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Effectiveness of Interventions to Prevent Suicide and Suicidal Behaviour: A Systematic Review

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EFFECTIVENESS OF INTERVENTIONS TO PREVENT SUICIDE AND SUICIDAL BEHAVIOUR: A SYSTEMATIC REVIEW

Maria Leitner, Wally Barr & Lindsay Hobby

Health & Community Care Research Unit, Liverpool University

Info*Tech* UK Research

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This report is available on the Scottish Government Social Research website www.scotland.gov.uk/socialresearch.

It should be noted that since this research was commissioned a new Scottish government has been formed, which means that the report reflects commitments and strategic objectives conceived under the previous administration. The policies, strategies, objectives and commitments referred to in this report should not therefore be treated as current Government policy.

CONTENTS

EXECUTIVE SUMMARY

Aims

1 The remit of this review was to provide a comprehensive overview of the known effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population. Whilst not restricted to the Scottish context, one goal of the review was to evaluate the evidence available to inform the prevention of suicide in Scotland. The review was commissioned by the (then) Scottish Executive Health Department in 2005 and is now being published by the Scottish Government as part of a programme of research work, in support of its commitment to suicide prevention and in taking forward the *Choose Life* National Strategy and Action Plan to Prevent Suicide in Scotland (Objective 7 in the strategy related to 'knowing what works'). This commission followed a scoping exercise which identified the need for a review of interventions. To address this need, the research team carried out a wide-ranging systematic review of the available evidence. The review evaluated both quantitative and qualitative evidence for the effectiveness of interventions. Any and all interventions for which research evidence could be found were included within the remit of the review. The review represents the most comprehensive overview of the intervention literature currently available.

Specific objectives

2 The specific objectives of the review were as follows:

- Identify the interventions which have been evaluated to date
- Summarise the conclusions which can be drawn from the literature as it stands, taking into account the quality of available data
- Highlight key defining features of the interventions evaluated to date
- Specify the known impact of interventions, taking into account the populations and settings to which these apply
- Address the cost-effectiveness of interventions where such data are available
- Consider the transferability of effective interventions to the Scottish context and examine the implications for implementation and replication
- Identify gaps in the evidence base
- Make evidence-based recommendations for the development of national and local policy and practice, identifying variations in strategic approach for different key risk groups

3 All of the above objectives have been addressed. However, the available research evidence was not suited to providing answers to all of the questions posed within these objectives. There is, for example, very little evidence available regarding the cost-effectiveness of particular interventions. Since the effectiveness even of the most promising interventions largely remains to be established this is perhaps unsurprising. However, this clearly presents a problem for service providers with limited resources to allocate and a clear remit to reduce existing rates of suicide and self-harm. Similarly, there is very little evidence specific to the Scottish context. The available evidence overall also tends to be fairly non-specific both in terms of the defining features of interventions, which are rarely discussed in the empirical literature, and in respect of the demographic or other population characteristics of study participants, which are poorly reported in the literature.

4 It is not possible, given the current state of the evidence, to model adequately the likely impact of transferring interventions to the Scottish context. However, there is to date also little reason to believe that the more 'generic' interventions, such as the provision of ongoing contact or provision of telephone support would differ in their impact on distinct populations. Finally, in respect of recommendations for key risk groups, it is clear that the approach of the literature to date has been rather more eclectic than is desirable from the viewpoint of the practitioner or policy maker. Few studies have evaluated interventions developed explicitly for 'high risk' groups and where such groups have been the focus of intervention research, they tend not to match the priority groups identified by national prevention initiatives in Scotland or in England and Wales. Where the review *is* able to make substantive recommendations is in respect of the gaps within the current evidence base, the means by which future research could significantly improve the evidence base and, in relation to the evidence which is currently available, the merits of particular forms of intervention based on the quality of the available evidence.

Methods

5 The review process followed the 'gold standard' for systematic review methodology set out by the Cochrane Collaboration and by the NHS Centre for Reviews and Dissemination. However, it differed from many of the reviews which have been produced using this method in the breadth and depth of its search strategy. The remit of the review was to include evidence relating to *any* evaluated intervention regardless of the research methods used, the population, setting or other foci of the pertinent studies. This broad-ranging approach offers several advantages over more 'traditional' systematic reviews, not least of which is the opportunity to compare outcomes across settings, populations, modes of intervention and modes of suicidal behaviour and ideation. The citation database generated for the review also provides an extensive repository of available evidence which can be further explored to address issues in research and practice not specifically addressed within the remit of the current report.

6 The review was restricted to searches conducted using electronic databases. Eighteen separate databases were searched, including primary research databases, specialist and secondary research databases and databases accessing the 'grey' (largely unpublished) literature. Whilst the only restrictions on the initial citations retrieved were that they had to address interventions for suicidal behaviour or suicidal ideation, additional criteria were imposed on the citations to be included within the review report. Specifically, research reports had to be written in the English language, to present evidence from an 'empirical' study (broadly defined to include any attempt at quantitative or qualitative evaluation) and to focus on 'intentional' behaviour, with interventions for non-intentional self harm in people with learning disabilities or conditions such as Lesch Nyhan's disease excluded.

7 The initial search process identified 26,085 citations relevant to intervention for suicidal behaviour and suicidal ideation. Using restriction terms to identify *empirical* evaluations of interventions reduced this total to 8,606 citations. Two reviewers then screened the abstracts of each of these citations to exclude material not meeting the core criteria for the review report. This reduced the number of citations meeting our criteria to 646. All 646 studies were screened by two reviewers in full-text format and from this process we identified 200 primary empirical studies and 37 prior systematic reviews meeting the criteria for the review. These studies form the basis of the evidence presented in this report.

Overview of retrieved material

8 The review identified a number of methodological issues relating to the existing research evidence which need to be addressed if future research is to successfully inform evidence-based practice. It also identified a number of concerns regarding the extent and focus of the current evidence base. Research to date has adopted a 'scatter-gun' approach, with a very small number of studies each addressing one of a very broad and diverse range of interventions. This has resulted in an evidence base poorly suited to meeting the immediate needs of either practitioners or policy makers seeking to prevent suicidal behaviours and ideation. Populations which are particularly poorly served by the available literature are people engaged in (currently) non-fatal self-harm, in particular self-cutting; people at either end of the age spectrum (those younger than 15 or older than 65); and people from social, cultural and ethnic minority populations. Socio-economic status has also been given little attention in the intervention literature.

9 Overall, the quality of available research in this field compares favourably with that of research addressing other broadly comparable public health issues such as other-directed violence (Leitner et al 2006). However, the evidence base does suffer from certain methodological failings which are commonly attributed to actual or perceived ethical and pragmatic constraints on research into suicidal behaviour and ideation. In particular, a failure to randomise participants to treatment and 'control' conditions, to 'blind' investigators and, where relevant, participants, to treatment allocation and a failure to control for the impact of other ongoing but un-evaluated 'background' interventions. Additional methodological concerns include high drop-out rates and a lack of attention to the adequacy of implementation of interventions.

10 The majority of the available evidence derives from studies carried out on US or Canadian populations. However, there is an international focus to the literature with 21 countries contributing to the current evidence base. In contrast to many other public health literatures, the UK has contributed a substantive amount of evidence, accounting for 19% of primary empirical studies. We were, however, able to identify only 5 independent studies of interventions for suicidal behaviour or ideation which had been carried out on Scottish populations.

11 Other concerns regarding the 'coverage' of the available research evidence relate to the populations and settings in which research has been carried out. There is a clear tendency in the literature to associate suicidal behaviour with mental illness. Nearly half (46%) of the available research evidence focuses on interventions for psychiatric populations. In particular, the research focuses on people with depression or with borderline personality disorder. Whilst mental illness has been identified as an important risk factor, this imbalance in the available evidence exaggerates the association and, as a consequence, comparatively little is known about interventions for the general population. In contrast, the majority of research studies have focussed on interventions carried out in community settings, with comparatively little evidence regarding intervention in institutional (e.g. school or prison) settings or in the broad range of available health care settings. Intervention in the Accident & Emergency setting is particularly under-researched, despite the fact that this setting represents the main point of first contact with health services for many people at risk of suicide.

Impact of interventions on suicidal behaviour and suicidal ideation

12 The most prominent focus of the literature to date has been on pharmaceutical intervention. However, the broad range of individual pharmaceutical interventions evaluated show a rather chequered profile in terms of outcome, with few indicators of consistent positive impact. Even commonly used pharmaceutical interventions such as anti-depressant treatment demonstrate a rather equivocal profile in terms of their impact on reductions in suicidal behaviour and ideation. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. However, concerns deriving from one study, that lithium *increased* the likelihood of suicide overall and from an additional high quality study that discontinuation of lithium treatment increased risk argue for caution in implementing the treatment in the absence of further high quality confirmatory studies. There is currently little evidence of any effective pharmaceutical intervention for self-harm. Suicidal ideation has been the preferred focus of a comparatively high proportion of pharmaceutical studies and there is some evidence from higher quality studies that the treatment of depression using fluvoxamine and sertraline may reduce suicidal ideation.

13 Equivocal outcomes for pharmaceutical intervention may account for a growing trend in the research literature to focus on the evaluation of non-pharmaceutical interventions. Whilst, to date, these have fared little better than pharmaceutical intervention, the emerging evidence base does point more consistently to some promising avenues for intervention. In respect of completed suicide, the available studies, including a limited number of higher quality studies, consistently point to a reduction in completed suicide following restrictions in the access to means[1] and also following the maintenance of ongoing contact with the suicidal person. There is some evidence that service provision via specialist centres with highly trained personnel may also reduce rates of completed suicide. Consistent reductions in attempted suicide have been shown following a restriction in the access to means and following the setting up of informal social support for the suicidal person, although these outcomes are taken from a very small number of studies.

14 The use of individualised and intensive cognitive and behavioural therapies has shown particular promise in respect of reductions in attempted suicide and self-harm. The best evaluated of such therapies to date are Cognitive Behaviour Therapy (CBT) and Dialectical Behaviour Therapy (DBT), with the latter finding more consistent support within the literature, notably in the context of treatment for borderline personality disorder. There is currently little evidence relating to the effectiveness or otherwise of non-pharmaceutical interventions for suicidal ideation. The evidence which does exist presents only equivocal support for the use of CBT in this context. There is some limited evidence from higher quality studies that suicidal ideation may be reduced, over the short-term at least, by the use of telephone-based support, with non-interventionist/non-directive styles of communication demonstrating a greater impact on reductions in suicidal ideation.

[1] Primarily evaluated in the context of national firearms control initiatives, but also with regard to the impact of individual-level firearms control, other national initiatives including carbon monoxide legislation and 'personalised' restriction of the access to 'preferred means of self-harm'.

Considerations for future research and practice

15 It is important to recognise that a lack of evidence of effectiveness is not the same as evidence that an intervention does *not* work. Very few interventions to date have been evaluated by more than a very small number of studies and the number of high quality studies available is even smaller. Although the methodological approaches adopted by the available literature are relatively sophisticated in comparison with many fields of health research, clear methodological failings are nevertheless evident and need to be addressed in future research.

