of evidence. There were many. common sources of bias; specifically, selection bias was highly prevalent, and there was a risk of bias associated with confounding in study design. and /or analysis.
Hofstra (2020)	Systematic review and meta-analysis. Databases: PubMed, PsycINFO, the total database of the Cochrane library: Database of Abstracts of Reviews of Effect, Cochrane Central Register of Controlled Trials, Health Technology Assessment database, NHS economic evaluation databases. Search range: January 2011 to December 2017.	16	General population 252932 Participants	Suicide attempts and completed suicides	16 studies with a meta-analysis in 15 studies with 29071 participants, to determine effects and synergy in multi-level interventions	None stated	A significant effect was found for suicide. prevention interventions & uncompleted suicides (d= – 0.535, 95% CI -0.898; -0.171, p=.004) and on suicide attempts: (d= -0.449 95% CI –0. 618; –0.280, p<.001). Meta regression for a synergistic effect for multi-level interventions showed a significantly higher effect rate related to the number of levels of the intervention (p=.032). **Quality**: Quality of each study was determined by the risk of bias in both study and outcome.
Inagaki (2019)	Systematic review and meta-analysis. Databases: Medline, PsycINFO, CINAHL, Embase. Date range: from inception to January 2015.	28	9238 persons who presented to ED with a suicide attempt. No other demographic data specified.	Primary outcome: the effect of ED initiated active contact and follow-up intervention on the risk of a repeat suicide attempt within 6 months for patients admitted to an ED for suicidal injury. As a secondary outcome the effect at	Interventions included: intensive care + outreach: intensive follow-up with scheduled visits, Nurse home visits to patients who did not keep outpatient appointment, intensive and community intervention, assertive intervention with outreach consultations assertive and continuous case management , Support for up to 2wk , & 4-6sessions problem-solving therapy in wk4 followed	Intensive care+ outreach: TAU. care by hospital personnel +TAU. outpatients' appointment, TAU. routine clinical service. TAU; referral or a	Of the 28 selected trials, 14 were active contact and follow-up interventions. Two of these trials (n=984) reported results at 6 months, where there was a statistically significant effect of the intervention on prevention (pooled RR = 0.48, 95% CI:0.31 to 0.76). There were not sufficient trials of other interventions to perform meta-analysis. Some trials in the meta-analysis were judged (as per Cochrane Handbook for Systematic reviews of intervention (v 1.1.0)), as being at risk of bias. None of the 9 selected trials of psychotherapy interventions examined the effect on repeat suicide attempt at 6 months. There was only one trial of Pharma-logical therapy intervention, which did not

				12 months were also examined.	by 8 postcards; Brief intervention & contact: Both brief intervention & contact , 1 study plus 7 follow up telephone contacts; Letter or postcard: Post card sent. Telephone: telephone call at 4 & 8 months, Telephone call from psychiatrist at 1 month& 3month. Composite letter cards, telephone: Information leaflet 2 telephone calls in the first 2 wks., & series of 6 letter over 12months.	range of different treatment modalities. TAU: enhanced usual care. TAU and referrals to multi-disciplinary teams, crisis teams, and/ or recommendation for engagement with community alcohol & drug treatment centres. Brief intervention & Contact: TAU: the norms prevailing in respective ED depts. Brief interventional contact followed by TAU. Letter or postcard: TAU assessment & diagnosis by a psychiatrist, TAU: & assessment & referral to community based mental	report effects on a repeat suicide attempt at 6 months. The effects at 12 months noted that the risk of a repeat suicide attempt was reduced but not statistically significant (RR: 0.86; 95% CI: 0.73 to 1.02). The authors concluded that active contact and follow-up interventions are recommended for suicidal patients admitted to an ED to prevent repeat suicide attempts during the highest risk period of 6 months. **Quality** : Risk of bias in trial include in meta-analysis It is notable that not all psychometric measures had been validated or had associated reliability data.

						health services. TAU follow-up care was not coordinated. Telephone: TAU: assessment by psychiatrist & a social counsellor & referral to further general psychiatry. TAU: no telephone contact. Composite letter / postcard/ telephone TAU: mental health liaison nursing team for specialist assessmen	
Isaac (2009)	Systematic review. Databases: Medline, PsycINFO, PubMed. Date range: from inception to 2008.	4	1,522 Participants: Training: 342 school staff 36 intervention ability study subjects 176 knowledge and attitude studies 186 school counsellors 44 Australian Aboriginal community members 65 Canadian adolescence 71 youth workers 602 US Veteran affairs workers	Suicidal ideation suicide attempts and death by suicide	Gate keeper training Comprising: Using Living works, train the trainer models, Question Persuade and Respond and Yellow Ribbon International For Suicide Prevention. Training time from a few hours to 5 days average 2 days.		All reported: Increase in knowledge, intention to help and confidence in giving help, and self-efficacy. For physicians gatekeeper training may help to reduce suicide deaths. **Quality:** was reported using CEBM.

			Physicians & military (US airforce)				
Ishimo (2021)	Systematic review. Databases: Medline, PsycINFO, Embase. Date range: January 1990 to February 2020.	100	Populations in 33 high income OECD countries	Suicide rates	Multi-component programmes, comprising: means restriction, using physical barriers; legislation and regulation; media reporting; and access to healthcare.		Physical barriers, legislation and regulations are effective in reducing suicides. There is limited evidence concerning impact of media reporting and multi-component programmes in national strategies. **Quality:** EPHHQ quality assessment tool used to determine quality.
Itzhaky (2022)	Systematic review and meta-analysis. Databases: PubMed, Scopus, Embase, PsycINFO, Cochrane library database for clinical trials. Date range: January 1995 to December 2020.	30	15016 adolescent participants age range 10-18 years in 25 RCTs with SI as outcome; 25 RCTs With SHB 14, 988 persons demographic information was available in 28/29 trials, average % females =63.5%, race was noted in 21 trials (all US) with on average, 42.5% White; 19% Black & 10% Hispanic. No other demographic data available.	Outcomes: measures corresponding to SHB and SI. SHB included: 1. suicide attempts, defined as self-harm with suicidal intent irrespective of lethality and 2. Deliberate self-harm with unknown intent.	CBT was most frequent intervention (n=8), 3 rcts used it solely, others combined it with therapeutic assessment, (n=1) therapy+DBT (n=2) or DBT+Psychodynamic techniques(n=1). Supportive (n=5) & educational n=3). Assessment & Screening was part of the intervention in 6 studies, including most of the studies in schools (5 out of 8). Single intervention type was DBT(n=2) Systemic (n=2) motivational interviewing (n=2) attachment based (n-2) interpersonal Therapy (n=1) Mindfulness (n=1) or safety Planning n=1). Motivational interviewing was used with Assessment screening (n=1). Weekly over 3 months; Motivational interviews 2-5 session then contact weekly 1&2 weeks; family therapy 6-8 session over 6mths; CBT only - 6 session up to 3 months; School 1 class period for 3mths; Family therapy 12 sessions over 12 weeks; mentors 4-6 per mth for 6 mths; MST & Family therapy 2-5 sessions then phone 1& 2 weeks; DBT& DBT-A weekly for 6 months.	Wait List, TAU +Psychoeducation and support; exposure to education posters; TAU +Supportive sessions with family or adolescents or teachers. Assessment as usual; Single call intervention. Email contact. enhanced TAU; community resources; In clinic session& weekly visits. Supportive relationship treatment. TAU + exclusion from group therapy.	There were 30 RCTs: four measuring SA, and 7 assessing SI demonstrated treatment effectiveness. Overall Interventions decreased SI (n=25) with low effect size(d=0.08, p=0.01), non d significant after controlling for publication bias (d=0.05, p=0.1); interventions were non-significant for SHB (n=25 d=0.001, p=0.97) or SA (n=18, d=0.03,p=0.52) Number needed to prevent on SHB 45[26156];for SA, NNT= 42[24,149] to treat. Non superiority may relate to effectiveness of control treatments. Experimental and control were compared to baseline: both reduced SI($p<0.0001$), and effectiveness improved for SHB(NNT=12) and SA (NNT =11). Psychosocial interventions for suicide risk in adolescents showed little effectiveness compared to control treatments; suicide outcomes improved in both groups compared to baseline. **Quality**: Risk of bias was assessed using the NIH quality assessment of Controlled Intervention Studies tool. Publication bias was Self harm behavior p= 0.06) suicidal ideation p=0.02 and for suicide attempts p= 0.20 therefore no publication bias . Heterogeneity for SHB I^2 = 087% indicating a large heterogeneity , overall the smaller studies were the most heterogeneous.
Iyengar (2018)	Systematic review.	21	4723 Adolescents aged 12-17 years in 21 studies: 8 in USA,	Primary outcomes were to reduce self-harm and suicide	individual problem solving, mentalization, cognitive behaviour or skills deficits, these	Treatment as usual (TAU) no	The eighteen unique therapeutic interventions were identified among all studies, of which 5 studies found a significant effect for the primary outcomes self-harm

	Databases: Medline, PubMed, Embase, PsycINFO, Cochrane Central Trials Register. Date range: inception to October 2017.		2 in Canada, 3 in Australia 6 in UK, 2 Holland and 1 in Iran. No other demographic data stated. 82 % participants in 20 studies were female, 1 study was predominately male 85.1%.	attempts. Secondary outcomes to address the links between suicidal ideation and depressive symptoms in adolescent regarding self-harm.	included treatments such as CBT n=3, DBT-A n=1, and MBT=-A n=1. Other interventions were skills-based treatment, Developmental Group Psychology, Emotion regulation training, therapeutic assessment, Emergency token, home based family intervention, family intervention for suicide, Family based crisis intervention, attachment-based therapy, Youth nominated support 1 week up to 11 weeks, Resourceful adolescent partner program. duration range 9 weeks to 36 months (av. 2.5 months). Frequency not commented upon. Two thirds of care commenced in ED.	description given. Routine care, no description given.	and suicide attempts (31.3%) and 5 studies found a significant effect for therapeutic intervention vs. treatment as usual. Collapsing across different variation of CBT and classifying DBT-A as a type of CBT, then CBT is the only intervention that replicated positive impact on reducing self-harm in adolescents. Many studies were not able to determine efficacy of therapeutic intervention for both primary & secondary outcomes, this review suggests that individual self-harm and systems driven approaches show promise for reducing overall self-harm and suicide attempts No discussion of quality assessment
Katz (2013)	Systematic review. Databases: Medline, Scopus. Date range: 1960 (Scopus)/1966 (Medline) to 2012.	16 school-based suicide prevention programs	Not stated	Suicide attempt; “suicidal behaviour”	Signs of Suicide (SOS): universal program that promotes the idea of suicide being directly related to mental illness, rather than a normal reaction to stress or emotional distress. The program includes suicide awareness, education, and screening strategies. Good Behavior Game (GBP): universal program for students in early elementary school. It is a classroom-based, teamwork, behavior management approach to help children develop self-regulation by rewarding teams that meet the behavior standards set by each teacher. Care, Assess, Respond, Empower (CARE) program: identifies high-risk youth through an in-depth, computer-assisted suicide	Classrooms where children are not exposed to experimental intervention	SOS: 2 RCTs, demonstrating significant reduction of self-reported suicide attempts at 3 months (study 1) and 12 months (study 2) follow-up. GBP: 1 RCT, demonstrating significant decrease in suicide attempts at follow-up. CARE: 4 RCTs (of which 3 also evaluated the Coping and Support Training (CAST) program. There was no significant impact of the program on suicide attempts. No further details on statistics in the review. Quality: Studies of SOS and GBP were graded B based on the Oxford Centre for Evidence-based Medicine level of evidence scale. Studies of CARE were graded D.