16 Of particular concern is the fact that not one of the evaluated interventions had been pursued fully from the start point of theoretical development through to full scale long-term 'real world' implementation, as recommended by the Medical Research Council (MRC, Campbell 2000). Whilst this report attempts to identify the most promising interventions given the evidence which *is* currently available, it is important that the lack of extensive and robust evidence is addressed. A well-funded, co-ordinated programme of research could go a long way towards improving the effectiveness of interventions for suicidal behaviour and ideation. Focussing initially on those interventions which find some support in the existing literature is likely to be the most cost-effective approach to driving forward the research base.

17 Many of the interventions which have shown promise to date are either not currently provided within the mainstream of service provision (e.g. long-term ongoing contact following discharge, support in developing social support networks) or are not available to the majority of people presenting with suicidal behaviours because services are over-subscribed (e.g. DBT). The most common form of intervention (pharmaceutical intervention), although it is also the most extensively evaluated, finds only equivocal support in the available literature. This picture may be improved by targeting the more promising forms of pharmaceutical intervention on population sub-groups for which there is some evidence of effectiveness (as with current studies evaluating the use of lithium in bipolar disorder and sertraline in depression). However, with emerging evidence that both minimalist interventions (such as ongoing contact) and intensive individualised therapies (e.g. DBT) show consistent evidence of effectiveness, there are clear incentives to focus future research initially on these comparatively novel and potentially cost-effective approaches. Future research could, for example, usefully evaluate which components of such therapies are of particular value and for which groups.

18 Considering the *platform* for service delivery, services for people showing suicidal behaviour or ideation in the UK are not currently structured around the model of specialist service provision (via dedicated centres or teams) which the literature suggests may be the most promising model of service delivery. Also at the broader, national, level, the most prominent forms of general population prevention initiatives (public information and school-based educational initiatives) are both under-evaluated and lacking in robust evidence of effectiveness where they have been evaluated. It may be that over time both the general nature of prevention and service provision and specific approaches to service provision for suicidal behaviour and ideation need to be re-considered and re-structured in line with outcomes from the developing evidence base. In the short-term however, it is essential that a co-ordinated approach to the research evaluation of *both* the structure of service provision and of the more promising interventions is put in place. Currently the 'scatter-gun' approach to research and the resulting fractured picture of intervention hinders any systematic approach to implementing evidence-based practice either in respect of the platform for service delivery or in respect of the interventions themselves.

19 In the absence of a fully developed evidence base, current recommendations for practice need to focus on those approaches for which there is both the most consistent support *and* the least evidence of potential harm to the client. Following this approach, the review provides some evidence that both relatively 'low key' interventions such as maintaining ongoing contact or supporting people in the development of social networks and short, intensive, cognitive interventions with a behavioural component (e.g. DBT) may be of benefit. At the broader level of national initiatives, the most promising interventions may be legislation aimed at restricting the access to means, service provision co-ordinated through specialist centres and provision of telephone-based or other centres to support the maintenance of ongoing contact with people at risk of suicidal behaviour.

20 We recommend that, in an effort to increase the evidence base as rapidly as possible, practitioners and researchers collaborate in the evaluation of ongoing interventions using routine data collated across the full range of clinical, community and institutional settings. This will be a challenging task, notably given current constraints on the use of patient information, but it is a necessary strategy, since the likelihood of individual research studies significantly increasing the current evidence base in the short term is slim. Future prevention strategies could be significantly improved by the routine collection of accurate and detailed cross-service information relating to presentations for self-harm.

CHAPTER ONE INTRODUCTION

Background

1.1 Scotland has higher age standardised rates of completed suicide than all other parts of the UK, with an age-standardised three year rolling average rate of 15.1 per 100,000 reported for the period 2004-2006 (Scottish Public Health Observatory) compared to a rate of 11.4 reported for the nearest available comparator period in England and Wales (Office of National Statistics, rates for the period 2000-2003). To draw a wider comparison, the 2005 European age standardised rate cited by *Choose Life*, was 14.6 per 100,000. In line with other parts of the UK, available data show variation in the rates of completed suicide associated with age, gender, level of deprivation and geographic location. The suicide rate for males is around three times that for females, suicide is a leading cause of mortality in those aged under 35 and the risk of death overtly identified as suicide or specified as relating to an act of undetermined intent in the most deprived areas of Scotland is almost double the Scottish average[2] .

1.2 Whilst the profile of completed suicide is relatively well-established, with national mortality rates calculated annually and evaluated for broad demographic variation, less is known about the incidence and distribution of attempted suicide, self-harm and suicidal ideation[3]. Hospital inpatient admission and discharge statistics, collected separately for England, Wales, Scotland and Ireland, provide figures for the number of admissions and discharges recorded as being the result of 'self-injury' defined by International Classification of Diseases (ICD) -10 classifications. These data suggest higher rates of non-fatal self-harm in the UK than elsewhere in Europe, and provide some additional comparative information of relevance to the current review. However, inpatient admissions and discharges are likely to be a poor estimate of the absolute prevalence of suicidal behaviour and the figures do not distinguish between attempted suicide and self-harm or provide any indication of the prevalence of suicidal ideation.

1.3 The most recent national survey (Singleton 2001) comparing all three behaviours estimates lifetime self-report prevalence rates for adults to be 4.4% for attempted suicide, 2% for self-harm (without suicidal intent) and 14.9% for suicidal ideation. All three behaviours are reported as more common in women than in men and also as more common in younger than in older people. In contrast to the profile of completed suicide, self-harm and suicidal ideation showed little association with the socio-economic characteristics of survey respondents, although attempted suicide was found to be more common amongst people in lower socio-economic groups. Whilst the survey included respondents from England, Wales and Scotland, prevalence rates are not reported separately and no comparisons are drawn on the basis of location.

[2] All figures taken from rates specified by the Scottish Public Health Observatory

[3] It should also be noted that there is currently no agreed nomenclature for suicidal behaviour and ideation in the literature and consequently behaviours refered to as, for example, 'attempted suicide' in one context may not be directly comparable with the behaviours to which the same term is applied in a different context. For more information on definitions and terminology used in this report, see page 20.

1.4 One issue which is of particular relevance to the current review and which has been poorly addressed to date is the association between individual behaviours within the spectrum considered here (completed suicide, attempted suicide, self-harm and suicidal ideation). National statistics and a broad range of research studies have established beyond doubt that people engaging in suicidal behaviours (see Glossary, Annex J) are at substantively increased risk of completed suicide (e.g. Hawton et al 2003). Several recent studies have also sought to identify the broad characteristics of people engaging in different forms of suicidal behaviour (e.g. Brunner et al 2007) However, there has been little attempt to explore the underlying association between these behaviours more fully. In particular (cf. Whitlock & Knox 2007), there is a need to establish the nature of any causal relationship between suicidal ideation, self-harm, attempted suicide and completed suicide and to establish the factors and mechanisms which result in an individual moving from one form of behaviour to another. This type of holistic approach could contribute significantly to the search for effective interventions.

1.5 The (then) Scottish Executive responded to the significant public health issues outlined above by establishing a National Strategy and Action Plan, *Choose Life* (Scottish Executive, 2002), which aims to reduce death resulting from suicide by 20% by 2013. This aim mirrors other goals set within the UK (e.g.. *Saving Lives*, 1999) and contributes at a broader level to national programmes for improving mental health and wellbeing. *Choose Life* is co-ordinated at the national level by the National Implementation Support Team (NIST), which promotes and oversees the strategy's objectives, and at the local level by *Choose Life* co-ordinators who have been appointed in each of Scotland's 32 local authority areas. Working within their Community Planning Partnerships, *Choose Life* co-ordinators are tasked with agreeing, developing and implementing a local suicide prevention plan. These plans are now being implemented and a major independent evaluation of the first phase of *Choose Life* has recently been completed (Platt et al 2006).

1.6 A Scoping Study commissioned by the (then) Scottish Executive to support the above initiative identified the need for a set of reviews to provide a comprehensive overview of current knowledge regarding both the determinants (risk and protective factors) of suicidal behaviour and effective interventions for its prevention. The review of interventions which forms the focus of the current report was commissioned and is being published as part of a programme of research in support of the Scottish Government's commitment to suicide prevention, and in taking forward the *Choose Life* National Strategy and Action Plan - Objective 7 in the strategy related to 'knowing what works' (improving the quality, collection, availability and dissemination of information on issues relating to suicide and suicidal behaviour and on effective interventions to ensure the better design and implementation of responses and services and use of resources). The review serves to inform ongoing work at both local and national levels, and information drawn from the review will subsequently dovetail with a review of risk and protective factors that has also been commissioned by the Scottish Government and with the evaluation of the first phase of *Choose Life's* implementation (Platt et al 2006).

Aims and objectives

1.7 The remit of the review was to provide a comprehensive overview of the known effectiveness of interventions aimed at preventing suicidal behaviour and ideation both in key risk groups and in the general population. Specific objectives of the review were to:

- Identify the interventions which have been evaluated to date
- Summarise the conclusions which can be drawn from the literature as it stands, taking into account the quality of available data
- Highlight key defining features of the interventions evaluated to date
- Specify the known impact of interventions, taking into account the populations and settings to which these apply
- Address the cost-effectiveness of interventions where such data are available
- Consider the transferability of effective interventions to the Scottish Context and examine the implications for implementation and replication.
- Identify gaps in the evidence base
- Make evidence-based recommendations for the development of national and local policy and practice identifying variations in strategic approach for different key risk groups

Scope of the review

1.8 The review had an extremely broad focus, addressing the evidence available for any and all interventions which have been evaluated for the prevention of suicidal behaviour and suicidal ideation. Issues which were *outwith* the scope of the review were:

- Postvention
- Interventions for mental illness *not* including outcomes related specifically to suicide or suicidal behaviour
- Self-harming behaviours lacking the specific intent to self-harm (e.g. alcohol abuse; overwork etc)

CHAPTER TWO METHODS

Review approach

2.1 The review team followed the 'gold standard' protocol for the systematic review method set out by the Cochrane Collaboration and the NHS Centre for Reviews & Dissemination. The core principles of this methodology, which set it aside from the more traditional approach to carrying out a review, are:

- A comprehensive and replicable search strategy
- Quality control of included material
- Objective synthesis of the evidence

Pitfalls of the systematic review approach, which are increasingly highlighted in the literature, are:

- Long time scale
- Narrow focus
- Lack of cost-effectiveness
- Wasteful approach to data retrieval
- Lack of clinical relevance

2.2 Aside from time-scale, which is an ubiquitous complaint regarding all research, the above concerns are, in fact, not an inherent feature of the systematic review method. They derive primarily from the approaches taken to data retrieval and analysis. With regard to data retrieval, 'live' on-line search and retrieval strategies commonly result in high cost and, perhaps more importantly, the necessity of discarding substantive quantities of potentially relevant material. The narrow focus and lack of clinical relevance commonly cited results from the decision to set tight search parameters in advance of initial citation retrieval and to focus, for similar reasons, on retrieving and extracting data from only the 'highest quality' studies (currently synonymous with randomised controlled trials in the context of intervention research). The latter requirement relies on the implicit and erroneous assumptions that 'poorer quality' evidence is no evidence at all and that poorly executed high quality designs are nevertheless able to provide superior evidence to that provided by well executed but less ideal methods.