					assessment interview and a subsequent motivational counselling intervention.		
KoKoAung (2015)	Systematic review and meta-analysis. Databases: 15, including PubMed, CINAHL, Embase, ScienceDirect, PsyArticles, Cochrane Central Trials Register. Date range: inception to October-December 2012.	13 (RCTs=8; observational studies=5)	Persons aged 60+ years	Suicide; Suicide attempt	Treatments using any selective serotonin reuptake inhibitors (SSRI) medication.	Comparators included placebo or a different class of antidepressants including monoamine oxidase inhibitors or tricyclic antidepressants	In a meta-analysis of four RCTs comparing treatment with SSRIs and treatment with other antidepressants among older depressed people, there was no difference in the risk of suicide attempt. In a meta-analysis of two observational studies of 7-11 years of SSRI exposure, there was no difference in the risk of suicide. In a meta-analysis of three observational studies of 2-11 years of SSRI exposure, there was a significantly lower rate of attempted suicide among SSRI exposed elderly patients compared to the no treatment group. The calculated RR was 1.18 (95% CI 1.10-1.27). Quality: Critical appraisal was undertaken by two independent reviewers using the standard critical appraisal instrument from the Joanna Briggs Institute Meta-Analysis of Statistical Assessment and Review Instrument. The McMaster Quality Assessment Scale for Harms was used to analyse reporting quality on suicide related harm.
Kothgass-ner (2021)	Systematic review and meta-analysis. Databases: Medline, PubMed, Scopus, Google Scholar, Embase, Cochrane library database for clinical trials. Date range: inception to July 2020.	21	1673 Adolescents aged 12-19 years in 11 studies in USA, 2in Canada, 2 in Germany 2in UK. Rest Ireland, Spain Australia & Norway. No other demographic data stated. 85.7% of 20 studies were female, 1 study is presumed to be male only.	Primary outcomes: The effect of DBT-A on self-harm and suicidal ideation. Secondary outcomes borderline personality symptoms: BPD)	All were DBT-A; 0.36 months to 12 months. Frequency not specified	Mode activation therapy. TAU Enhanced care; historical controls; individual and support group therapy; Pre and post	DBT-A compared to control groups showed small to moderate effects for reducing self-harm (g= -0.44, 95% CI -0.81 to -0.07) suicidal ideation (g= -0.31, 95% CI -0.52 to -0.09) Pre post evaluations suggest large effects for all outcomes (self-harm g= -0.98, 95%CI -1.15 to -0.81; suicidal ideation: g= -1.16, 95%CI -1.51 to -0.80; BPD symptoms: g= -0.97, 95% CI -1.31 to -0.63). The results suggest that DBT-A appears to be a useful treatment in reducing both adolescent and self-harm and suicidal ideation. Only in pre and post evaluations did DBT-A appear to reduce BPD symptoms.

						studies had no controls.	The authors found no evidence for publication bias in the studies assessing self-harm, suicidal ideation or BPD symptoms included in the meta- analysis. There was high heterogeneity among studies the efficacy of DBT-A on self-harm. Finally, the meta-analysis is limited by the low number to effects available to be included in the review. .
LaFlamme (2022)	Systematic review of reviews (umbrella review). Databases: Medline, PsycINFO, Embase, Web of Science, CINAHL, Cochrane Library, SVEMED, Google Scholar. Date range: January 2000 to April 2020.	4	All Adults including those over 60 years, with depression. No numbers give. Studies located in the Netherlands, UK USA Canada Denmark, France Germany Israel and Europe (11 countries) South KOres. No other details stated.	Suicide, suicide attempts and serious self-harm & other	2009: Antidepressants including selective serotonin re-uptake inhibitors & other second-generation drugs for adults with depression: treatment time less than 8 weeks (range 24 weeks to 3 years). 2015 Selective serotonin re-uptake inhibitors, no other treatments or antidepressant treatment time span: 4 weeks to 11 years.	Placebo	2009 review found significant risk reduction for suicide attempts / self-harm. 2015 review found increased risk of suicide attempts with antidepressants versus no treatment, or ideation versus placebo. Authors stated that this review of reviews found the evidence to be inconclusive towards the use of antidepressants for the prevention of suicidal behaviour in older people. **Quality:** Measured using AMSTAR 2.
Leske (2020)	Systematic review. Databases: CINAHL, Embase, PubMed, PsycINFO, ProQuest dissertations and theses, Web of Science. Date range: from inception to April 2020.	24	Studies with Indigenous populations occurred in the USA (n=15), Australia (n=4), Canada (n=4) and New Zealand (n=1)	Suicide deaths, attempted suicide & suicide ideation.	Multi component programmes		Multilevel programmes may impact on suicide deaths and attempts. Psychoeducation may reduce suicidal ideation. There was insufficient evidence to confirm the effectiveness of any single suicide prevention intervention, due to shortage of studies, risk of bias, population and intervention heterogeneity. Review limitations included language bias, no grey literature search, and data availability issues. **Quality:** No included studies had a low risk of bias. Risk of bias was assessed, using the Cochrane risk of bias tool and the risk of bias assessment for nonrandomised studies.
McCabe (2018)	Systematic review. Databases: MEDLINE, CINAHL, EMBASE, the	4	3412 adult participant s; suicide attempters (3 studies) and adolescents with	Suicide attempt, Suicide	Four brief psychological interventions which address suicidal thoughts and plans: Brief Intervention and Contact (BIC); the Attempted Suicide Short	Any comparison or no comparator/	Suicide: The BIC trial was effective in reducing suicide over 18 months, with a 90% relative risk reduction in completed suicides (RR = 0.10, 95% CI 0.02 to 0.45, p = 0.0025).

	Cochrane Central Register of Controlled Trials, PsycINFO. Date range: from inception to April 2017.		suicide risk factors (1 study).		Intervention Program (ASSIP); teen options for change (TOC); and Safety Assessment and Follow-up Telephone Intervention (SAFTI).	usual care.	Attempted suicide: The Miller study (SAFTI) reported a relative risk reduction of 20% for the intervention phase (RR 0.80, 95% CI 0.63 to 1.02). Another study (ASSIP) reported a mean hazard ratio of 0.17 (95% CI 0.07–0.46), indicating that the ASSIP group had an 83% reduced risk of attempting suicide during the 24-month follow-up period compared to the control group (Wald $\chi 2$ 1 = 13.1, 95% CI 12.4–13.7, $p < 0.001$). **Quality**: Risk of bias was assessed using the Cochrane Risk of Bias Tool for Randomized Controlled Trials on six criteria. Study quality was also assessed using the Critical Appraisal Skills Programme (CASP) for randomised controlled trials checklist. Three studies were of high quality, while one study presented medium risk of bias. Studies were rated high in the CASP for RCTs checklist.
Meerwijk (2016)	Systematic review and meta-analysis Databases: Medline, PsycINFO from inception to December 2015.	44	Baseline numbers treatment 6658 intervention group and 6711 control; follow up 6658 participants. Participants located in: Canada 2, UK 5, USA 15, Australia 2, Iran 2, Denmark 3, Germany 1, Netherlands 1, Taiwan1, Pakistan 1; 6 Studies had adolescents, 3 had a mix of adults and adolescents, 22 studies only adults.	CBT, DBT, MBT are more effective in preventing suicide and suicide attempts during immediate treatment,	Direct interventions include Psychotherapy e.g. cognitive behavioural therapy (CBT) dialectical behavioural therapy (DBT)mentalization based treatment (MBT). Indirect intervention include active outreach, postcards, telephone calls, home visit, non-directive support, skills (e.g., problem solving, communication, adaptive coping) and case management.	Controls in most studies was treatment as usual (TAU) which included community treatment, general practitioner care or general psychiatric management. The descriptions of usual care in the included	The odds of suicide or attempted suicide by the end of treatment sessions were significantly lower for participants who received direct interventions than control group participants (OR 0.62 95% CI 0.45-0.87). The post treatment difference between direct and indirect interventions did not reach statistical significance at the 0.05 level (OR 0.62[95% CI 0.45-0.87} v 0.93[0.77-1.12}, p=0.06 with a large effect size (Cohen's d=0.77). At longer term follow up the difference was not significant (OR 0.65[0.46-0.91] v).82[0.70-o.96], p=0.25) but it represented a medium effect (Cohen's d=0.47). for indirect interventions only one indirect intervention active outreach showed a significant preventive effect (OR 0.75, 95% CI 0.57-0.99) in 4 studies.

			No other demographic data provided.			studies did not mention directly addressing suicidal thoughts or behaviours as part of TAU. Four control groups cognitive remediatin, supportive relationship therapy or medication)mean treatment duration was 11.3 months (SD 7.1)	**Quality:** Publication bias for Direct interventions significant at post treatment p=0.01), but not a longer tern follow up (p= 0.36) Heterogeneity noted in Direct v indirect intervention at end of study(i^2 =27.6%).
Miller (2009)	Systematic review. Databases: PsycINFO, ERIC. Date range: September 1967 to February 2008.	13 (of which 2 assessed suicide behaviour outcomes)	>350,000 students, grades K-12.	Suicide, suicide attempt	Study 1: Signs of Suicide. Study 2: multi-component district-wide suicide prevention and crisis management programme	Study 1: controls. Study 2: no controls.	Study 1: significant reduction in rate of suicide attempts. Study 2: significant reduction in rate of suicide and suicide attempts. No further details. No effect sizes. Quality: All studies assessed on 8 methodological indicators based on The Tak Force on Evidence-based Interventions in School Psychology Procedural and Coding Manual. Methodological limitations of both studies were identified.
Milner (2015)	Systematic review and meta-analysis	14	8485 participants: 4101 in the treatment group and 4384 in control	effectiveness of brief contact interventions in reducing self-harm,	Interventions were1. telephone contacts following presentation to an ED or other healthcare facility; 2. emergency crisis cards	Treatment as usual (TAU) no descriptions given.	Self-harm or suicide attempt v control gp: OR+ 0.8795% CI0.74to 1.04, P=0119. There was a moderate and non-significant amount of g heterogeneity between studies (I=19.9%, P-0.273. At 12 month follow up or less, pooled