2.3 In carrying out a similarly wide-ranging systematic review of risk assessment and intervention in the context of other-directed violent behaviour (Leitner et al 2006), we developed an alternative approach to data retrieval which we believe better serves the pragmatic needs of clinical research and which has advantages for future research in retaining rather than discarding material suited to addressing novel questions which may arise following the initial outcomes of a review. Simply put, our approach is to set very broad initial search parameters, download all initially retrieved citations to a bibliographic software package and develop syntax to carry out *post hoc* explorations of the resulting extensive database.

2.4 The above approach allows outcomes to be explored 'iteratively' following the standard empirical approaches to theory testing used in primary research. The syntax models we use are based on the successive fractions approach of Hartley et al (1993) which test the impact of permutations of main terms (such as 'suicide') and restriction terms (such as 'intervention') in determining the volume and specificity of retrieved material. An additional benefit of using this approach in the current context is that it allows any 'clustering' of the literature around core themes to be data driven. In combination with an approach to data analysis which embraces a broad range of distinct study designs and which evaluates outcomes using studies as well as participants as a unit of analysis, we feel that this approach provides the necessary flexibility to address immediate clinical concerns in complex areas such as suicide. It also provides the option of revisiting the broader database of initially retrieved citations should additional queries arise following preliminary research.

Review protocol

2.5 Since the aim of the review was to provide as broad as possible an overview of the relevant literature in this field, the range of databases searched was chosen to reflect a diverse range of approaches to the issue of intervention and to access, in so far as was possible within the restricted time period available, both formal and 'grey'[4] sources of literature. The **databases** chosen on this basis were as follows:

Medical Literature: Medline, National Research Register, NICE, Controlled Clinical Trials Register

Nursing, Allied Health & Complementary Medicine: CINAHL, AMED

Social Sciences & Psychology: PsychInfo, ASSIA (applied social sciences), Social Sciences Citation Index, APA PsychArticles

Specialist Reviews Literature: Cochrane (Medical) (including DARE and Cochrane Reviews and Cochrane Methodological Reviews), C2-Spectr (Criminological/forensic)

Health Economics & Health Technology Assessment: NCCHTA, NHSEED, ECONLIT

'Grey' Literature: PROQUEST, FADE

[4] 'Grey' literature refers to hard-to-access literature, primarily literature which is unpublished or published only in a restricted format such as in-house journals, annual reports, doctoral dissertations etc.

2.6 Within each of the above databases, searches were **unrestricted by date**, except in respect to the limits set by the database itself. The earliest citation retrieved was from 1956 (via Social Sciences Citation Index). Searches were updated and finalised in June 2006. Material appearing in electronic databases after this point is therefore outside the scope of the review. Given the limited time and resources available for the review, it was necessary to restrict searches to the **English language literature**. Previous experience with similar reviews suggests that this restriction is unlikely to have had a significant impact on outcomes. Only around 1% of available material in this research field is likely to be accessible only in languages other than English. In line with specifications in the tender, the search was not restricted by **age of study participants**, or by the **type of intervention** considered, or by **study design** or by the **population** or **setting** for which an intervention had been developed or in which an intervention was evaluated. Following initial trials of possible search strategies and subsequent discussions with the Research Advisory Group, the following limited range of **inclusion/exclusion criteria** were set to 'fine tune' the otherwise very broad remit of the review outlined above:

- Only 'empirical' studies to be included, broadly defined to include any quantitative or qualitative approach aiming to evaluate the impact of an intervention on self-harm or suicide
- Outcomes to include all completed suicide and suicidal behaviour, including self-harm and suicidal ideation
- Focus on 'intentional' behaviour only (e.g. exclusion of non-intentional self-harm in people with learning disabilities or conditions such as Lesch Nyhan's disease)

2.7 In categorising studies with respect to the type of suicidal behaviour addressed (completed suicide, attempted suicide, self-harm, suicidal ideation) we were, of necessity, wholly dependent on the descriptions given by study authors. Since the descriptions provided were in general quite poor, it has not been possible to draw any fine-grained distinctions within and between categories. For example, we are unable to differentiate here between attempted suicide/self-harm with or without identified suicidal intent. The four main categories themselves reflect the forms of behaviour specifically included within the remit of the review, but also accurately reflect the most common labels applied by study authors to the behaviours being evaluated. It should be noted that there is likely to be some overlap in the behaviours assigned, respectively, to the categories of 'attempted suicide' and 'self-harm'. One author's definition of attempted suicide may well be another author's definition of 'self-harm' and we have no way of unpicking this further.

2.8 Following the novel approach outlined earlier, initial search terms used for on-line searching in the above databases adopted the generic format outlined below:

Suicid* OR selfharm* OR self-harm* OR (self AND harm*) OR selfinjur* OR self-injur* OR (self AND injur*) OR selfpoison* OR self-poison* OR (self AND poison*) OR selfmutilat* OR self-mutilat* OR (self AND mutilat*) OR selflacerat* OR self-lacerat* OR (self AND lacerat*) OR selfcut* OR self-cut* OR (self AND cut*) OR parasuicid* OR para-suicid* OR ((deliberat* OR intent*) AND overdos*)

2.9 The asterisk in the above search string indicates a 'wildcard', which allows for the retrieval of all terms including the preceding phrase (e.g. for 'suicid*' this would retrieve also articles referencing suicide, suicidal, suicidality etc.). The search string as set out is written in a generic format. Different databases use distinct approaches to literal and Boolean searching and substitute diverse wildcards and connection terms. The search string was adapted to the format of each database as necessary. The rationale for restricting the main search terms for 'overdose' by the terms 'deliberat*' and 'intent*' was that, in running trials of the search strategy, it become clear that whilst the other self-harm related terms were in and of themselves comparatively specific, the term 'overdose' was, in search terms, an extremely over-sensitive one, accessing a broad range of irrelevant material including accidental overdosing of patients in the medical context. A Medline trial of the search string including overdose as an unrestricted term, for example, produced a total of 289,799 citations in contrast to 70,371 with the restriction terms added.

2.10 Once citations from all databases had been downloaded into the bibliographic software (Reference Manager) and de-duplicated to remove replications of any given citation which had been identified by more than one database, a restriction term string was developed to identify material relating specifically to interventions:

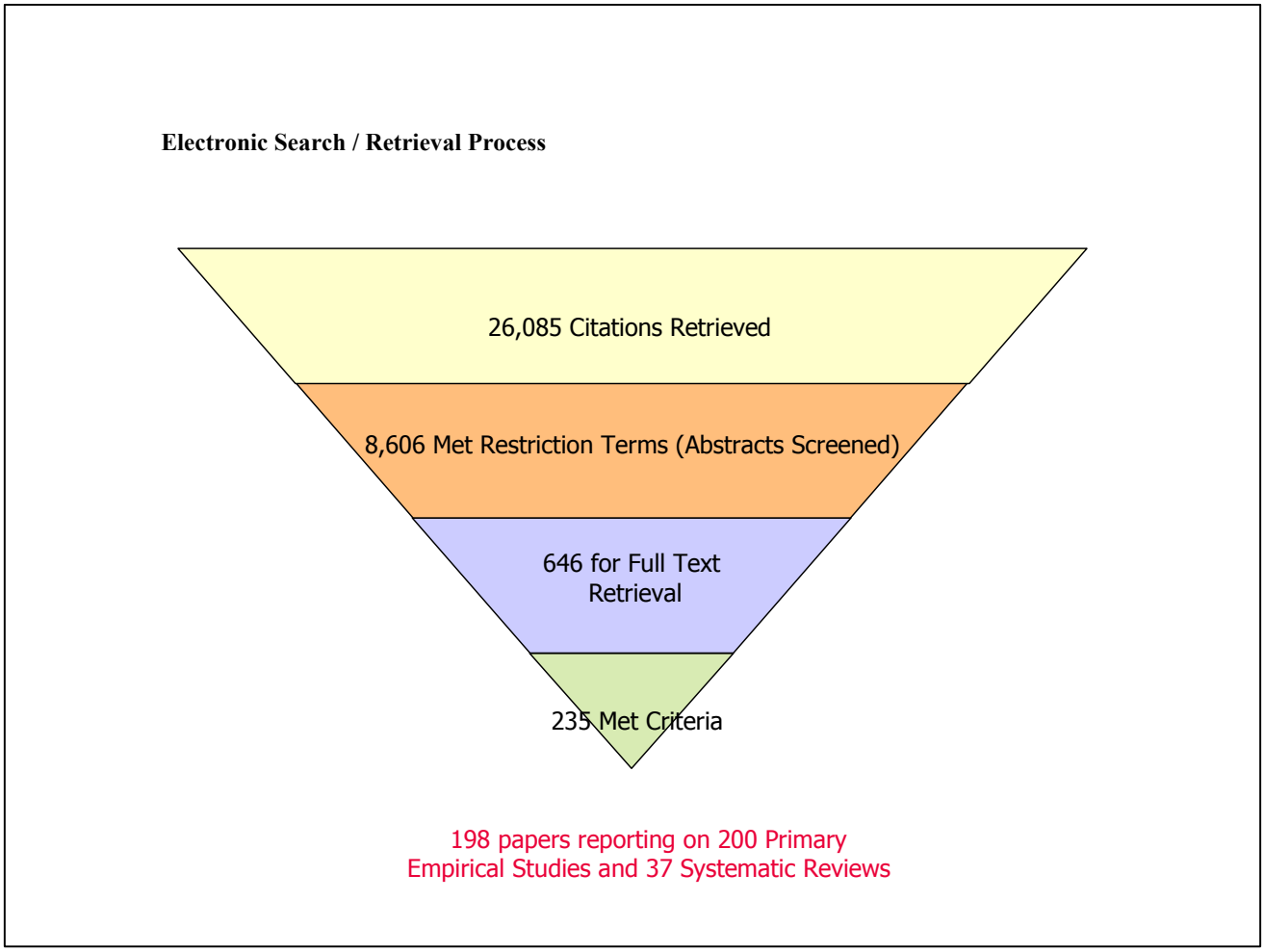
{Interven*} OR {prevent*} OR {control*} OR {manage*} OR {treat*} OR {reduc*} OR {stop*} OR {restrain*} OR {trial*}

2.11 Additional restriction terms initially run on a trial basis and subsequently rejected included car* (care, caring etc.) and help* (helping etc.). As with 'overdose', these increased the sensitivity but substantially reduced the specificity of the search in identifying relevant material. Although, ideally, a full abstract or full-text search would have been undertaken, given pragmatic constraints, the final search was tied to words appearing either in the title of a citation or in specified keywords. Annex D provides a table summarising outcomes from the above search strategy, setting out the number of citations retrieved via each database (prior to de-duplication) for the full Boolean search (for those databases supporting Boolean search strings) and for each individual set of search terms (self-harm, selfharm, self AND harm etc) taken separately. This is of value not only in tracking the current search through to its sources, but also in evaluating the breadth of coverage of material relating to suicide and self-harm by the different types of source previously outlined.