	Databases: Medline, Embase, Cochrane Central Register of Controlled Trials. Date range: not specified.		group. Studies were conducted in UK, n=6; Australia, n=3; rest 1 study: Taiwan, France, Sweden New Zealand & Iran.no other demographic data stated.	suicide attempts and suicide.	or green cards;3. postcard or letter intervention. These interventions can be in isolation or in combination, with treatment as usual.	Routine care, no descriptions given.	OR 0.81, 95% CI 0.58-1.13, P=0.215. At 12month + OR 0.91, 95% CI 0.74-1.10, P=0321. Number of repetitions of self-harm or suicide attempt v control: Across 3 eligible studies there were 373 repeats (out of 3086 person years in the intervention group v 678 repeats out of 3214 person years) in control gp. There was 34 % reduction in number per person year. (IRR 0.66 95% CI 0.54-0.80 P<0.001 Deaths by suicide at follow up: out of 4106 people, 72 died by suicide, result suggest that odds of suicide were lower but not significantly for treatment gp v controls. (OR=0.58, 95% CI 0.24to 1.38, p= 0.216) **Quality:** Publication and small study bias effects were assessed via funnel plots p= 0.084. 3/12 studies had a high risk of randomization, allocation, masking and /or incomplete reporting. Remaining paper had a low risk of bias. Heterogeneity not discussed. .
Milner (2017)	Systematic review. Databases: Central Trials Register, Embase, PubMed, Global health, PsycINFO, ProQuest Scopus, EU clinical trials register, Australian and New Zealand clinical trials register. Date range: inception to April 2016.	13	General practitioners. Studies were conducted in a variety of countries Slovenia Sweden Japan Norway Iran Australia the UK the USA Hungary Germany.	Attempted suicide Death by suicide, self -harm, or suicidal ideation.	Multi component programme Comprising education, lectures, leaflets, practice guidelines, management of depression and suicide.		This review contained a white variation in study design is used to assess the effectiveness of GP training that's included an intervention that assess suicide. self-harm attempted suicide ideation. There was no evidence of effect for most. outcomes. Interventions produced equivocal. results, varied by study design and outcome. The authors conclude that they could not. recommend the rollout of GP suicide prevention. initiatives. **Quality:** Authors acknowledge reviews are likely to have a high level of BIAS. No formal quality review undertaken.
Nabi (2022)	Systematic review and meta-analysis. Databases: PubMed, PsycINFO, Embase, Clinicaltrial.gov, Cochrane schizophrenia	12	2578 participants were adults over 18 years with diagnosis of mood disorder.	Primary outcome of interest was suicide. Secondary outcomes for non-fatal suicidal behaviour	Effects of lithium on suicide and suicidal behaviour post search from 2000, 12 trials. Participants had a diagnosis of bipolar, and or major depressive disorder. 3 reviews had participants with prior Lithium use.	Placebo + Fluoxetine or Divalproex or Lamotrigine or Nortriptyline or Quetiapineor	There were no significant differences in any subgroup analysis. There was no difference in rates of all non-fatal suicide behaviours in seven trials that reported this outcome and in five trials that reported suicide attempts specifically. Authors concluded that evidence from randomised trials is inconclusive and does not support

	group trial register, Google Scholar. Date range: inception to March 2022.		NB: Unable to find further demographic information in supplementary files.		Duration of trial 20 weeks to 104 weeks.	optimised person treatment	the idea that lithium prevents suicide and suicide behaviours. **Quality:** Authors undertook risk of bias analysis.
Nelson (2017)	Systematic review. Databases: Medline, PsycINFO, SocINDEX, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews. Date range: January 2008 to September 2015.	37	Populations of veterans, military personnel, &nonveteran adults ages 18 years and older from the United States, United Kingdom, Canada, New Zealand, and Australia.	Reduced suicide, suicide attempts and other suicidal (non-fatal) behaviours.	Multicomponent program issues).Brief cognitive therapy interventions.	Treatment as usual and non deployed units	Population level interventions lowered suicide Rates. There was low evidence for suicide outcomes Very limited evidence on suicide attempts. **Quality:** Authors used the Cochrane handbook for SRs. USPSTF quality of prognosis studies on SRs. Low quality f evidence
Noh (2016)	Systematic review and meta- analysis. Databases: PubMed, Embase, Cochrane Central Register of Controlled Trials, PsycINFO, CINAHL. Date range: inception to May 2014.	5	Suicidal behaviour mental health and other outcomes. Suicidal behaviour included suicidal ideation suicide attempt deliberate self-harm and completed suicide.	2099 participants with previous suicide attempts or deliberate self-harm. Located in China Sweden France and UK. Participants mainly female mean age 27.8 years.	Studies of both mobile and landline telephone interventions were included, and studies using phones for calling or messaging were included. Three studies provide suicide attempters with telephone contact interventions, and two reviews provided deliberate self-harm patients with crisis cards to help after discharge. Post suicide attempt One or two telephone contacts four and eight months after a suicide attempt. 20 to 45 minutes each by a psychiatric nurse or a social worker. One telephone contact at one or three months after attempted suicide after discharge from an ED, call made by psychiatrists.	Telephone intervention versus no telephone intervention.	Effects of telephone contact intervention on suicide reattempts and completed suicide. meta-analysis found that telephone contact did. not significantly reduce the proportion of those repeating suicide attempts (RR 0.78, 95% CI 0.58-1.07) and suicide deaths (RR 0.70, 95% CI 0.12 to 4.16) at follow-up during the following year. Effects of the provision of crisis card on self-harm Recurrence. Two of the studies found no evidence. that the provision of a crisis card reduced self-harm recurrence (RR 0.72, 95% CI 0.24 to 2.17). **Quality:** Risk of bias was low in all included studies Detection bias was low, but one study by Wei et al. 2013., was deemed at high risk of reporting bias. The risk of attrition bias was low in all studies.

					12 calls in a three-month period weekly 20 to 40 minutes each by professors Green card which offers 24-hour crisis telephone consultation with a psychiatrist for up to 6 months after the index deliberate self-harm episode. Green card indicating that the doctor was always available to patients with deliberate self-harm.		
Nuij (2021)	Meta-analysis. Databases: Medline, Embase, PsycINFO, Web of Science, Scopus. Date range: from inception to December 2019.	6	3536 participants 2 studies with military personnel 1 with active soldiers, 1 veterans; Adults attending ED with suicide attempt All 3 USA based; 2 studies in Taiwan, I Switzerland; All adults having ideation and /or suicide attempt presenting at ED or case management services. No other demographic data stated.	Primary outcome: suicidal behaviour; Secondary outcome: suicidal ideation.	Crisis response Plan (CSP) (n=32) & E-CRP (n=33) single session, CRP (warning signs, coping strategies, social support crisis resources) & referral to Treatment; E-CRP (CRP plus reasons for living & referral to treatment, follow up @ 6 months; Control plus coping cards(N=250; crisis postcard(individual coping strategies , crisis resources) sent after 3 months, follow up @ 6 months;; TAU & Attempted suicide short intervention program(ASSIP)n=60, 3 sessions (interview, personal safety strategies, Crisis resource:, leaflet regular letters to participants for 24 months follow-up 24 months; ED safe & screening (n=502) Secondary suicide risk screening; self-administered safety plan) follow up calls ; follow up at 12 months; Care as usual (CAU) and SPI (n=1186) single session, follow up calls follow up at 6 months; TAU and crisis coping cards (n=34) 6 week coping card training session s follow-up at 3 months.	TAU. Contract for safety (n= 32); Case management for 3 months. TAU (n=60) enhanced care as usual care as considered necessary by clinicians in charge. single clinical interview. Screening only (n= 377) & TAU(n=497); secondary suicide risk screening& care as usual. CAU (n= 454) assessment secondary evaluation care as needed, outpatient	Suicidal behaviour**:** Of the 3536 participants, 348 engaged in suicidal behaviour during the follow up period (n=150 in the intervention conditions & n=198 in the control condition) . The incidence of suicidal behaviour ranged from 0-18.3% in intervention conditions 5.3- 26.7% in control conditions. Relative risk of suicidal behaviour for participants who received an SPTI was 0.57 compared to TAU (95% Ci 0.41-0.80, P = 0.001; I^2 =32.51%, 95%CI 0-71% ; NNT =16) indicating that the risk of suicidal behaviour was significantly reduced by 43% in the intervention condition . The forest plot indicted no outliers, as the effect sizes overlapped with the 95% CI of the pooled effect size. **Suicidal ideation:** the mean effect size of the three studies examining the effect of SPTIs on suicide ideation (combined N=283) was non-significant (g=0.69, 95% CI -0.04 -1.42, P=0.06; I^2=87.60%). **Quality:** Methodological quality was measured by the Cochrane collaboration risk of bias tool 2. This considers risk of bias across from the randomisation process, deviations from the intended intervention process, missing outcome data, measurement of outcome and selection of the reported results. The risk of bias for each domain was scored low, moderate or high. The overall bias risk considered high when -one of the domains were scored as high. The risk of bias assessment was performed independently by two authors.

						appointment at discharge. TAU (n=33) case management, (suicide crisis assessment, emotional support & referral).	
O'Connor (2013)	Systematic review. Databases: Medline, PsycINFO, Cochrane Central Register of Controlled Trials, CINAHL. Date range: 2002 to December 2012.	7	Adults, Adolescents, Older Adults, Trial 1 Adult and adolescents n=443, located in the UK. No other data stated. Two trials of older adults in primary care, no numbers given. Four trials for persons of increased risk of suicide: Primary care > 18 years, general population being reviewed, n= 1001; General primary care patients (n=626) Two trials adolescents (n= 799) High risk population. No other data are available.	reduction of suicide attempts in the immediate period after screening.	Trials in primary care, with reference to people with depression in the UK and USA, (3) trials in schools setting	Other health screening	Among primary care patients with positive screening result for depression screening for suicide risk (compared with other health screening) did not reduce suicidal ideation after two weeks; only one suicide was attempted in the trial. Data not reported separately for older adults. There was no increase in suicide attempts or ideation after screening . A short-term non-significant reduction in suicide attempts was observed (hazard ratio for time to suicide attempt 0.52; p= 0.20). Identified persons with depression, no other results. There is limited evidence that screening can reliably detect the risk of suicide in primary care populations.
O'Connor (2009)	Systematic review. Databases: Medline, the Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic	7 regulatory reviews (suicide); 5 meta-analyses (suicidal	General adult population; older adults; psychiatric patients	Suicide; Suicidal behaviours (including suicide attempts, preparatory acts, serious self-harm).	Antidepressant treatment, particularly selective serotonin reuptake inhibitors [SSRIs] and other second-generation drugs) for depression.	Other treatments for depression; placebo	Suicide: none of 7 meta-analyses supplied clear evidence that use of second-generation antidepressants (or SSRIs in particular) increased odds of completed suicide in adults of any age compared with placebo. However, power to detect these rare events was limited, given very few suicides.

	Reviews, Database of Abstracts of Reviews of Effects, PsycINFO. Date range: 1998 to 2007.	behaviours)					Suicidal behaviours: results from 5 meta-analyses showed no statistically significant differences in the odds of suicidal behaviours in adults who received treatment with antidepressants compared with placebo, with several exceptions. In one fair quality systematic review, odds of suicidal behaviours were increased in adults of all ages who were treated with SSRIs for any indication (odds ratio [OR], 2.70 [CI, 1.22 to 6.97]). In a review of regulatory data of placebo-controlled trials by the U.S. Food and Drug Administration, odds of suicidal behaviour were approximately doubled in adults younger than 25 years who received second generation antidepressants for all psychiatric disorders (OR, 2.31 [CI, 1.02 to 5.64]) (34). In contrast, the odds of suicidal behaviours were unchanged among middle-aged adults and were greatly reduced in older adults receiving second-generation antidepressants (OR, 0.06 [CI, 0.01 to 0.58]). The highest odds of nonfatal suicidal behaviour were reported in adults of all ages who received treatment for major depressive disorder with paroxetine compared with placebo (OR, 6.70 [CI, 1.1 to 149.4]). The increased risk is assumed to be primarily in young adults because most events (8 of 11) occurred in those aged 18 to 29 years. Quality: Articles were rated for quality by using design-specific criteria on the basis of the USPSTF methods. The National Institute for Health and Clinical Excellence criteria (for all study designs) and the Oxman criteria (for systematic reviews) supplemented these methods.
Okolie (2017)	Systematic review. Databases: Medline, Embase, PsycINFO, Web of Science, Cochrane Central Register of Controlled Trials. Date range: from inception to April 2016.	21	Older adults 60 years and over. Mean age 75.9 years. All participants n= 1,425, 812. Three included studies did not give participant numbers. Most study participants were female (65.2%). Five studies reported ethnicity of study participants majority being White (75.3%) Studies were in Japan (7), USA (6)	Suicide, Suicide attempts, Suicidal ideation, self-harm	Multi-faceted interventions directed at primary care physicians and populations especially at-risk elderly.		Effective interventions were multifaceted primary care based depression screening and management programmes. Treatment intervention (pharmacotherapy & psychotherapy); telephone counselling for vulnerable older adults, and community based programmes that include education , gatekeeper training , depression screening , group activities and treatment referral. **Quality**: Measured by Cochrane risk of Bias tool, found low risk.

			Italy and Israel (2), one each in Australia, Hong Kong, France and Germany				
Okolie (2020)	Systematic review and meta-analysis. Databases: Cochrane Library, Embase, PsycINFO, Medline, Web of Science (Science Citation Index, Social Science Citation Index), WHO International Clinical Trials Registry Platform, ClinicalTrials.gov. Date range: inception to May 2019.	11	General population	Reduction of suicides and attempted suicides	Certain sites have gained notoriety as 'hotspots' for suicide by jumping. Structural interventions (e.g., barriers and safety nets) have been installed at some of these sites. Meta -analysis on 9 studies.		Post interventions, there was an 86% reduction in jumping suicides per year at the sites (95% CI 79% to 91%). There was a 44% increase in jumping suicides. per year at nearby sites (95% CI 15% to 81%), but the net gain was a 28% reduction in all j umping suicides per year in the study cities (95% CI 13% to 40%). Individual studies examining the effectiveness of these interventions were underpowered. **Quality:** not reported
Ougrin (2015)	Systematic review and meta-analysis Databases: Cochrane, Medline, PsycINFO, EMBASE, PubMed. Date range: from inception to May 2014.	19	2176 Young people under 18 years of age. Age range was 10 -18 years. Studies were in the UK 6; USA 8; Australia 2; Holland 2 & Norway 1. No other data stated.	The efficacy of specific pharmacological social or psychological therapeutic interventions, in reducing both suicidal and non-suicidal self-harm in adolescents.	Trials included a wide variety of Tis covering both individual and group treatments: specific problem solving intervention to increase engagement, cognitive behavioural treatment targeting problem solving and affect management skills; home based family therapy delivered by social workers; developmental group psychotherapy, including problem solving &cognitive behavioural interventions, Dialectical behaviour therapy, & psychodynamic group psychotherapy, individual cognitive analytic therapy attachment based family therapy , therapeutic assessment for self-harm , emotional regulation group training , issuing tokens to enable readmission, youth	Hospitalizatio n; Supportive relationship treatment; Enhanced usual care;(not described)	The treatment interventions (TIs) were psychological and social, there were no pharmacological interventions. The proportion of adolescents who self-harmed over the follow-up periods was lower than the intervention groups (28%) than in controls (333%) (z=3.31; p= .02) TIs with the largest effect size were DBT, CBT, MBT. there were no independent replications of efficacy of any TI. The pooled risk difference between Tis and TAU for suicide attempts 7 non suicidal self-harm considered separately were not statistically significant. Publication Bias was assessed, in the meta – analysis, which suggest that there is no serious publication bias. there was little evidence of funnel plot asymmetry. Beggs' & Egger's tests were non-significant (p=.16 & p=.11 respectively). Very large heterogeneity was found by the authors regarding the pooled efficacy of therapeutic interventions v treatment as usual. This heterogeneity in conjunction with the absence of successful replications

					nominated support team family intervention for suicide prevention , CBT, DBT, Mentalization therapy , and multisystemic therapy.		underscores the need for more research about optimal form of Therapeutic interventions.
Oyama (2008)	Systematic review and meta-analysis. Databases: Medline, PsycINFO, CINAHL. Date range: 1966 to January 2007 (Medline), 1967 to December 2006 (PsycINFO), 1982 to January 2007 (CINAHL)	5	23995 participants of whom 19.8% were over 65 years, all resident of rural areas. There were no other demographic data stated. Participation rates ranged from 60-90%. Only one study noted the difference in male versus female numbers, the male group was marginally smaller. All studies were conducted in Japan.	Quantify the effect of community-based depression screening (CDS) on the risk of completed suicide among older adults.	All interventions were universal prevention programmes that consisted of screening for depression , follow-up and health education in the community setting. Screening was voluntary and comprised the completion of self -report questionnaires and assessment s by General practitioners and psychiatrists.		The general findings of the meta-analysis demonstrate that the implementation of universal prevention programmes involving community depression screening plus health education is associated with a reduced risk of completed suicide among older residents, that is, older than 65 years. Follow up by a psychiatrist demonstrated significant reductions in completed suicide for men. , similar reductions were found in women. GP follow up showed statistically significantly reductions in completed suicide in women, but not for men. **Quality:** The authors did not state that they assessed methodological quality. Visual appraisal of the funnel plots and the Begg's test showed no evidence of publication bias.
Padmana-than (2020)	Systematic review and meta-analysis. Databases: Cochrane Central Register of Controlled Trials, PsycINFO, PubMed, Embase, Web of Science. Date range: inception to January 2019.	6	486 persons, aged between 13 -65 years with Severe opioid use disorder, and / or alcohol use, and / or cannabis comorbidities :Major depressive disorder. Alcohol Misuse Borderline personality disorder. High emotional dysregulation. Studies were located in USA=3, the rest one each in : Australia, Iran and the UK.	Suicide, suicidal ideation, suicide attempts, or non-suicidal self-harm, (or a combination of the latter commonly referred to as self-harm).	Psychosocial interventions using the FRAMES" (Feedback, Responsibility, Advice, Menu, Empathic, Self-accuracy) to address suicide prevention in users of alcohol and/or drugs	Treatment as usual	Across all studies there was weak evidence of a Small positive effect of interventions on suicide and self-harm . (d= -0.20, 955 CI - -0.39-0.00). **Quality** was assessed by Cochrane risk of Bias 2 Tool. Authors noted studies were heterogeneous in terms of population, intervention, controls .There were some concerns regarding bias for all trials. All trials were liable to type II error.

Pirkis (2013)	Meta-analysis. Databases: Medline, PsycINFO, Scopus. Date range: inception to July 2012.	9	General population in several countries (no details reported)	Suicide (by jumping)	Six studies examined the effect of barriers installed on five separate bridges or viaducts. Two studies considered the effectiveness of fencing off road access to cliffs. The final study examined the effectiveness of installing a safety net below the top of a high terrace.	Period prior to installation of barrier/fencing/net (variable n years). Other 'jump sites' at same locations.	The overall effect of the introduction of the interventions was an 86% reduction in the number of jumping suicides per year (RR.0.14, 95% CI 0.09 to 0.21, P.0.001). At other jump sites in the same cities, there were 158 suicides over 57 study-years in the pre-intervention periods (mean, 2.8 deaths per year) and 150 deaths over 42 study-years in the postintervention periods (mean 3.6 deaths per year). The interventions were associated with a 44% increase in the number of jumping suicides per year at nearby sites (RR.1.44, 95% CI 1.15 to 1.81, P.0.002). Considering all jumping suicides — both those at the intervention sites and those at nearby site s— there were 354 suicides during 57 pre-intervention study years (mean 6.2 deaths per year) and 171 deaths during 42 post-intervention study-years (mean 4.1 deaths per year). The net overall effect of jump-site interventions on suicide by jumping was a reduction of 28% in the number of deaths per year (RR.0.72, 95% CI 0.60 to 0.87, P.0.001). **Quality**: there was some evidence of heterogeneity across studies (at intervention sites, MIRR [median incident rate ratio] =2.76; at other sites, MIRR=3.50; at all sites, MIRR=2.95)
Pirkis (2015)	Systematic review and meta-analysis. Databases: Medline, PsycINFO, Scopus. Date range: inception to April 2015	18	General population	reduction of suicides and suicide attempts.	Out of the 18 sites, 14 reported restricting access to means at "hotspots" predominately bridges and rail systems. 7 sites encouraged help seeking with 4sites noted increased likelihood of a third-party intervention.	N/A	Interventions that restricted access to means were associated with a reduction in the number of suicides per year (IRR 0.09, (%% CI 0.03-0.27; p<0.0001). Reduction in suicides were also associated with interventions that encourage help seeking(0.49, (5% CI 0.29-0.83; p=0.0086) and third-party intervention (0.53, 95% CI 0.31-0.89; p=0.0155). Assessing a particular intervention isolation , restricting access to means reduced the risk of suicide(0.07, 95% CI 0.02-0.19; p<0.001) , help seeking (0.39, 95% CI 0.19-080; p=0.0101). No studies assessed third party interventions as a lone intervention. The authors concluded that offered together reducing access to means and help seeking have the potential to complement each other, with strategies that actively encourage help seeking or increase the likelihood of intervention by a third party might further enable means restriction.
Pirkis (2019)	Systematic review. Databases: PsycINFO, Medline, Scopus, EBSCOHost.	20	General population	rates of suicide and death by suicide.	Media campaigns to raise awareness		Results were mixed. But are promising in that Media campaigns may aid reduction of the number of suicides. It appears that media campaigns may be more effective in improving beliefs and knowledge and influencing behaviours.

	Date range: inception to May 2017.						**Quality:** Not reported.
Pistone (2019)	Systematic review and meta-analysis. Databases: Scopus, PubMed. PsycINFO, ASSIA. Date range: inception to May 2017.	41	21, 223 Participants ranged from pupils in school, university students, Teachers in schools, Persons working in social services, Parents of high-risk children and adolescents, general public, Military, Volunteers, Family, school personnel, nurses in hospitals peer leaders(Pupils). Studies were located in USA n= 26; Australia n= 6, Israel n=2, Europe not specified n=2; the remaining countries all had I study: Canada, Denmark, The Netherlands, Sweden and Taiwan. No data on ethnicity or gender stated.	Effect of educational interventions in the prevention of suicidal behaviour. & suicide attempts.	Six studies evaluated the effect of school-based education on suicide attempts. School based education interventions included: SOS, CAST, ASIST; Surviving the teens; Mental Health First AID (MHFA); short in class curriculum-based discussions. Suicide attempts were measured by asking participants or the population that gatekeepers were supposed to help. Gatekeeper training showed no significant effect on suicide attempts or on gatekeeper skills.		Results showed a significant decrease in suicide attempts in the intervention group compared to the control group at 3-month follow-up: (OR=0.56, 95%CI_ 0.39-0.80, p=0.001). and at 12 month follow up: OR=0.60, 95% CI 0.38-0.95, p=0.03). These were multi-modal interventions and which interventions had best effect is unknown, conversely a multi -modal approach seems to have some effect. School-based training interventions significantly reduced suicidal ideation and suicide attempts in youths. The meta-analysis showed no increase in gatekeeper skills in the intervention group compared to the control group at 3-to-6-month follow-up (OR =0.97, 95% CI = {0.77, 1.22} p=0.80). There was no indication of heterogeneity between studies. There were a lack of studies evaluating skills at longer follow up as such the quality of evidence for the estimate for treated. Very low quality due to risk of bias, due to short term follow-up, and imprecision of data.