Review process

2.12 The following diagram gives a visual overview of the stages and outcomes in the review process:

Figure 2.1



2.13 Following de-duplication, the number of individual citations available for searching with the set of restriction terms developed was 26,085. The intervention restriction terms reduced this number by around two thirds. Exploratory random selection searches within the excluded material suggest that a high proportion of the excluded material relates to purely discursive papers. However, it was equally apparent that there is an imbalance in the literature favouring the analysis of risk over intervention.

2.14 The abstracts of the 8,606 citations identified using the intervention restriction terms were each read by one reviewer with the aim of *excluding* any which very clearly did not meet our review criteria. Abstracts which were ambiguous or which failed to provide sufficient information were initially read by two reviewers and if a decision regarding exclusion could still not be made the full-text material was ordered. At the end of this process 646 citations were identified as potentially meeting all of the review criteria and were obtained in full-text format. Each of these full-text articles were read by two reviewers, with a third reviewer reading any for which an initial decision to include or exclude proved problematic. This resulted in 235 reports of studies meeting the review criteria. An additional 8 reports were identified as of possible relevance, but these could not be retrieved during the timescale of the review. Subsequently we have been provided with copies of 6 of these missing papers[5] and references and brief summaries of the papers are provided at Annex A. Evidence taken from this additional material does not alter any conclusions reached in the review.

2.15 Within the 235 reports identified, we include 'linked' material. That is, separate reports of a study which provide additional rather than identical material – for example, additional years of follow-up for an ongoing trial, or a meta-analysis of data from two or more trials. For current purposes these are counted as separate studies. Duplicate papers, providing no new information, have been discarded, with the named paper for the review referring to the paper providing most comprehensive details of the study methods etc. In total, 198 of the citations subject to full-text retrieval reported on *primary* empirical studies. A small number of these reported on either two distinct primary studies or on a primary study and a meta-analysis or systematic review. Dividing these out provided a final total of **200 primary empirical studies** and **37 systematic reviews** falling within the remit of the current review.

2.16 Since the review process was designed to identify studies reporting on suicide, attempted suicide, self-harm or suicidal ideation as explicit outcomes, studies which may include pertinent information but which have not themselves identified these issues as a specific outcome (for example studies reporting on suicide as an unintended adverse consequence or studies focussed on other main outcomes but reporting incidental outcomes for suicidal behaviour) are unlikely to have been included. All material was identified by electronic searches as, for pragmatic reasons, it was not possible to carry out hand searches of key journals or to check the reference lists of all retrieved articles. This may have led to additional material being missed.

[5] We are very grateful to Professor Stephen Platt for kindly providing us with copies of the missing papers.

Definitions and terminology

2.17 The remit of the review was to identify and report on studies evaluating interventions for suicide, attempted suicide, self-harm and suicidal ideation. Defining these terms is not straightforward and, increasingly, both researchers and clinicians are recognising the need for a standardised nomenclature in this field (cf. Andriessen 2006, Silverman 2006). Definitions of the terms which have been cited fairly widely in the literature are as follows:

Suicide The termination of an individual's life resulting directly or indirectly from a positive or negative act of the victim himself which he knows will produce this fatal result (Durkheim 1857)

Attempted suicide A potentially self injurious action with a non-fatal outcome for which there is evidence, either explicit or implicit, that the individual intended to kill himself or herself (Moscicki 1997)

(Deliberate) Self-Harm An acute non-fatal act of self harm carried out deliberately in the form of an acute episode of behaviour by an individual with variable motivation (Gelder et al 2001)

Suicidal Ideation The existence of current wishes and plans to commit suicide (Steer et al 1993)

2.18 All of the above definitions refer directly or indirectly to the conscious motivations of an individual and it is this reference to the motivation behind an act which makes the definition of suicidal behaviour and ideation problematic. By way of example, at the point at which a person engages in an act which may later be defined by themselves or by others as attempted suicide, they are likely to be in an emotionally charged state, may be under the influence of alcohol or drugs and may have little perspective regarding their own specific motivations or intentions. Following the act, external rationalisations, concerns regarding the perceptions of others and a confused memory of the events leading up to the act or of the act itself may cloud any retrospective interpretation of what happened. Consequently even the person themselves may not be able to provide a clear account of their motivation in carrying out a particular act.

2.19 Defining suicidal behaviour via the perceptions of other key observers of the act or its aftermath (e.g. Harris et al's 2005 definition of self-poisoning, which includes "severe alcohol intoxication where clinical staff consider such cases to be acts of self-harm") is equally unreliable. Studies evaluating variations in clinician-assigned diagnostic codes (e.g. Rhodes et al 2002), for example, have demonstrated that the likelihood that a person who *has* self-harmed will be *diagnosed* as having self-harmed depends on a wide variety of factors, including the age of the person, their length of stay in hospital, the prior existence of a mental health diagnosis, the clinical speciality of the diagnosing clinician and whether or not the clinician was asked to identify the diagnosis as 'deliberate self-harm' or simply 'self-harm' in hospital records.

2.20 Attempts to provide operational definitions via reference to 'objective' features of an act such as its lethality or via the development of psychometric measures of intentionality such as the Suicide Intent Scale (Beck 1974) have also failed to resolve the problem of definition, since there appears to be at best only a weak association between intentionality, lethality and the nature of the act itself (cf. Nielsen et al 1993). Finally, attempts to define suicidal behaviours *without* reference to motivation (e.g. the definition of self-harm as "…intentional self-injury or self-poisoning, irrespective of motivation" given by Hawton et al 2003a and the definition of 'parasuicide' as an act "in which the (person) simulates or mimics suicide, in that he is the immediate agent of an act which is actually or potentially physically harmful to himself" by Kreitman et al, 1969) unfortunately only shift the problem of definition elsewhere by substituting terms which themselves are open to interpretation (e.g. 'intentional' 'simulate').

2.21 The authors of the primary studies included in this review very rarely provided any definition of the behaviours evaluated beyond ascribing the broad labels of 'suicide', 'attempted suicide' etc. It is, however, apparent from the above discussion that the behaviours against which interventions are judged are unlikely to be wholly equivalent across studies even where the labels assigned are the same. Similar problems of definition occur also in respect of the outcome measures used. For example, in the case of completed suicide a study author may establish rates of suicide based on local police statistics, coroner's reports, national statistics or the reports of next of kin. These and other available sources do not operate to the same guidelines, accept the same weight or type of evidence or report their conclusions in the same format. Again, therefore, one study, even of completed suicide, can only be regarded as approximately similar to another. Similarly, one scale-based measure of suicidal ideation may take into account factors not considered by another (e.g. presence or absence of 'plans' to carry out a suicide attempt) and again the behaviours included in the evaluation of an intervention, although broadly similar, cannot be encompassed within precisely the same definition.

2.22 **Since we have no access to any account of the behaviours evaluated in the literature *other than* through the study author's descriptions, we use the labels given by individual study authors to define the behaviours at issue throughout the report.** We recognise that the lack of tightly specified concrete definitions of the behaviours addressed by individual studies may be a source of frustration for practitioners attempting to apply the findings to their own clients. Unfortunately, this reflects the reality of the literature available and, more broadly, the complex nature of the behaviours themselves.

2.23 Finally, in respect of a further key definition within the text, we use the terms 'intervention' or 'intervention practice' to cover intervention by the full range of professional and volunteer bodies engaged in suicide prevention activity. In reality, however, the vast majority of the research evidence relates to *clinical* practice, generally with the implied expectation that the evaluated interventions will be delivered by the medical, mental health and clinical psychology professions. Very few studies specified a particular provider outside of these professional groups. This, of course, does not rule out the effectiveness of such interventions delivered via other groups and, in the small number of cases where studies addressed educational or other public health and related initiatives, the primary provider is in any case likely to be a specialist outside of these professions.

Further contextual details of the included studies and how these may be seen to impact on the interpretation of study outcomes are given in Annex F.

CHAPTER THREE OVERVIEW OF RETRIEVED MATERIAL

Profile of retrieved and rejected material

3.1 The 646 papers retrieved in full-text format and screened by two reviewers provide a backdrop against which to set the core material included in the review. A number of papers were rejected simply because, although referring to intervention in their abstracts, they addressed only risk assessment. These aside, the rejected papers provide some insight into the way in which intervention has been addressed in the literature. Taken together with the minority of studies which were eventually included and seen as a snapshot of available research, it becomes apparent that, as with comparable public health literatures (such as other-directed violence *cf.* Leitner et al 2006), much of the available research material focuses on issues which are, in fact, peripheral to prevention or intervention as such. Table 3.1 below summarises the reasons for excluding material following full-text retrieval.

Table 3.1 Reasons for Study Exclusion (% of rejected studies)

Study focussed on risk not intervention	Study described an intervention or approach to prevention but presented no data	Study was a non-systematic review	Study was purely epidemiological	Study related to unintentional self-harm	Other reason
8.5	18.2	15.2	8.1	29.4	21.6

3.2 The reasons for rejection included in the comparatively large 'other' category in Table 3.1 are quite diverse, but primarily, as suggested above, relate to studies which focussed on issues relevant but peripheral to intervention, with no attempt to evaluate outcomes of direct relevance to self-harm. In addition to purely polemical material and to reviews of the primary literature which failed to meet the criteria for a systematic approach, this category included a number of studies with the potential and stated intention to provide material of direct relevance to intervention. For example, a study of the frequency with which GPs questioned their patients regarding the presence of firearms in their house; a study focussed on how best to teach medical students about self-harm; and a study interviewing families bereaved by suicide about their experience of medical care for the family member who had completed suicide. These studies were excluded because, although they addressed issues of direct relevance to intervention, they failed to provide any data relevant to the evaluation of the intervention discussed.

3.3 The proportion of studies rejected for describing an intervention without presenting data is comparatively high, but not unusually so for the mental health literature. This may be a reflection of a lack of funding to complete the research or possibly of the difficulty of carrying studies through to completion, given actual or perceived ethical and pragmatic constraints. Studies which are categorised as purely epidemiological in the above table provided only simple 'headcounts' or rates rather than data which could be used to directly address outcome.