							Quality: Quality of evidence was measured using GRADE, it ranged from very low to moderate. Heterogeneity was measured. Authors note lack of comparative studies on similar interventions
Randall (2011)	Systematic review. Databases: Medline, EMBASE, PsycINFO, Scopus, Cochrane library, Web of Science. Date range: from inception to June 2010.	12	Adult and Adolescents No numbers of participants nor demographic data were supplied. Studies were in the UK and USA, 4 studies in each, and one study from each of the following: Canada, France, Ireland, and Switzerland.	Recurrence of self-harm or suicidal ideation.	Screening using: Tools to assess future self-harm risk: Beck hopelessness scale (BHS) , Beck suicide intent scale,(BSIS)), Beck scale for suicidal ideation,(BSS) Optimal thinking test,(OTT) Brief psychiatric rating scale(BPRS), Symptom checklist – 90 revised(SC), Manchester self-harm rule(MSHR), Violence and suicide assessment form(VASA), severity of psychiatric illness system(SPIS), Beck depression inventory(BDI), Beck anxiety scale,(BAI) High-risk construct sale(HRCS), Self-injury implicit association's test(IAT), and the Hamilton depression rating scale (HDRS).		Scales that are part of the Manchester self-harm project; the IAT programme; and the VASA scale were found to be significant predictors of self-harm. Prediction of future events was difficult to ascertain, as they examined all self-harm events, including incidents that were likely not suicidal in nature. There is therefore uncertainty about the effectiveness of these measures to discriminate between those at risk and those at risk for no suicidal self-harm events. The authors concluded that while the scales in this review had strong psychometric properties, there is little clinical evidence supporting their use. **Quality** Study quality was assessed using the 14 point QUADAS tool. the authors stated that the risk of bias was considered moderate to low in this review. It is not clear whether publication bias or selection bias within the reviewed studies affected the results.
Reifels (2019)	Systematic review. Databases: Embase, Scopus, PsycINFO, Cochrane Library, CINAHL, PubMed. Search range: inception to July 2017.	5	Five studies took place in communities defined by districts or villages with a heavy dependence on agriculture.	Reduced suicides and suicide attempts,	Means restriction to ingestible pesticides , either locked in store centrally or in village household.	Control villages	Central locked storage was effective. Suicides and attempted suicide combined decreased more by intervention than in control villages by a difference of 295 per 100, 000 person years for pesticide suicide (95% Ci 155, 435, p<.001) and 339/100,000 person - years for suicides by any method (95%CI 165, 513, p<.001) House storage was not effective in reducing, suicides nor suicide attempts.

Riblet (2017)	Meta-analysis. Databases: Embase, Medline. Date range: inception to December 2015.	78	3 RCTs (n=2028) on WHO brief intervention was delivered in middle to low-income countries, details not provided. 24 RCTS on psychotherapies to prevent suicidal behaviour, Participants details: mean age 31,7years, 47% females. Location Europe, follow up 12 and 18 months, attrition % for 6 trials of CBT 16%, non- CBT 10%. No other details.	Suicide Deaths Suicidal behaviour	WHO brief intervention and contact included an educational session on suicide prevention followed by regular contact over phone or in person for up to 18 months 6 trials of CBT delivered by GP or RN Letter/ phone contact follow up 13 months Case management follow up at 35 months; intensive follow up 12 months follow up. Aftercare strategy, no details 12 month follow up Online CBT no descriptions of frequency of delivery for interventions	Only online CBT used a wait list control.	WHO BIC 3 out of 1041 persons in the intervention group, and 24 out of 987 in the control group died by suicide. Significant difference (OR =0.20, 95% CI 0.09-0.42, p<0.0001); IRR was not calculable due to insufficient studies. For those in the CBT intervention 3 out of 5144 died by suicide, and 10 out of 526 in control. Results not statistically significant (OR=0.34, 95% CI; 0.12-1.03, P=0.06; IRR= 0.30, 95% CI 0.08-1.11, P =0.07. No other evidence that other CBT or non-CBT reduce the risk of death by suicide. **Quality:** Very low heterogeneity, except for intensive follow up interventions I^2.= 48%. Publication bias assessed, among complex psychosocial interventions p=0.20; psychotherapy P=0.47; intensive follow up strategies p=0.57 , CBT p= 0.71. P = 0.05 was the level suggested for publication bias.
Robinson (2018)	Systematic review and meta-analysis. Databases: Medline, PsycINFO, Embase. Date range: January 1990 to September 2017.	99 unique studies (52 in clinical settings; 47 in other settings)	**Clinical settings**: young people (target ages 12-25) with a history of self-harm or attempted suicide resulting in presentation to hospital-based or mental health services. **Non-clinical settings**: vulnerable university, college and high school students, general population; target ages 12-25 years.	Clinical settings: repeat self-harm; suicide-related behaviour. Non-clinical settings: suicide attempt, suicidal behaviour, suicide	Interventions specifically designed to reduce suicide-related behaviour in young people. Intervention types: psychotherapy (including CBT, DBT, mentalisation therapy, problem-solving, motivational interviewing, supportive therapy, family therapy), brief interventions (focused on maintaining contact or facilitating re-engagement with services via a minimal amount of supportive contact, including provision of an emergency or crisis card; or interventions delivered within a very brief period, such as screening and referral or provision of one-off assessment and supportive therapy); and educational (relating to suicide-		**Clinical settings*:* RCTs (n=33)** *Self-harm measured dichotomously:* Compared to controls, there was no evidence of any intervention effect on self-harm at postintervention (k = 12, RR = 0·889, 9 5% CI 0·71 to 1·11, I2 = 37·1%). At follow-up there was some evidence of a reduction in the proportion of people who had received an intervention who went on to have a repeat self-harm episode (k = 16, RR = 0·83, 95% CI 0·70 to 0·99, I2 =40·9%). *Self-harm measured continuously*: Compared to controls, there was little evidence, with high heterogeneity (I2 = 94·4%), that the intervention resulted in a reduction in the mean number of self-harm episodes at post-intervention (k = 5, SMD = −0·66, 95% CI −1·45 to 0·13), and there was limited evidence of this at follow-up (k = 4, SMD = −0·23, 95% CI −0·49 to 0·03, I2 = 38·9).

					related behaviours, mental illness associated with these behaviours, signs and symptoms to look out for and advice on how to respond.		**Clinical settings: other study designs (n=19)** Two of 5 studies testing a CBT-based intervention reported reductions in suicide-related behaviour. Five of 6 studies testing DBT reported reductions in suicide-related behaviour. One of 3 studies testing family-based interventions a reduction in suicide attempts. One study reported a reduction in the proportion of young people reporting a suicide attempt following exposure to a crisis intervention program. One study tested a brief contact intervention and reported no between group differences in self-harm behaviours. A study of a problem-solving intervention reported a reduction in the proportion of participants reporting suicide attempts in the treatment group compared to controls. **Studies conducted in educational and workplace settings: RCTs (n=15)** *Self-harm measured dichotomously*: Compared to control, there was evidence of an intervention effect on self-harm at postintervention (k = 3, RR = 0·31, 95% CI 0·15 to 0·61, I2=0%) and at follow-up (k = 3, RR = 0·63, 95% CI 0·42 to 0·96, I2 = 0%). *Self-harm measured continuously*: Compared to control, there was one study that reported continuous data post-intervention with little evidence of an effect (k = 1, SMD = −0·16, 95% CI −0·61 to 0·30). No studies reported follow-up data for this outcome. **Studies conducted in educational and workplace settings: other study designs (n=16)** Of the five studies testing universal interventions, one reported a reduction in suicide-related behaviour post-intervention. One selective intervention study reported a reduction in suicide attempts associated with a training intervention delivered to U.S. naval instructors. Two of the five studies testing indicated interventions assessed suicide rates as the outcome of interest. The first found no impact of a therapeutic program among

							secondary school students. The second examined the impact of a university suicide prevention policy and reported a reduction among the intervention group compared to increases among controls. Four studies tested a multimodal intervention. One was conducted in a workplace setting and reported lower suicide rates at postintervention. Two studies reported decreases in suicide attempts. **Studies conducted in community settings (n=16)** Five of the six studies examining the impact of policies designed to restrict access to firearms reported decreases in the firearm suicide rate among young people], and one reported an increase. Only one reported a decrease in the overall youth suicide rate. Two studies examined the impact of regulatory action to restrict use of antidepressants and found no evidence of an effect on suicide rates. One of these studies also examined the impact of such regulatory action on rates of hospital admissions for self-harm and reported decreases in females only. Three of the 5 studies evaluating multimodal interventions reported generally positive impacts on rates of suicide and/or suicide-related behaviour. One study found the suicide rate decreased by 5·5% in 15-19 year-olds but increased by 38% in 10–14 year-olds. One study reported a reduction in the number and percentage of self-immolation cases among women but did not report statistical significance. One study evaluated multiple interventions delivered across different counties in the U.S. The interventions were associated with lower rates of suicide attempt and suicide but there was no evidence of a longer-term effect. A study evaluating the impact of government-initiated national suicide prevention programs across multiple nations reported decreases in suicide rates.

							Quality: For all RCTs, quality was assessed based on the Cochrane Collaboration Risk of Bias Tool. For non-RCTs, other criteria were used. Detailed findings reported in the paper.
Schmeckenbecher (2022)	Systematic review and meta-analysis. Databases: Web of Science, Scopus, PubMed. Date range: 2000 to 2021.	38	11158 included at post intervention, 9201 at follow-up. 64.43% were female average age 31.87years, youngest mean age was 14.70 & oldest 51. Out of 35 studies, most data were from westernised educated, industrialised democracies, USA k=10, the Australia k=9. Five from non-Western educated democracies.	reduction in suicidal ideation and /or behaviours, such as suicidal planning, suicide attempts and death by suicide	Distance based Interventions (DBI)included telephone calls, post cards, crisis hotlines and email follow- ups. Telehealth approaches and online programmes. The meta-analyses differentiate between autonomous DBI i.e., apps, online programmes and human DBI telephone calls post cards, telehealth Median duration of studies was 26 weeks. range 0.14-782 weeks/ median time post interventions and follow up was 17 weeks. range 0.82-522 weeks.	Treatment as usual, included enhanced treatment as usual intensive case monitoring. Attention placebo included attention placebo, control article, journaling, attention control. Control programme, body positivity images Waitlist no contact, reminder letter at the end, waitlist, no interventions.	Effectiveness was low in reducing suicidal ideation (SMD -0.174, 95%CI -0.238 to -0.110). DBis were significantly less effective against suicidal behaviours than against suicidal ideation, although still effective (SMD= -0.059, 95%CI -0.087 to -0.032). Human Effectiveness had no effect on effectiveness. Effectiveness of the DBI decreased significantly between time points (SMD = 0.028. Ninety-five percent CI -0.026 to 0.082. P= 0.271). Autonomous DBI and Human DBI did not differ significantly in effectiveness (SMD=-0.061, 95% CI -0.142 to 0.019, P=0.1213). No Publication bias was observed. Quality of evidence rated good, Heterogeneity was described by the author as manageable, multimodal studies, had the wide range of heterogeneity , but only one aspect of the included studies.
Scudder (2022)	Systematic review Databases: Medline, CINAHL, SCOPUS, Cochrane databases, PsycINFO.	43	Adolescent ED patients ranged from 30 to 31,610. 12 years old was the most common low age limit for screening. 16 studies focused only on patients	Identify and compare the existing tools used to detect suicidality in children and adolescents who come to the emergency department.	A range of researched tools were used to screen, these were: **Ask Suicide Screening Questions (ASQ)** N = 15. **Columbia Suicide Severity Rating Scale**(C-SSRS) N= 12.		Where screening was applied to al attending patents , about one -fifth of paediatric patients screened positive; where screening was applied to psychiatric patients only , over half screened positive . Positive screens were more likely to be female , and older, than negative screens and they were more likely to be assessed and admitted. **Quality:** The authors stated that there was high heterogeneity of the screening tools and populations