Profile of systematic reviews and protocols retrieved

3.4 The aim of the review was to provide an account of the existing *primary* research evidence in relation to interventions for suicidal behaviour and suicidal ideation. The intention was to provide a novel synthesis of the evidence, giving a broader overview of the available information than that provided by existing reviews. However, it would be cavalier to wholly ignore the outcomes of the many systematic reviews and meta-analyses carried out on aspects of the evidence base to date. Annex E provides an overview of the systematic reviews retrieved by our search strategy and a more detailed account of the outcomes of these reviews. The main issues and outcomes identified are summarised below:

- The bulk of previous systematic reviews (49%) have focussed exclusively on pharmaceutical interventions
- Around one third of the available reviews include only material derived from Randomised Controlled Trials (RCTs)
- None of the systematic reviews identified focussed specifically on outcomes from qualitative research
- Nearly half of the reviews (46%) focussed solely on populations with a diagnosed mental health problem
- A high proportion (43%) of the reviews identified positive outcomes for the intervention evaluated
- Despite the positive tone of many of the reviews, the evidence base cited for individual interventions was consistently weak and reviews of the same intervention often reported contradictory findings[6]

3.5 Taking the outcomes of the existing reviews at face value, reductions in suicidal behaviour or ideation are reported for the following interventions:

- Lithium for bipolar, affective and mood disorders
- Alprazolam for depression
- Fluvoxamine for depression
- Paroxetine for depression
- Fluoxetine for depression and mood disorders
- Clozapine for schizophrenia or schizoaffective disorders
- Cognitive Behaviour Therapy in self-harming populations
- Dialectical Behaviour Therapy (no specific population)
- Green Card Initiatives in self-harming populations presenting to A&E
- Physician education in recognising and treating depression
- Restriction of access to means (primarily evaluated in the context of firearms control)

[6] Perhaps surprisingly, this is not an uncommon finding. Different reviews may choose to include different primary material, or may choose to set distinct criteria for a 'successful' outcome for an intervention, or may simply interpret the evidence differently.

3.6 Adverse outcomes (an increase in suicidal behaviour or ideation) are reported for the following interventions:

- Levetiracetam for epilepsy
- Naltrexone for opioid dependence

3.7 Equivocal outcomes (evidence of both increases and decreases in suicidal behaviour or ideation or calls for further evidence) were reported for the following interventions:

- Lithium for mood disorders
- Lithium as an adjunct to olanzapine
- Fluoxetine as an adjunct to olanzapine
- SSRIs for depression
- SSRIs used to reduce self-harm in the general population
- Pharmacological treatment of any kind for borderline personality disorder
- Psychosocial programmes for depression
- Psychosocial programmes for low risk groups
- Curriculum based educational initiatives
- Suicide prevention centres
- Electro-Convulsive therapy
- No-suicide contracts
- Contact with clinicians or with liaison psychiatry
- Prevention programmes based in general hospital or A&E settings

3.8 The above profile of outcomes from previous reviews can be compared to the outcomes from this review, which are based, for the most part, on a broader overview of the literature as a whole and on a more recent evidence base. The main differences between this and previous reviews lie in the greater caution expressed in this review regarding the quality and reliability of the evidence base, in particular in respect of pharmaceutical interventions and in the addition of more recent evidence in this review regarding a range of interventions not currently in general usage including psycho-therapeutic and service-based initiatives. One chief advantage this review holds over previous reviews is the ability to directly compare and contrast outcomes for different modes of intervention and different modes of behaviour across different populations and settings.

Profile of primary studies included

3.9 A further key advantage of carrying out a review with very broad inclusion criteria is that the review provides a comprehensive overview of the nature of the existing primary literature. This overview is of benefit both in informing the development of future research programmes and in evaluating the extent to which current practice can be regarded as truly 'evidence based'. In Annex F, we provide a detailed overview of the nature and focus of the primary studies retrieved. A summary of key points is given below:

- The intervention literature is rapidly expanding with the majority of available studies (54%) published between 2000 and 2006
- The focus of the research literature shows a shift of emphasis away from pharmaceutical interventions and towards psycho-therapeutic and service-delivery initiatives
- The research literature has adopted a 'scattergun' approach (a total of 200 studies have evaluated 150 separate interventions). *The evidence base for any single form of intervention is therefore very limited*
- Despite an international focus (21 countries provided relevant evidence), the bulk of current research evidence derives from the US and Canada
- In contrast to other public health literatures, the UK as a whole has provided a substantive contribution to the evidence base (19% of available studies, N=38)
- Very limited evidence specific to the Scottish context is available (only 5 independent studies have evaluated interventions in the Scottish population).
- A high proportion of studies (46%) have focussed exclusively on interventions with psychiatric populations
- There is very limited evidence relating to intervention within the general population and currently we are lacking even accurate estimates of the prevalence of suicidal behaviour and ideation in either the Scottish or UK-wide general population (cf. Hawton et al 2002)
- In respect of mental health problems, the research literature shows a strong focus on depression (38% of studies) and on borderline personality disorder (24% of studies)
- Outside the mental health context, the main focus (30% of studies) is on people who have previously presented with self-harming behaviour
- Evidence specific to particular demographic groups is lacking, as studies commonly fail to report relevant details of their participants and also tend to combine outcomes for participants from different gender, ethnic or socio-economic groups
- Studies also commonly fail to identify whether participants have previously engaged in suicidal behaviour or have reported suicidal ideation
- Very few studies have focussed specifically on participants with diagnosed substance misuse and the majority of studies (73%) have failed to identify whether participants are currently or have previously engaged in substance misuse
- Just over half of all studies (53%) evaluated outcomes with participants living in the community
- The literature is lacking in high quality qualitative studies capable of providing information regarding the 'lived experience' both of pathways to suicidal behaviour and of intervention for suicidal behaviour

Scoping review of study outcomes

3.10 In line with the goal of providing a broad overview of the literature as a whole, we carried out a scoping review to identify trends in the literature. This evaluated outcomes for the full range of studies available, irrespective of the quality of individual study design, in an attempt to identify possible 'promising' interventions requiring further evaluation and to assess the impact on outcomes of key features of the available studies such as populations, settings and mode of intervention. The scoping review also attempted to address the likely cost-effectiveness of interventions, but in the event we were only able to identify three studies focussing on this issue. In considering the outcomes of the Scoping Review and also of the evaluation of the highest quality evidence set out in subsequent sections of the report, it is important to recognise that, where research is lacking, this cannot be taken as an indication that the intervention does *not* work, it is simply that there is, as yet, insufficient evidence to determine whether the intervention works or not. This is, unfortunately, the case for very many interventions which have been tried for suicidal behaviour and ideation. A detailed account of the findings of the scoping review is given in Annex G, here the main outcomes are summarised for each of the behaviours evaluated:

Suicide

- Around one third of studies (33%) evaluated intervention outcomes on the basis of their impact on completed suicide
- One third of *these* studies (33%) provided statistical evidence supporting the conclusion that completed suicide had been significantly reduced
- Studies with follow-up in the community and using official statistics as their main outcome measure were more likely to report positive outcomes
- Unequivocal support for the impact of *specific interventions* on completed suicide is nevertheless lacking due to the diverse focus of studies reporting successful outcomes
- Interventions which are consistently supported by a number of studies including some higher quality studies are the restriction of access to means and the maintenance of ongoing contact with the suicidal person; a promising approach to service delivery identified by a small number of higher quality studies is provision via specialist centres with highly trained personnel

Attempted suicide

- Over one third of studies (37%) evaluated intervention outcomes on the basis of their impact on attempted suicide
- Just under half of these studies (44%) provided statistical evidence supporting the conclusion that attempted suicide had been significantly reduced
- Higher quality studies and studies conducted on populations outside the US and Canada were more likely to report positive outcomes
- No specific intervention is consistently supported by more than a very small number of studies within the literature, promising interventions are treatment with lithium for bipolar disorder (*with the caveat that one study has identified increases in suicide and an additional study has identified increases in risk following discontinuation of treatment*), restriction of access to means and the setting up of informal social support networks

Self-harm

- Only around one fifth of studies (22%) evaluated intervention outcomes on the basis of their impact on self-harm
- Just over one third of these studies (34%) provided statistical evidence supporting the conclusion that self harm had been significantly reduced
- Higher quality studies, in particular randomised controlled trials, were more likely to report positive outcomes, whilst studies focussed on older people (aged >65) and children or young adults (aged <25) were less likely to do so
- The only specific intervention finding consistent support from a number of studies within this literature is Dialectical Behaviour Therapy (DBT) in the treatment of borderline personality disorder. Cognitive Behaviour Therapy (CBT) and the maintenance of ongoing contact also find some support as promising approaches, although the evidence for these options is more limited.

Suicidal ideation

- Close to half of the studies (47%) evaluated intervention outcomes on the basis of their impact on suicidal ideation
- Just under half of these studies (43%) provided statistical evidence supporting the conclusion that suicidal ideation had been significantly reduced
- The diversity of interventions, methodologies and populations studied is too great to allow for comparative analysis of outcomes
- No specific intervention is consistently supported by the literature: promising approaches are treatment of depression with sertraline or fluvoxamine and non-directive telephone-based support

3.11 A key message to take away from the above summary of the scoping review is that the 'scatter-gun' approach adopted by the research literature has hampered efforts to identify successful interventions. There are numerous reports of interventions which show promise, but very few interventions have been evaluated by more than one or two studies. Where an intervention *has* been evaluated by a reasonable number of studies, outcomes tend to be more equivocal, suggesting that the impact of specific interventions on suicidal behaviour or ideation may also be context dependent (an intervention of benefit to one population or within one setting may not prove effective in another). Finally, it is clear that both the methodological approach taken and the quality and rigour of study design also have an impact on outcomes. This argues for caution in the interpretation of outcomes from poorer quality studies.

3.12 To explore further the impact of different features of study design and focus on the outcomes reported, we carried out a multivariate regression analysis. Details of this analysis are set out in Annex G. The analysis suggests that the likelihood that a study will report positive outcomes is most strongly influenced by whether the study design is quantitative or qualitative (qualitative studies are significantly *less* likely to report that the intervention was successful); whether or not the study focuses on people with mental health problems (with a greater likelihood that successful outcomes will be reported for psychiatric populations) and on the primary focus of the study (with studies evaluating interventions for self-harm being significantly less likely to report positive outcomes than studies focussing on other forms of suicidal behaviour or ideation). These outcomes emphasise the need for greater attention to detail in both research and practice – suicidal behaviour is *not* a unitary phenomenon and the outcome of intervention is likely to be highly context specific.

CHAPTER FOUR EVIDENCE FROM THE HIGHEST QUALITY STUDIES

4.1 The scoping review provided an overview of outcomes for the primary literature largely independent of any consideration of study quality. To evaluate the *best* evidence currently available and also to identify aspects of current research design which could be improved on in future, we also evaluated outcomes on the basis of the quality of design and implementation shown by individual studies. Details of the approach taken are set out in Annex H. To summarise, we used a total of 15 aspects of study design and implementation to evaluate each study individually and then, in order to compare 'like with like' we selected the strongest studies from within the two categories of quantitative and qualitative design and, within each of these broad categories, selected the highest quality studies evaluating, respectively, interventions for completed suicide, for attempted suicide, for self-harm and for suicidal ideation. The 'best' studies in each category were defined as those studies achieving a total 'quality score' equal to or exceeding the median quality score for that category (that is for either quantitative or qualitative studies addressing a particular aspect of suicidal behaviour or ideation). It is important to recognise that there are significant caveats surrounding the now quite common use of summative quality scores to evaluate research studies. However, they can provide a useful rule of thumb in evaluating the likely robustness of identified outcomes and it is in this light we present findings from our quality evaluation of the available studies.

Suicide

4.2 Five of the highest quality studies identified (Owens et al 2004, Meltzer et al 2003, Milstein et al 1986, Tondo et al 1998, Zenere & Lazarus 1997) addressed completed suicide as an outcome. Studies following a quantitative methodology identified no significant improvements in outcomes following the use of clozapine or olanzapine (Meltzer et al 2003) or ECT (Milstein et al 1986) in psychiatric populations. One study (Tondo et al 1998) of lithium treatment for bipolar disorder identified a higher rate of suicidal acts prior to lithium treatment and, for those discontinuing lithium treatment, also in the first of 5 years following treatment discontinuation. This study failed, however, to specifically differentiate completed suicide from 'suicidal acts' as a whole. Positive outcomes from this study are to an extent supported also by the outcomes from a broader range of lower quality studies. However, some evidence of possible *increases* in suicide following discontinuation of treatment with lithium and the subsequent reduction in incidents of suicide only back to baseline following 2 or more years of discontinuing lithium in this study argue for caution in over-interpreting the possible benefits of this intervention.

4.3 One final quantitative study (Zenere & Lazarus 1997) reported positive outcomes following the introduction of a school crisis management programme. However, the overall number of suicides reported in this study were so low (7 at initiation of the programme down to 5 in the fifth year of the programme) that in practice random variation may equally well have accounted for the outcomes observed. The only high quality qualitative study addressing completed suicide (Owens et al 2004) followed a retrospective psychological autopsy design. This study evaluated whether or not detection and treatment of mental ill health by GPs had any association with the rate of completed suicide. The authors concluded that detection and treatment of mental ill health by GPs had been adequate and could therefore not be held as accountable for suicide. This study relates specifically to 'detection and treatment' of those who chose to *present* to a GP and of these nearly one quarter (24%) of patients failed to have their mental illness detected or treated. It therefore remains open to question whether for this sub-group of patients or for the broader group of patients with similar problems who fail to present themselves to a GP mental illness is or is not subsequently associated with suicide.

4.4 **In summary**, evidence from high quality studies of the effectiveness of available interventions to reduce completed suicide is very limited. This somewhat pessimistic outcome should be set against the broader range of studies which, whilst having less robust methodological approaches, nevertheless provide some suggestions for promising avenues to pursue. For example, studies addressing the restriction of access to means and ongoing contact with suicidal people following discharge from hospital. It is clear that a major research initiative is required in this field if practitioners are to be given the opportunity to pursue evidence-based intervention. In the interim, it could be of value to cautiously pursue the more promising approaches identified by the broader range of literature, bearing in mind the lack of high quality studies reporting unequivocal outcomes for interventions to prevent completed suicide.

Attempted suicide

4.5 Five of the highest quality studies (Kuipers & Lancaster 2000, Perseius et al 2003, Brown et al 2005, Meltzer et al 2003, Zenere & Lazarus 1997) directly addressed outcomes for attempted suicide, a further study of lithium treatment (Tondo et al 1998), referred to above, addressed attempted suicide in combination with completed suicide under the umbrella term 'suicidal acts'. All of these studies reported positive outcomes. In respect of lithium treatment, the caveats set out above also apply to outcomes for attempted suicide. Considering the other studies, three were quantitative studies (Brown et al 2005, Meltzer et al 2003, Zenere & Lazarus 1997) and two were qualitative studies following a content analysis/grounded theory methodology (Kuipers & Lancaster 2000, Perseius et al 2003). Of the quantitative studies, 2 RCTs (Brown et al 2005, Meltzer et al 2003) provide statistical support for their outcomes.

4.6 The first of the RCTs reported significantly greater reductions in attempted suicide following treatment with CBT in comparison with treatment as usual (TAU) for people attending A&E as a consequence of self-harm (a repetition rate of 24% versus 42%). The second RCT reported significantly greater reductions in attempted suicide following treatment with clozapine versus treatment with olanzapine for people with schizophrenia (a repetition rate of 7% versus 11%). It is unfortunate that the latter study did not include a placebo or non-pharmaceutical TAU arm. Without either of these comparisons in place, it is not possible to evaluate whether clozapine, in addition to outperforming olanzapine, is also able to achieve better outcomes than interventions with fewer side-effects. Both olanzapine and clozapine have known side-effects, but the main side-effect associated with clozapine (agranulocytosis) is particularly severe and also results in increased treatment costs via the need for ongoing monitoring of patients during the course of treatment. It is also worth noting in this context, that a broader range of additional, albeit lower quality, studies are more equivocal in their support for clozapine.

4.7 The one quantitative study (Zenere & Lazarus 1997) which failed to provide statistical analysis of outcomes nevertheless provided figures demonstrating a substantive decline in attempted suicide over the course of a school crisis intervention programme. The study is also referred to above in relation to completed suicide. With regards to attempted suicide, however, outcomes are more convincing. The reported incidence of attempted suicide fell from 243 at baseline to a figure of 95 during the fourth and fifth years of the study. Whilst these figures look very promising, it should still be noted that the number of individuals to whom the programme was delivered was extremely large (330,000) and that the authors did not control for random variation or for natural trends downwards. It is important therefore to avoid over-interpreting these results. Finally, two qualitative studies addressed outcomes for attempted suicide. The first study (Kuipers & Lancaster 2000) evaluated informal social support for brain injured patients. Themes identified using content analysis of interview scripts from structured interviews with patients and their carers identified two consistent mechanisms for successful intervention in suicide attempts. The first, restriction of access to means, had successfully resolved prior suicide attempts, but was cited by only a minority of patients. The second, cited by the majority of participants (total N =14) was informal social support by family, friends and clinicians.

4.9 Whilst qualitative research, in particular research with such limited numbers of participants, is not ideally suited to providing unequivocal support for the success or otherwise of interventions, provision of social support (including ongoing contact) is also consistently identified in the broader range of literature as a successful intervention. Studies reporting successful outcomes from this type of intervention include larger scale quantitative studies with adequate statistical evaluation. Restriction of access to means is similarly cited by a broader range of studies, primarily in the context of firearms control but also with reference to other national and individual level initiatives as having successful outcomes. Broader support in the literature for interventions identified as promising by at least one well conducted and more in-depth study provides a degree of confidence in assuming that these are useful avenues to explore further. However, it should again be borne in mind that the number of studies addressing any given intervention is in absolute terms quite small.

4.10 The final qualitative study evaluating interventions for attempted suicide (Perseius et al 2003) addressed the use of DBT for people with borderline personality disorder. The study provides only limited outcome details and again includes only a very small number of participants. Nevertheless, support for the intervention shows a measure of consistency, with themes derived from the transcripts of all 10 female patients suggesting that DBT was regarded as having 'saved their lives' by reducing the frequency of suicide attempts. This limited but comparatively robust evidence is also supplemented by a broader range of support from both quantitative and qualitative studies within the full range of studies identified by the review. Although positive outcomes are not as consistently reported as is the case for social support and the restriction of access to means, DBT does appear to be a promising intervention to evaluate further for some client groups, in particular for people with personality disorders.

4.11 **In summary,** the outcomes of the highest quality studies, supplemented by additional evidence from the broader range of studies outlined earlier, present a more promising picture for interventions to prevent attempted suicide than for interventions to prevent completed suicide. There is both a greater consistency in support for particular interventions and more substantive evidence to suggest which interventions can be effective in preventing attempted suicide than is the case for completed suicide. This having been said, the most promising interventions for attempted suicide have primarily been evaluated in the context of mental ill health and further research is required to confirm that the same interventions could have a similar impact in other populations, including the general population. Particularly promising interventions which have the potential for widespread implementation in a range of populations are the provision of informal social support and the restriction of access to means. Further studies exploring the latter approach in a broader range of contexts would be helpful. More specific clinical approaches which also appear promising are DBT (primarily evaluated in the context of borderline personality disorder) and, although this intervention receives less consistent support in the literature as a whole, CBT.

Self-harm

4.12 Although under-represented in respect of intervention studies as a whole, the number of higher quality studies addressing self-harm as an outcome is similar to that for other modes of suicidal behaviour. Six of the highest quality studies evaluated interventions for self-harm. Of these, two addressed self-harm defined broadly as any form of self-harm. One addressed self-mutilation, one self-injury and two self-poisoning. It is notable both here and across the full-range of studies identified that self-cutting as a specific form of self-harm is rarely addressed. The three quantitative studies addressing self-harm focussed on quite diverse interventions. The first (Bennewith et al 2002) evaluated a general practice based intervention whereby GPs were given management guidelines for good practice in respect of self-harm and subsequently pro-actively offered clients with self-harming behaviour the opportunity for a consultation. This study was a particularly well conducted RCT, with a large sample size (N=1,932) but failed to find any significant differences between the intervention and non-intervention groups on any of the three outcome measures evaluated (repeat episodes of self-harm, the number of repeat episodes and time to first repetition). This rather disappointing outcome is unfortunately supported by the broader range of General Practice-based training and other initiatives evaluated in the wider literature.

4.13 A further RCT (Carter et al 2005ps) evaluating ongoing contact, via postcards sent to people following discharge from hospital for self-poisoning, provided slightly more optimistic but still limited positive outcomes. No significant differences were found in the absolute likelihood of further admissions. However, the intervention group - who received 8 supportive postcards enquiring about their well-being over a 12 month period - did show a substantive and significant reduction in the total number of episodes recorded. One hundred and ninety two episodes were recorded for the control group versus 101 for the intervention group. For a very minimalist intervention, this is a quite substantial outcome in clinical terms. Further evidence from this study demonstrated that the impact primarily related to improvements for women rather than men, suggesting that the intervention may benefit from targeted rather than general implementation. The final quantitative study (Kapur et al 2004) addressing self-harm was a retrospective cohort study evaluating emergency department management strategies for people attending with self-poisoning. Following adjustment for baseline differences, receiving a psychosocial assessment was *not* found to be associated with reduced repetition rates. However, being referred for specialist follow-up *did* reduce rates of subsequent repetition. Again this was a particularly well conducted study with a large sample size (N=658).

4.14 Three of the six studies evaluating interventions for self-harm were qualitative studies. One of these has already been discussed in relation to suicide attempts (Perseius et al 2003) and outcomes in the context of self-harm were as for suicide attempts, with DBT showing some promise in respect of patients with borderline personality disorder. The other two studies (Bloxham et al 1993, Cowdery et al 1990) are case studies in effect traversing the borderline between quantitative and qualitative approaches. Both addressed the use of behaviour therapy to reduce self-harm using single case studies and both reported positive outcomes. In the first study, a 35 year old woman who had consistently self-injured over a lengthy period of time ceased to self-injure by the 26th week of an inpatient admission. Treatment during the admission focussed on behaviour therapy incorporating a combined token-economy and 'time-out' strategy. In the second study, a nine-year old boy substantially decreased the frequency with which he self-mutilated over the course of 50 therapy sessions, using differential reinforcement of other (non-self-harming) behaviour (DRO). Neither client was reported as having any specific mental health diagnosis.