	Date range: inception to August 2021.		presenting with psychiatric or behavioural issues, as chief concerns, the rest focused on patients presenting with psychiatric or medical /surgical concerns or in a few cases medical /surgical patients only.		**Suicidal Ideation Questionnaire (SIQ**) N= 11; and the **Risk of suicide questionnaire (RSQ**) n=7.		identified. Quality of included studies was high, no discussion on how this was assessed. The risk of bias template based on the NIH Quality Assessment tool for Observational Cohort and Cross- sectional studies was employed but not discussed. Sensitivity and specificity were addressed in a narrative only.
Skopp (2023)	Systematic review and meta-analysis. Databases: Medline, Embase, PsycINFO, Cochrane library, Clincaltrials.gov. Date range: inception to February 2020.	13	6218 participants. Patients discharged from inpatient psychiatric care N=843, mean age 34 % female 56%; Person >16 years presented to ED with deliberate self-poisoning N=772 33 years 68% female; Person presenting at ED - self harm or attempted suicide, n=327 33.8 years n=229 70% female; Person .12 year admitted for self-poisoning n=2300, 24 years, 66.4 % female; Active military persons 25.2 years n=657, 18% female; military personnel discharged from Inpatient psychiatric care n=1318, 32.46 years 24 % female. No other participant data.	Primary outcome: suicide mortality. Secondary outcomes: suicide attempts and Emergency dept (ED) presentations and hospitalisations.	24 caring letters sent for a total of 5 years at 1,2,3,4,6, 8, 10, 12, 14, 16, 18 & 20 months thereafter every 3months. 8 caring postcards sent at 1,2,3,4,6,8,10 & 12 months post discharge + treatment as usual. 6 caring postcards sent at ,2, &,6 weeks: 3-, 6-, 9- & 12-months post discharge+ treatment as usual. 8 caring postcards sent at 1, 2, 3, 4, 6, 8, 10 &12 months post discharge=1 on patients' birthday. 11 caring text messages sent at 1day, 1 week and 2,3, 4, 5, 66, 8, 10 & 12 months and birthday + treatment as usual. 13 caring emails sent at 1, 2, 3, 4,6, 8, 10 & 12, 14, 16-, 18-, 20- & 23-months post discharge =1 week of discharge.	No Contact. Treatment as usual in all 5 other reviews.	**Suicide:** 5 studies provide data on death by suicide. At 1 year post randomisation 3 studies provide suicide mortality, 2 years for 3 studies and 2 reported at 5 years. At I year post randomisation there was a small imprecise increase in suicide mortality risk RR 1.29 (0.32, 5.24). At 2& 5 years, the summary risk ratio was protective with the 2 years estimate having the greatest magnitude RR 0.75 (0.30, 1.86). **Suicide attempts:** for all studies this was a self-reported measure at year 1, RR 0.57 (0.40, 0.80); in year 2 RR 0.73(0.49, 1.10), there was significant statistical heterogeneity at year 2. Summary risk ratio estimate ranged from 0.57 to 1.29 across outcomes and time points; most estimates indicated a small protective effect. **For suicide deaths and ED presentations / hospitalisations** interval estimates at 1 year post randomisation were consistent with either an increase or decrease in risk. A protective effect was observed for protective effects at 1 year post randomisation. **Quality and bias:** Statistical heterogeneity at years 1& 2 was moderate. Quality of evidence was rated as low because of the imprecision in summary estimate.

Smith (2017)	Meta-analysis Databases: PubMed, PsycINFO, Cochrane library Date range: January 1980 to June 2017.	16	2179 studies with: Persons with mood disorders, especially depression, persons who have bipolar disorder, persons who have self-harmed. No numbers and no demographic details given	Lithium as an anti-suicide agent	Lithium and its effect on suicide and self-harm.	Placebo	There were only 1/3 reviews that included lithium and self-harm, lithium showed less clear benefits in preventing deliberate self-harm than placebo (OR 0.60, 95%CI 0.27 to 1.32). Lithium in mood disorders significantly reduced the risk of suicide (OR 0.13, 95% CI 0.03-0.66) and risk of death. From both randomised evidence, supported by observational data, the authors suggest lithium should be the treatment of choice for persons with bipolar disorder, especially for those at risk of suicide. Lithium may also have a role in protecting those with depressive disorders against fatal suicide acts. **Quality**: issues of heterogeneity were discussed along with the lack of RCTS and the trials being underpowered.
Sobanski (2021)	Systematic review. Databases: PubMed, Google Scholar. Date range: 1980 to June 2020.	18	1990 patients aged 18 years or older. Mean age of patients in the psychotherapy and control groups ranged from 20.40 years (*SD* = 0.76) to 44.8 years (*SD* = 16.4). Most participants were female.	reduction in suicide re-attempts and suicides.	Psychosocial intervention for suicide re-attempts and suicides. Most interventions were based on CBT (N = 9). The length of the follow-up periods ranged from zero up to 24 months.	Treatment as usual. (No details)	Psychosocial interventions were significantly more efficacious than TAU or other control conditions in reducing the risk of suicide re-attempts. Modest heterogeneity was observed, suggesting there may be differences between types of psychosocial interventions. CBT interventions and psychodynamic therapies were significantly more efficacious than control conditions in reducing the number of suicide re-attempts and suicidal behaviours. CBT with a specific focus on SA produced the most favourable results in terms of the reduction of suicide re-attempts. DBT or solely problem-solving strategies did not significantly impact upon suicide re-attempts. A significant reduction in risk in studies using long follow-up period (12 months and more) was found. Pooled analysis of 18 studies yields significant differences in terms of number of suicide re- attempts between psychosocial intervention in total and TAU or other control conditions RR-0.66; 95% CI 0.48-0.90; Z=2.63, p=0.008; OR 0.56 CI 0.36-0.84; p=0.006. The between study heterogeneity was moderate (*I= 51%).* CBT from 10 pooled studies yielded a significant in terms of suicide re attempts RR= 0.66; 95% CI 0.48-0.90; Z=2.61, p=0.009; OR 0.53, CI 0.34-0.83; p= 0.006. between study heterogeneity was low. (I = 28%).

							Publication bias via funnel plot indicated unlikely bias impact.
Stewart (2022)	Integrative review. Databases: CINAHL, Embase, Medline, PsycINFO, PubMed, Proquest. Date range: various start dates (inception to 1974). Most recent date not specified.	9	Adults mainly, sample sizes ranged from 51 – 6442. Nine studies were included: five American, one English, two Canadian, and one Taiwanese. This review includes seven multisite emergency department studies ranging from 2 to 32 sites, with two studies conducted in single urban hospitals.	self-harm or suicide incidences, admissions to hospital, and patient disposition. **Secondary outcomes** were: Quality of self-harm service, frequency of suicide risk screening, and adverse events that occur in the emergency department.	Multiple different risk assessment tools were used: most commonly, the SAD PERSONS scale(n=5) and the Columbia Suicide Severity rating scale (n=3).		Overall, the results show that there is no significant evidence to demonstrate that any of the tools has a strong predictive ability for repeat self-harm or suicide. The results demonstrate that risk assessment tools do not have a strong predictive ability when used without clinical judgement to predict suicide or repeat self-harm. **Quality:** Authors noted that there is potential for publication bias, as studies with negative outcomes were not located. The heterogeneity of study methodologies prevented combination of results to precisely determine what impact risk assessment tools have on suicide risk.
Szumilas (2011)	Systematic review. Databases: PubMed, PsycINFO, CINAHL, Cochrane database of systematic reviews, DARE. Date range: inception to September 2009.	16	Participants 2038. Middle school children Grade 7-8 School personnel School mates of deceased 13-17 yrs Peers of deceased=15 14-17 years Adult survivors 10-60+ Widow(ERS) 20-70 yrs Parents: 32-61	Suicide, suicide attempts, prevention at Postvention	Three target population school-based, Family focused and community based. Gatekeeper training in schools Outreach at the scene of suicide Contact with a counselling postvention for familial survivors of suicide. Media reporting of suicide events		No protective effect of any postvention target program could be determined for the available deaths or suicide attempts from the available studies. Gatekeeper training, raised awareness and increased knowledge to assist and support. Outreach was deemed helpful. Counselling was supportive for those in distress. . Media reporting as per other countries was useful. **Quality:** of evidence of evaluations of included programmes ranged from low to moderate . The authors used the Centre for Evidence based. medicine framework to evaluate study design. and methodology.
Tarrier (2008)	Systematic review and meta- analysis	28	3461 participants across twenty-eight studies. Fourteen	reduction in hopelessness; suicidal ideation and	Mean duration of intervention was 19.52 weeks (SD=24.77) median 10 weeks. 6 interventions	TAU; Enhanced TAU;	18 Studies reported on adults v adolescents 0-3 months post treatment was highly significant for adults Hedge's g =-0.775, z=-5.497, p=<.0001, 95%cl =-1.051 to -0.498)

	Databases: PsycINFO and Web of Science. Date range: 1980-2008.		studies were located in the USA; 5 in the UK; 2 in both The Netherlands& Denmark, I each in Australia, Canada, India, Ireland, and Israel. There were seven studies with adolescents and the rest adults, definitions were defined in the original papers.	suicide attempts or plans, reduced probability of suicide and suicide threats	were 12 months or longer e.g., DBT. Majority of interventions were either solely CBT or included CBT as a significant component. Fourteen studies included some form of problem solving as well as CBT. 5 studies included family support or family therapy. The most frequently used standardized programme was DBT. Structure of treatment showed considerable variation, most interventions were delivered on an outpatient, sessional basis. Four studies reported intensive structured inpatient of day hospital treatments of 10 -14 days, one study provided brief solution focused treatment over the telephone. Another provided school-based treatment programme of 12 weeks and another an integrated mental health service of assertive community treatment, antipsychotic medication, psychoeducation family treatment, individual family session, family groups and social skills train goer 2 years. 3 studies used a self-help manual of CBT with brief contact with a therapist (6-7 sessions). A range of professionals delivered these interventions.	Supportive counselling; Placebo; Wait list; individual therapy; Brief problem-solving approach; no treatment	Effect size for adolescent sample was not significant: (combined Hedge's g=-0.260, z=-1.355, p=.175.95%CI=-0.635-0.116). Type of therapy effect sizes for CBT and DBT were robust and comparable respectively, combined Hedge's g=-0.562. z=-4.244p<.0001, 95%CI =-1.143to -0.250). Overall, there was significant effect for CBT in reducing suicidal behaviour. Outcomes measures were not able to be measured as there were few studies with the satisfaction with life scale and hopelessness subgroups. The measure that was most proximal to suicidal acts was taken for each study. The authors noted that it was not possible to consider every outcome measure in one overall analysis as the same study would be included multiple times, thus violating the independence assumptions for each study. Heterogeneity was measured. With a wide heterogeneity in included studies as noted by authors. Publication bias assessed and authors noted that small sample numbers with large effect sizes have a disproportionate influence over the overall effect size. In this analysis the authors noted that such as bias appeared to be operating.
Torok (2017)	Systematic review. Databases: Cochrane Library, Cochrane Central Register of Controlled Trials, Embase, Medline, PsycINFO, PubMed, Scopus, Web of Science	13	General population	suicide deaths suicidal ideation and attempted suicide	12 unique campaigns 9 studies were evaluations of single "standalone" mass media campaigns. These campaigns comprised of messages and target group Delivered in newspapers, radio and tv advertisement.		Standalone campaigns were modestly useful in increasing suicide literacy. Community engagement appeared to be fundamental to the success of these campaigns. Campaign visibility was rarely reported best figure was 28%. Only 2 standalone campaigns reported a positive outcome for suicide (IRR=0.971, CI 0.95 7–0. 985) Campaigns appeared to increase knowledge and

	Date range: inception to April 2016.						help seeking. Media campaigns may be more effective when targeting specific populations and if combined with other strategic approaches. Quality: not reported.
Torok (2020)	Systematic review and meta-analysis. Databases: Cochrane Library, Cochrane Central Register of Controlled Trials, Embase, Medline, PsycINFO, PubMed, Scopus, Web of Science. Date range: inception to May 2019.	16	4398 participants, 2 school based with mean average age of 15.7 years, other studies were 1 of hospital interns mean age 25.2 years, the rest were community online with an mean age range of 16.9-42.5years Studies were from Belgium 1, USA 6, Australia 7, Netherlands 1, Germany 1. no other demographic stated.	Suicidal ideation and behaviours	Think Life- CBT DBT & Mindfulness; 6 modules, 6 weeks Therapeutic evaluative conditioning n=3; Unlimited access for 1 month; Reframe IT - CBT & TAU; 8 modules over 10 weeks; Leap_ CBT for insomnia 2 modules and active learning over 2 weeks. ibobby_acceptance & commitment therapy; 3 modules 3 self-assessments over 6 weeks; Control- CBT, DBT & mindfulness 6 modules over 6 weeks; ; Living with Deadly thoughts -CBT, DBT& Mindfulness, 6 modules over 6 weeks; FitmindKIT-behaviour activation CBT & mindfulness 10 modules over 2 weeks. Bluepages+MoodGym_ CBT only Vs CBT& Lifeline call back vs call-back only 5 module & 1 psychoeducation module over 6 weeks; SHUTi -CBT for insomnia 6 modules over 6 weeks; MoodGym - CBT for insomnia 4 module over 4 weeks; iDBT-st 8 modules over 8 weeks ;Deprexis CBT 10 modules over 10 weeks; SPARX -R - CBT 7 modules over 5 weeks.	Wait list available after completion of post surveyx3; attention placebo, therapeutic evaluative conditions x3; treatment as usual; Attention placebo Psychoeducation x7; Waitlist plus weekly screening for suicidal ideation / behaviours or alcohol use (available 8 weeks post baseline); Waitlist (available after 6 month follow-up)	Primary outcome of overall post intervention effect for suicidal ideation was small but significant immediately following the active intervention phase (Hedges' g =-0.18, 95% CI- 0.27 to 0.10, p<0.0001; P=0%, I CI 0.0-47.9). The secondary outcome, comparing direct and indirect interventions, showed that direct interventions significantly reduced suicidal ideation at post intervention (g-0.23, 95%CI -0.35 TO -0.11, P<0.0001; p =17.6% 95% CI 0.0-58.6) but indirect interventions failed to reach significance (g-0.12, 95%CI -0.25 to 0.01, p=0.071; P=0% I CI 0.0-30.7). Self-guided digital interventions targeting directly suicidal ideation are effective immediately post intervention. Indirect interventions were not significant for reducing suicidal ideation. Findings suggest that digital interventions should be promoted and disseminated widely, especially where there is a lack of health service access. **Quality:** **Heterogeneity**: authors noted that they found no evidence of significant heterogeneity in the overall, direct or indirect models. No effect was detected at follow up. Risk of bias as per Cochrane risk of bias the quality of studies was variable: attrition bias for 11/16 studies (69%), performance bias 68.& %, 56 % of studies did not report sufficient information to rule out selective reporting or detection bias 43.755%.
van der Feltz-Cornelius (2011)	Review of systematic reviews (umbrella review).	6	General and settings-based populations	reduction in suicide behaviour	Multi component program	None stated	Best practices identified as effective were. training general practitioners to recognise & treat. depression &suicidality. Improving accessibility of care for at-risk people and restricting access to means of suicide,

	Databases: PubMed, Cochrane, DARE. Date range: January 1964 to January 2011.						when combined multi-level interventions show synergistic effects of multiple interventions when applied together. Indirect support was found for possible synergies of combinations of interventions within multilevel strategies. **Quality:** authors undertook risk of bias Assessment **Quality:** The authors noted that the meta-analysis based on post-test assessments showed a substantial amount of heterogeneity (i.e., dispersion about the pooled effect size.) For suicidal ideation at post-test. heterogeneity across effect sizes was high I^2 =85, (95% CI [73,91} with one study favouring control over intervention at postintervention. Funnel plot inspection showed some publication bias, in addition there were studies with low sample size and low effect size. Overall, there was substantial heterogeneity between studies. Small sample sizes and few samples that included the targeted known risk factors for STBS, therefore these results should be interpreted with caution. Authors concluded that school-based prevention STBs show some promise within three months post-test assessments and may potentially have effects that are sustained over time.
Wilkinson (2022)	Systematic review and meta-analysis. Databases: Medline. Date range: inception to December 2019.	52	Lithium studies Included 36 studies involving 58,244 participants treated and 87,965 controls (in addition to 103,487 person years of lithium and 160,729.2 person years of control follow up). 17 studies included persons exclusively with bipolar disorder and 19 studies included participants	Primary outcome measure for this meta -analysis was effect sizes of pharmacological interventions with respect to suicide death	Lithium and Clozapine	Placebo or no intervention, Antipsychotics (except clozapine)	Bipolar studies: lithium was associated with a significant reduction in the odds of suicide compare to an active control (OR=0.58, 95% CI 0.40-0.85) p=0.005, and went to compare to placebo or no specific intervention (OR =0.46, 95% CI 0.25-0.82), p=0.009. Studies with individuals with mixed psychiatric disorders lithium was similarly associated with the reduction in odds of suicide compared to placebo or no intervention. Lithium and clozapine have consistent data supporting protective affects against suicide in certain clinical contexts. **Quality:** measured heterogeneity, and risk of bias.

			with the other diagnoses. No other demographic data stated.				
Witt (2017a)	Systematic review and meta-analysis. Databases: CENTRL-Trials Register, National Police Library, Australian Federal Police Digest, Criminal Justice Abstracts, National Criminal Reference Service, Embase, PubMed , Global Health, PsycINFO, ProQuest, Scopus. Date range: inception to June 30, 2015.	13	Persons working in protective and emergency services: Police (n=3) 1 each in Canada, South Africa& USA. Military(n=9) 6 in USA with 1 each in: Australia, Norway, Serbia & Montenegro, Lithuania and Ukraine; And: Fire services n=1 in USA. No other details given.	Prevention activities that encompass coping strategies to manage job stressors, identify person at risk of suicide . Prompt actions to connect persons to treatment support options, e.g. crisis telephone hotlines, and support those who have already engaged in suicidal behaviors in returning to work.	Muti component programmes		For the programmes that enabled calculation of IRR and 95% CI, overall implementation of the programmes was associated with an approximate halving of the suicide rate at post- intervention over an average follow up period of 5.25 years (SD+ 4.2; range 1-11) (IRR 0.45, (95 %CI: 0.31- 0.65; five studies, I^2 = 14.8%, P<0.001). This was predominately in police and military populations. Few programmes integrated activities at the primary prevention level. **Quality**: Five studies included in this review were not formally evaluated. Publication bias cannot be ruled out particularly as the authors were unable to undertake tests for funnel plot asymmetry as there were fewer than 10 dependent trials included in the review. Study quality was measured according to the GRACE criteria, was in general poor for aspects of study design and methodology
Witt (2017b)	Systematic review and meta-analysis. Databases: Applied Science and Technology, Cochrane Central Register of Controlled Trials, Embase, Medline, PsycARTICLES, PsycINFO, Global Health, Centre for Research Excellence in Suicide Prevention, .	14	3356 total participants recruited from the community. Participants included both adolescents and adults. While recruited from the community, all participants had been in contact with primary care and counselling and psychiatric services.	The primary outcome was suicidal ideation. Secondary outcomes included: episodes of self-harm, attempted suicide, and completed suicide measured according to self-report and/or hospital or medical records.	Digital interventions (online and mobile apps) for self-harm and suicidality. Most programs were developed by clinical psychologists and/or psychiatrists with experience treating suicidal ideation and/or self-harm. Most programs were based on principles of CBT. Some were based on elements of mindfulness, dialectical behaviour therapy, or mentalization-based cognitive therapy. Other programs included acceptance-based therapy, problem-solving therapy, interpersonal therapy, mood monitoring, and crisis	Treatment as usual, waitlist, attention placebo, psychoeducation, face-to-face psychotherapy , or no control.	Digital interventions were associated with reductions for suicidal ideation scores at post-intervention. These effects tended to be stronger in observational pre-test/ post-test designed studies as compared with RCTs. There was no evidence of a treatment effect for self-harm or attempted suicide. However, only three studies investigated these outcomes. Digital interventions were associated with reductions in suicidal ideation scores post intervention from the observational studies, as compared to RCTs overall results: frequency of self-cutting: 0.34(-2.10-2.78); 1 month follow-up -2.8(-1.87-1.31) Post intervention NSSI -0.20(-3.49-3.09) Frequency NSSI 1 month follow-up: 2.04(-3.50-7.58). Self-Harm 1 study of 3 RCTs, at post intervention there was no indication for treatment effect. Combined self-harm & attempted suicide there was no evidence in a reduction in proportion who attempted suicide and /or self-harm, at 24 months follow -up: (OR 2.11, (95%CI 0.19-23.81