4.15 It is worth noting, that whilst behaviour therapy shows consistently positive outcomes both in the small number of studies included in the current review and more generally in relation to studies in the wider public health and mental health literature, it appears to be an intervention which has more recently 'gone out of fashion'. Interventions adding a cognitive component to behaviour therapy, including DBT and CBT, which are shown to be promising approaches in the current context appear to have displaced behaviour therapy *per se* as an intervention of choice[7]. Interestingly, however, we were unable to find any studies providing evidence that the addition of a cognitive element improved outcomes and/or that it is the cognitive element specifically which successfully addresses the behaviour. It is therefore unclear that this evolution from a simpler to a more resource intensive and complex intervention is itself evidence-based.

4.16 **In summary**, the evidence evaluating particular interventions for self-harm is more limited overall than is the case either for other suicidal behaviours or for suicidal ideation. Whilst the proportion of all studies which are of high quality is greater for self-harm than for the other outcomes evaluated, the messages for future intervention are also more equivocal and, in comparison with outcomes for attempted suicide, less positive overall. As the evidence base currently stands, there is, as with attempted suicide, some evidence that DBT may be of value, although it is important that in future research outcomes relating to the cognitive components of both this therapy and of CBT are distinguished from outcomes attributable solely to the behavioural component. There is again also some support for the efficacy of ongoing contact, although in the context of self-harm outcomes for this form of intervention are slightly less convincing than is the case for attempted suicide. There is currently no support for the efficacy of GP-based contact and training initiatives or for psychosocial assessment carried out in the context of hospital presentation. There is some limited evidence in the latter context that referral for specialist support may be of value. It is important that future research address the relative paucity of studies focussed specifically on interventions for self-harm.

[7] This point was raised during a discussion of initial outcomes from the review held during an annual meeting hosted by the Oxford Centre for Suicide Research. We are extremely grateful for the helpful discussion of this and other points relating to the review and would like to extend our thanks to those attending and contributing to the discussion.

Outcomes for suicidal ideation

4.17 In line with the broader range of studies considered earlier, suicidal ideation was also addressed by a greater proportion of the highest quality studies than suicidal behaviour. Three qualitative studies and 8 quantitative studies evaluated interventions to reduce suicidal ideation. One of the quantitative studies (Brown et al 2005), also discussed in relation to outcomes for attempted suicide, presented evidence from a randomised controlled trial of CBT versus TAU in an A&E setting. Although a substantive reduction in attempted suicide was reported for the CBT group, this study found no significant differences in outcomes for suicidal ideation at any assessment point for the intervention group treated with CBT versus the TAU group. A further study (Zenere & Lazarus 1997) has been discussed in relation to outcomes for both suicide and attempted suicide. In respect of suicidal ideation this study, presenting outcomes from a school-based crisis intervention programme, also provided little evidence of more than a temporary decline in suicidal ideation, with the prevalence of suicidal ideation at the end of the study back to baseline figures.

4.18 The six quantitative studies which focussed exclusively on suicidal ideation all reported positive outcomes, with greater or lesser support from the statistical analyses presented. All six studies used scale-based measures of ideation. Five studies using the Hamilton Rating Scale for Depression (HAMD 1960) reported significant decreases in suicidal ideation from baseline for depressed patients treated with moclobemide (Gagiano et al 1995), fluvoxamine (Gonella et al 1990, Kasper et al 1995) and sertraline (Lapierre 1991a and b) but not for comparator groups receiving imipramine (compared with fluvoxamine, Kasper et al 1995) or amitriptyline (compared with sertraline, Gonella et al 1990). One study (King et al 2003) using a scale developed during the study but based on the MINI International Neuropsychiatric Interview (Sheehan et al 1998) reported significant reductions in suicidal ideation from the beginning to the end of telephone counselling sessions conducted in the context of a community based helpline.

4.19 The one study supporting the use of moclobemide is hampered by the fact that its main goal was to compare different dosages of moclobemide (all of which were reported as reducing suicidal ideation to the same degree) without any attempt to compare this intervention to either placebo or active comparators. One of the fluvoxamine studies (Gonella et al 1990) failed to provide adequate statistics to support narrative outcomes and also failed to employ a placebo comparator. However, outcomes are similarly positive for the second study (Kasper et al 1995) which, although again giving sparse details of statistical analyses, did match the active treatment against placebo. Of the two studies evaluating treatment with sertraline, one again failed to provide an adequate account of the statistical analyses carried out and also failed to provide a placebo comparator (Lapierre1991b), the other (Lapierre1991a) employed a placebo but failed to differentiate outcomes specific to suicidal ideation from outcomes relating to total HAMD scores in statistical analyses. Whilst these pharmaceutical studies are of high quality in respect of design and implementation therefore, the focus and presentation of their analyses leave something to be desired.

4.20 The one non-pharmaceutical study in this group of quantitative studies (King et al 2003) provides more concrete support for a reduction in suicidal ideation. However, this study has a very limited follow-up, restricting, for pragmatic reasons, the evaluation of outcomes to the course of a single telephone conversation, albeit for a large number (N=1010) of individuals. Nevertheless, consistently positive outcomes were reported with quite substantive mean differences in suicidal ideation from beginning to end of call ($t=12.6$ $p<0.005$) and similarly a substantive mean decrease in suicidal urgency ($t=-8.4$ $p<0.0005$). Comparable, although smaller, differences were reported for the subset of scale items relating to 'imminent' thoughts of suicide and to raters' perceptions of changes in suicidal ideation.

4.21 Three qualitative studies focussed on the evaluation of interventions for suicidal ideation. Two of these studies (Kuipers & Lancaster 2000, Perseius et al 2003) have been discussed earlier in relation to interventions for attempted suicide. Both reported similarly positive outcomes for suicidal ideation in respect of the effectiveness of informal social support and DBT respectively. The third study (Mishara et al 1997) reported more equivocal outcomes. This study involved non-participant observation of telephone intervention styles used by helpline staff. The study compared directive versus non-directive 'Rogerian' styles of communication. Overall, there were no significant differences between the two styles in respect of changes in suicidal ideation from the beginning to end of calls, as evaluated by the Suicide Urgency Scale (Morisette 1984). However, when outcomes were evaluated on the basis of whether or not a caller was regarded as 'chronic' versus 'non-chronic' in respect of the frequency of their calls to the helpline, the authors reported that Rogerian (non-directive) telephone styles improved outcomes for non-chronic callers. The Rogerian style of communication also significantly increased the likelihood of establishing a 'no suicide' contract with callers.

4.22 **In summary**, outcomes for the higher quality studies evaluating interventions for reducing suicidal ideation broadly match those observed for the wider range of lower quality studies. The two sets of studies also match one another in a focus on pharmaceutical intervention. The prevalence of pharmaceutical intervention in this context may be accounted for by the ease of adding scale-based measures of suicidal ideation to trials with a main focus on depression. Additional studies specifically focussed on suicidal ideation and studies exploring suicidal ideation outside the context of mental health problems would be helpful. Outcomes from the available pharmaceutical studies are also hampered by a lack of placebo control and poor reporting of statistical outcomes. The evidence as it stands suggests that there is some, very limited, support for the use of moclobemide and rather stronger, but not unequivocal, support for the use of fluvoxamine and sertraline in reducing suicidal ideation. There is currently no support from high quality studies or from the broader range of studies to support the use of imipramine or amitriptyline. All of these outcomes relate to interventions for people with depression only. In respect of non-pharmaceutical interventions, there is currently no support from higher quality studies and only equivocal support from the range of other studies available for the efficacy of CBT or school-based intervention programmes in reducing suicidal ideation. There is some limited evidence of the efficacy of telephone-based support over very short follow-up periods (the length of the call) with again some evidence that non-interventionist styles of communication may be beneficial with first-time callers.

Specific issues in research design and implementation

4.23 In evaluating the quality of the available primary research material, we were able to identify particular problems with current study design and implementation and also to identify where consistent differences in quality existed between different approaches to research. A detailed overview of these findings, which can be used to inform the commissioning of future research, is given in Annex H. Here we present a brief summary of the main points:

- Whilst there is substantial room for improvement in the quality of study designs, the literature relating to interventions for suicidal behaviour and suicidal ideation compares favourably with other public health literature in terms of overall quality
- The design and implementation of qualitative studies is substantially poorer than that of quantitative studies, with very few qualitative studies making any attempt to follow an identified methodology
- There are few substantive differences in the quality of studies addressing different aspects of suicidal behaviour or ideation, although overall the quality of studies addressing completed or attempted suicide is slightly higher than that of studies addressing either self-harm or suicidal ideation
- Both pragmatic and ethical constraints on the conduct of research were commonly cited to account for acknowledged failings in either study design or implementation.

4.24 A number of aspects of study design and implementation seem to pose particular problems for this literature. Specifically, a substantial proportion of studies were adversely affected by:

- high drop-out rates (losing one third or more of participants to follow-up)
- failure to randomise (in particular in studies addressing completed suicide)
- failure to 'blind' investigators to the allocation of participants
- a lack of attention to the adequacy of implementation of interventions
- failure to control for the impact of other (unevaluated) ongoing interventions
- failure to control for the baseline frequency of the behaviour used as an outcome measure

CHAPTER FIVE EVIDENCE FOR PRIORITY POPULATIONS, SETTINGS AND INTERVENTIONS

5.1 The previous sections of the report have been 'data driven' and have presented evidence taken, respectively, from the full range of studies identified and from the 'highest quality' studies identified. These data have provided an overview of what is currently known about intervention for suicidal behaviour and suicidal ideation and have outlined the most robust conclusions which can be drawn from the existing literature. This section of the report aims to briefly summarise study outcomes for the populations and types of intervention identified as priorities for *Choose Life.* Clearly, a number of studies will fall into more than one of the categories set out below. Since different priority groups may be of interest to people with distinct specialist interests reading this report, we replicate the relevant information within each category. Further details of the studies included in this chapter are given in Annex I.

Populations

Intervention by age group

5.2 For the purposes of the current report, age is categorised following the recommendations of the Research Advisory Group:

0-15 ('children', 10 studies included in the review)
16-25 ('young adults', 17 studies included in the review)
26-65 ('adults', 80 studies included in the review)
66+ ('older people', 2 studies included in the review)

Issues regarding the lack of reporting of participant age and the lack of substantial differences in outcome between age groups (where these have been specified) are discussed further in the context of outcomes from the Scoping Review presented in Annex G. The 'adult' age group includes the bulk of the general population. It is also the one age group from which study participants are regularly recruited. Consequently, it is fairly safe to assume that the majority of outcomes discussed elsewhere in this report relate primarily to this group. Here, we will therefore concentrate on outcomes specific to the 'minority' age groups (older age groups, children, young adults) identified as a priority for *Choose Life*.

Older people

5.3 As can be seen from the figures above, none of the 'priority' age populations are well served. However, the least well-served section of the population in terms of available intervention research is the substantial population of **older people**. Whilst outcomes for interventions evaluated in the context of other populations may well apply also to the elderly population, we were able to identify only 2 studies explicitly focussed on those aged 66+. However, both of these studies (Barak et al 2006, De et al 1995) were robust quantitative studies, supported by statistical evidence and both also reported positive outcomes in relation to a reduction in completed suicide. The first study focussed on treatment with SSRIs and also reported reductions in attempted suicide as a result of intervention. The second focussed on a community-based intervention involving telephone support services aiming to maintain contact and offer elderly people home assistance (for issues unrelated to suicidal behaviour).