	Date range: inception to March 2017.				planning. One program used gamification.		p=0.55) Attempted suicide, 1 RCT, no evidence in reduction of proportion of self-reporting a suicide attempt at post intervention follow-up (OR 0.58, 95%CI 0.16-2.02 p= 0.39). Quality: ROBINS-1 tool or the Cochrane Collaboration tool for RCTs and pseudo Controlled trials. Performance and detection bias could be not be ruled out., Variability of the control condition to be a possible source of heterogeneity.
Witt (2021a)	Systematic review and meta-analysis Databases: Cochrane CENTRAL, Cochrane DARE, Embase, Medline, ProQuest, PsycINFO, PubMed, Scopus, Web of Science. Date range: inception to 2021.	11	491 adult participant 18+ years Alcohol misuse with comorbid issues e.g. bipolar disorder, other mental health issues suicidal behaviours &ideation self-harm	Suicidal ideation, self-harm and /or suicidal behaviours	Psychosocial interventions using the FRAMES" (Feedback, Responsibility, Advice, Menu, Empathic, Self-accuracy) to address suicide prevention in users of alcohol . Interventions include CBT .	Treatment as usual.	Reducing alcohol may lead to a reduction in self harm and suicide attempt. This was judged by the authors on the final assessment (0R 57, 95%CI 0.33 to 0.97) in 6/11 studies. There was no apparent effect for these interventions on suicidal ideation or suicide deaths. There was no difference significant in affect by therapeutic approach. Neither intervention dose in hours or duration in months, significantly explain differences in treatment effectiveness. Interventions targeting harmful alcohol consumption may contribute towards a reduction in self harm at the individual level. **Quality:** The RCTs in this review were characterised by a moderate to high degree of bias. There was insufficient information provided on methods used to generate randomisation sequence, methods used to conceal the allocation sequence and whether blinding of participants was achieved. Studies were diverse in terms of populations /control conditions. Diverse in term of population clinically and in age. .
Witt (2021b)	Systematic review. Databases: Cochrane Common Mental Disorders Specialised Register, Cochrane Central Register of Controlled Trials, Cochrane	7	574 participants 18 years and up, all genders all ethnicities. Females 63.5%. mean age 35.3 years.	Repeat self-harm and follow up at 2 years	Tricyclic antidepressants (TCAs e.g., Amitriptyline). .Newer Generation antidepressants SSRIs e.g., Fluoxetine) serotonin and noradrenaline reuptake inhibitors (SNRIs e.g., Venlafaxine) norepinephrine reuptake inhibitors (NRIs reboxetine),	Placebo or any Pharmacologic al agent of any class, such as a standard pharmacologic al agent reduce those	Data from seven trials. It is uncertain if new generation antidepressants reduce repetition of self-harm (SH) compared to Placebo (OR 0.59. 95% CI 0.29-1.19; N=129; k=2; very low certainty of evidence. For antipsychotics there may be a lower rate of SH repetition (21%) as compared to Placebo (75%) (OR 0.09, 95%CI 0.02 to 0.50; N=30; k=1; low certainty evidence).

	Database of Systematic Reviews, Medline, Embase, PsycINFO. Date range: to July 2020. (Start date restriction applied because this review is update of earlier (2015) review. However, effective start date not specified.)					of the intervention agent or active comparator was used.	For antipsychotics compared to another comparator drug/dose for repetition of self-harm, there was no evidence of difference (OR 1.51, 95%CI0.50to 4.58; N=53; K=1; low -certainty evidence). There was no evidence of a difference from mood stabilisers compared to Placebo for repetition of self-harm (OR.99, 95% CI 0.33to 2.95; N=167; k-1; very low certainty evidence). There was no evidence of a difference for natural products compared to Placebo for repetition of self-harm (OR 1.33; 95% CI 0.38 to 4.62; k=1; low certainty evidence). Given the low or very low quality of available evidence and the small number of trials identified, there is only uncertain evidence regarding used pharmacological interventions in patients who engage in self-harm.
Witt (2021c)	Systematic review. Databases: Cochrane Common Mental Disorders Specialised Register, Cochrane Library, Cochrane Database of Systematic Reviews, Medline, Embase, PsycINFO. Date range: to July 2020. (Start date restriction applied because this review is update of earlier (2016) review. However, effective start date not specified.)	76	21414 participants, adults female (61,9%) mean age of 31.8 yrs., who engage in self-harm, with recent (within 6 months) presentation to hospital.	primary outcome was the occurrence of repeated self-harm over a maximum follow-up period of two years (self-harm and suicide attempts were considered together). Secondary outcomes (over follow-up period max 2 years) were treatment adherence, depression, hopelessness, general functioning, social functioning, suicidal ideation, suicide and other (open to include any secondary outcomes)	Various forms of psychosocial interventions included Individual CBT-based psychotherapy (e.g. CBT, PST) N = 21, Dialectical behaviour therapy (DBT) N = 10, Mentalization-based therapy N = 1, Emotion regulation psychotherapy N=2, Psychodynamic psychotherapy N=2 Case management N=5, GP Follow up N=1, Brief ED Intervention N=5, Provision of support and information=3, Other multimodal interventions N=3, Other mixed interventions N=9 Remote contact interventions N = 16 .	Treatment as usual defined as routine clinical care that the person would receive had they not been included in the study. Other comparators include no specific treatment, or enhanced usual care, that is TAU, that is supplemented by providing psychoeducation, assertive outreach, or more regular contact with	On the basis of evidence from 4 trials individual CBT psychotherapy may reduce repetition of SH as compared to TAU or other comparator by the end of the intervention (OR 0.35, 95%CI 0.12 -1.02; N=238 K=4 Grade low certainty), there was imprecision in the effect estimate. At longer follow up time points 6-12 months there was some evidence that individual CBT based psychotherapy may reduce SH repetition. For individual DBT (66.0%) as compared to TAU or alternative psychotherapy (68.2%) there may be a lower rate of SH repetition, therefore the evidence remains uncertain as to whether DBT reduces absolute repetition of SH by the post intervention assessment. MBT based on 1 trial reduces the repetition of SH and the frequency by the post assessment (OR 0.35, 95% CI: 0.17-0.73; N=134; k=1 GRADE high certainty evidence). A group-based emotion- regulation psychotherapy may also reduce repetition of SH, by the post intervention assessment based on 2 trials (OR 0.34, 95% CI 0.13-0.88; N=83, k= 2 Grade: moderate certainty evidence). There was little to no evidence for the different variants of DBT, on absolute repetition of SH. The evidence is uncertain for support and information. There is little to no evidence for psychodynamic psychotherapy, case management, general practitioner management, remote contact interventions, and other multimodal interventions or a

						case managers and standard assessment approaches.	variety of brief emergency department-based interventions. All studies examined psychosocial interventions for suicide reduction, and none examined a psychosocial intervention for self-harm. Meta-analyses did not find significant difference between treatment conditions in reducing suicide at post-therapy (SMD = – 0.14, 95% CI = – 0.38 to 0.10, Z = 1.12, p= .26) and at follow-up (SMD = 0.22, 95% CI = – 0.15 to 0.59, Z = 1.18, p= .24). A meta-analysis did not find a significant difference for treatment conditions at three to six month follow up (RR = 0.92, 95% CI = 0.41 to 2.06, Z = 0.18 p= .86, I2= 0%). Quality of included studies used GRaDE: low to moderate quality, heterogeneity was assessed between studies, small samples related to higher heterogeniety Bias was assessed.
Witt (2021d)	Systematic review. Databases: Cochrane Common Mental Disorders Specialised Register, Cochrane Library, Cochrane Database of Systematic Reviews, Medline, Embase, PsycINFO. Date range: to July 2020. (Start date restriction applied because this review is update of earlier (2015) review. However, effective start date not specified.)	17	2280 total participants. Children and adolescents up to 18 years of age who engage in self-harm. Most participants were recruited following clinical presentation of self-harm. A minority of participants were recruited though school. The majority of participants were female (87.6%). The weighted mean age of participants at trial entry was 14.7 years (SD	The primary outcome was the occurrence of repeated self-harm over a maximum follow-up period of two years (self-harm and suicide attempts were considered together). Secondary outcomes were treatment adherence, depression, hopelessness, general functioning, social functioning, suicidal ideation, suicide and other (open to include any secondary outcomes).	CBT-based psychotherapy (e.g. CBT, PST) *N* = 21, Dialectical behaviour therapy (DBT) N = 10, Mentalization-based therapy *N* = 1, Emotion regulation psychotherapy N=2, Psychodynamic psychotherapy N=2 Case management N=5, GP Follow up N=1, Brief ED Intervention N=5, Provision of support and information=3, Other multimodal interventions N=3, Other mixed interventions N=9 Remote contact interventions *N* = 16 .	Treatment as usual defined as routine clinical care that the person would receive had they not been included in the study. Other comparators include no specific treatment, or enhanced usual care, that is TAU, that is supplemented by providing psychoeducation, assertive outreach, or more regular	On the basis of evidence from 4 trials individual CBT psychotherapy may reduce repetition of SH as compared to TAU or other comparator by the end of the intervention (OR 0.35, 95%CI 0.12 -1.02; N=238 K=4 Grade low certainty), there was imprecision in the effect estimate. At longer follow up time points 6-12 months there was some evidence that individual CBT based psychotherapy may reduce SH repetition. For individual DBT (66.0%) as compared to TAU or alternative psychotherapy (68.2%) there may be a lower rate of SH repetition, therefore the evidence remains uncertain as to whether DBT reduces absolute repetition of SH by the post intervention assessment. MBT based on 1 trial reduces the repetition of SH and the frequency by the post assessment (OR 0.35, 95% CI: 0.17-0.73; N=134; k=1 GRADE high certainty evidence). A group-based emotion- regulation psychotherapy may also reduce repetition of SH, by the post intervention assessment based on 2 trials (OR 0.34, 95% CI 0.13-0.88; N=83, k= 2 Grade: moderate certainty evidence). There was little to no evidence for the different variants of DBT, on absolute repetition of SH. The evidence is uncertain for support and information. There is little to no evidence for psychodynamic psychotherapy, case management, general practitioner management, remote contact

						contact with case managers and standard assessment approaches.	interventions, and other multimodal interventions or a variety of brief emergency department-based interventions. All studies examined psychosocial interventions for suicide reduction, and none examined a psychosocial intervention for self-harm. Meta-analyses did not find significant difference between treatment conditions in reducing suicide at post-therapy (SMD = – 0.14, 95% CI = – 0.38 to 0.10, Z = 1.12, p= .26) and at follow-up (SMD = 0.22, 95% CI = – 0.15 to 0.59, Z = 1.18, p= .24). A meta-analysis did not find a significant difference for treatment conditions at three to six month follow up (RR = 0.92, 95% CI = 0.41 to 2.06, Z = 0.18 p= .86, I2= 0%). Publication bias was assessed. Bias: most trials were rated as either having some concerns (K=10, 58.8%) or were at high risk of bias (K=6, 35.%.) Grade: low to moderate Quality.
Yiu (2021)	Systematic review and meta-analysis. Databases: Embase, Medline, PsycINFO. Date range: inception to January 2021.	10	Psychiatric inpatients. Currently receiving care in a psychiatric inpatient setting. Most participants were female (ranging from 25.8 to 44 years). No other details provided.	The primary outcome was suicidality. Secondary outcomes were depression, hopelessness, and suicide attempts.	Psychosocial interventions to reduce risk of suicide and self-harm. The majority of the psychosocial interventions were CBT and Dialectical Behavioural Therapy (DBT). Follow-ups ranged from post-therapy (no follow-up) to 2 years.	Treatment as usual. Not described.	All studies examined psychosocial interventions for suicide reduction, and none examined a psychosocial intervention for self-harm. Meta-analyses did not find significant difference between treatment conditions in reducing suicide at post-therapy (SMD = – 0.14, 95% CI = – 0.38 to 0.10, Z = 1.12, p= .26) and at follow-up (SMD = 0.22, 95% CI = – 0.15 to 0.59, Z = 1.18, p= .24). A meta-analysis did not find a significant difference for treatment conditions at three to six month follow up (RR = 0.92, 95% CI = 0.41 to 2.06, Z = 0.18 p= .86, I2= 0%). **Quality:** Publication bias was not undertaken due to the small number of studies (,10) included in the meta-analysis Heterogeneity was noted by the authors as low.