5.4 Additional evidence can be drawn from studies which focussed on participants at the 'older end' of the 26-65 age category (Bruce et al 2004, Kugaya et al 1999, Lapierre 1991b, Oyama et al 2004, 2006a and 2006b and Ripamonti et al 1999). Four of these studies evaluated outcomes for suicide and three for suicidal ideation. With regard to suicide, two of the three studies evaluated community based support programmes for older people living in rural areas (Oyama et al 2004 and 2006a, discussed in greater detail in the context of interventions for rural populations). Both provided narrative support for a reduction in completed suicide, without accompanying statistical evidence. A third study (Ripamonti et al 1999) reported a reduction in suicide as the result of providing palliative care for older people with cancer. With regard to suicidal ideation, one study provided additional support for the effectiveness of palliative care for older people with cancer (Kugaya et al 1999). This study reported a reduction in suicidal ideation following anti-depressant treatment. The second study (Bruce et al 2004) reported a reduction in suicidal ideation following the introduction of improved treatment guidelines for the care of older people in primary care settings. The final study (Lapierre 1991b) reported reductions in suicidal ideation following treatment with sertraline for older people with major depression.

5.5 The above outcomes may be seen as promising, but cannot on their own provide unequivocal support for a particular strategy. Four of the eight studies cited (Kugaya et al 1999, Oyama et al 2004, 2006b, Ripamonti et al 1999) provided only narrative evidence of positive outcomes, with no statistical support, one cited statistical evidence but failed to give adequate details of this evidence (Lapierre 1991b) and one study (Oyama et al 2006b) did not report positive outcomes. It is essential that further 'purpose designed' intervention studies specifically focussed on older people are carried out. Given that the focus of the limited number of available studies reporting positive outcomes is, broadly speaking, on helping to resolve the particular problems faced by older people (via the provision of palliative care, anti-depressant and other support through primary care services and interventions to reduce the adverse impact of social isolation) similar provision of supportive services may be a good place to start in developing further initiatives specific to older people.

Children

5.6 At the other end of the age spectrum, a slightly larger number of studies focussed on evaluating interventions for **children** aged 15 and under**.** Outcomes for these studies are, unfortunately, not overwhelmingly positive. Four of the studies reported no reductions in either suicidal behaviour or in suicidal ideation. These studies evaluated treatment with escitalopram for children with major depressive disorder (Wagner et al 2006); interpersonal psychotherapy for depressed young adolescents (Mufson et al 2004), a psychoeducational intervention in schools involving a youth-nominated support team (King et al 2006) and a token for readmissions to hospital for suicidal young adolescents (Cotgrove et al 1995). The latter 2 studies did not give specific age ranges for their sample, each citing only a mean age of 15. Older adolescents are therefore also likely to have been included within the remit of these studies and it is not possible to separate out any outcomes specific to the younger age groups.

5.7 Three quantitative studies reported significant reductions in suicidal ideation, supported by statistical analysis. The focus of these studies was intervention with fluoxetine and fluoxetine combined with CBT (March et al 2004) and either staff training videos or family-oriented training videos designed to modify family expectations (both studies reported in Rotherham-Borus et al 1996). In addition to these comparatively robust outcomes, additional studies provide purely narrative support for a number of interventions. One of these (Rotherham-Borus 2000) also focussed on the use of a video-based educational initiative to educate families regarding the nature of self-harm. The authors report reductions both in suicide attempts and in suicidal ideation in response to this intervention. The final two studies reported reductions in self-harm based, respectively, on a case study of behaviour therapy using differential reinforcement with a nine-year old self-mutilating boy (Cowdery et al 1990) and on an RCT of developmental group psychotherapy for young adolescents with multiple episodes of repeat self-harm (Wood et al 2001). The latter study reported no concomitant reduction in suicidal ideation as a consequence of the intervention.

5.8 Additional evidence can be taken from five studies (Deykin et al 1986, Harrington et al 1998 and 2000, Toumbourou & Gregg 2002 and Valuck et al 2004) which provided few details of the age of their participants but which, by implication, focussed primarily on children. One of these studies (Deykin et al 1986) evaluated outcomes for suicide following a youth education programme, a second (Valuck et al 2004) evaluated outcomes for attempted suicide following treatment with anti-depressants. Neither reported positive outcomes. The remaining three additional studies evaluated outcomes for both self-harm and suicidal ideation. No impact on self-harm or suicidal ideation was found for an intervention involving empowerment-based parent education groups (Toumbourou & Gregg 2002) . Home-based family interventions with adolescents who had self-poisoned were found by two studies (Harrington et al 1998 and 2000) to be effective in reducing suicidal ideation but not effective in reducing further self-harm.

5.9 As the literature currently stands, it seems that there is no evidence to inform a targeted prevention strategy aimed at reducing suicide in children. There is limited evidence that some interventions, including pharmaceutical, psychotherapeutic, behavioural and staff or parent training initiatives *may* be effective in reducing attempted suicide, self-harm and, in particular, suicidal ideation. However, even in the context of these behaviours, the small number of studies, combined with the diverse modes of intervention evaluated, fails to provide a consistent body of evidence suggesting any clear way forward for intervention with children.

Young adults

5.10 Studies evaluating interventions for **young adults** (aged 16-25), although greater in number and generally more positive in outcome than those available for children and young adolescents, provide no substantially greater evidence to support a targeted intervention strategy. Taken together, the outcomes for studies focussed on children and young adults suggest that we currently have very little evidence of how to proceed in intervening with young people to prevent or reduce suicidal behaviour and, in particular, to reduce suicide. None of the available studies explicitly focussed on young adults within the specified age range reported outcomes for suicide and only one study including young adults did so. There are some limited pointers towards interventions which may be effective in reducing other suicidal behaviours and suicidal ideation in this age group, but currently the number of studies addressing any given intervention is again small and successful outcomes will need replication.

5.11 To summarise the available evidence *supporting* particular interventions for young adults: 6 quantitative studies with adequate statistical analysis have reported reductions in suicidal behaviours and/or in suicidal ideation following an intervention. These studies focussed on diverse interventions in a range of population groups. Two studies reported reductions both in suicide attempts and in suicidal ideation following school-based interventions involving, respectively, an emphasis on personal growth (Thompson et al 2000) or crisis intervention (Thompson et al 2001); one reported a reduction in suicidal ideation following treatment with fluvoxamine for older adolescents with obsessive-compulsive disorder (Apter et al 1994), one reported reductions in attempted suicide, self-harm and suicidal ideation for young adults with borderline personality disorder treated with DBT (Turner 2000) and one (Joiner et al 2001) reported a reduction in suicidal ideation in 'young adults' of unspecified age with anxiety and/or depression receiving a community-based problem-solving therapy. Finally, one study (Brent et al 1997) reported reductions in suicidal ideation following the treatment of depressed adolescents with either CBT, systemic behaviour family therapy or the provision of non-directive support.

5.12 Limited additional support is provided for an even broader range of interventions and populations based solely on the narrative report of authors. Specifically, these studies addressed the use of clozapine for self-mutilating behaviour in young adults with borderline personality disorder (Ferreri et al 2004), naltrexone for the prevention of suicide in a young heroin addict (Krupitsky et al 2001), psychoanalysis for the reduction of suicidal ideation in a young male university student (Maltsberger & Weinberg 2006) and hypno-behavioural therapy, including self-hypnosis, for the prevention of self-harm in a young woman (Orian 1989). Three of these four studies are single case studies only and outcomes from all four studies are unsupported by statistical analysis, so the reported outcomes should be treated with caution in the absence of further replication.

5.13 In contrast to certain of the above outcomes, three studies addressing school-based interventions for young adults failed to find any reduction in the target behaviours focussed on (attempted suicide and suicidal ideation).The first of these studies (reported in Eggert et al 1995 and Eggert et al 2002) evaluated skills training combined with either peer or adult support, the second (Randell et al 2001) evaluated brief counselling versus peer group coping and support training, the third (Vieland et al 1991) evaluated an educational intervention focussed on developing and maintaining social networks. Three further studies (all RCTs addressing suicidal ideation only) also failed to report any positive outcomes. These studies focussed, respectively, on outpatient problem-solving therapies for young adults (Rudd et al 1996, Wingate et al 2005) and on a writing therapy intervention for young adults with instructions designed either to produce positive cognitive changes in the response to an adverse stimulus or to allow exposure to the adverse stimulus only (Kovac & Range 2002). Finally, one further study (Hopko et al 2003) reported statistically significant *increases* in self-harm following treatment with mianserin in comparison to either nomifensine or placebo.

5.14 As previously, additional information can also be gleaned from studies which provide few details of participant age but which, by implication, seem to focus primarily on the 16-25 age group considered here. There were three such studies (Brent et al 1993, LaFromboise & Howard 1995 and Metha et al 1998). One (Metha et al 1998) evaluated legislative initiatives introduced in 50 US states to prevent youth suicide. Despite the broad range of initiatives evaluated, the authors found no significant change in rates of suicide. They concluded that in part this was due to poor implementation of the initiatives. A second study (Brent et al 1993) evaluated individual-level restrictions on the access to firearms in a community case-control study. This study reported a reduction in suicide and suicidal ideation as a result of the intervention, but no noticeable impact on attempted suicide. The final study evaluated a culturally tailored multi-component intervention for a minority ethnic group. This study reported reductions in attempted suicide and suicidal ideation, but specific details of the components of the intervention programme are limited and no attempt was made to identify which components were most closely associated with the observed outcomes.

5.15 As with studies focussed on interventions for children, the available evidence of effective interventions for young people is both limited and spread thinly across a broad range of interventions, giving little clear direction to future prevention strategies. There is very little evidence of effective interventions to prevent suicide (controlling individual access to firearms being the single exception here) and little robust evidence of interventions to prevent attempted suicide or self-harm (although school-based programmes, DBT and a culturally tailored initiative have all received support from at least one study). Suicidal ideation has been addressed by a larger number of studies, with equivocal outcomes overall, but some support for school-based programmes, treatment with fluvoxamine for young people with obsessive-compulsive disorder and a diverse range of psychotherapeutic approaches (DBT, CBT, systemic behaviour family therapy and problem solving therapy).

5.16 **In summary**, the available evidence for older people and for children is very limited and provides little clear direction for prevention initiatives. The evidence for intervention with young adults is more extensive, but also equivocal, with evidence both in favour of and against comparable interventions which have been evaluated by more than one study (school-based interventions and either outpatient or community based problem-solving therapies). Also with regard to young people, the diversity of interventions and populations for which outcomes have been evaluated hampers the development of a strategic approach. Comparing across all three identified age groups, it can be seen that the literature is both sparse and lacking in any specific intervention focus. It is also worth noting that only one of the 'highest quality' studies identified evaluated outcomes for any of the above age groups. Directed programmes of high quality research addressing these priority population groups are needed to provide firm evidence of effective interventions. In the meantime, broad *approaches* to intervention which it may be justified to pursue, given the weight of available evidence, include support-based initiatives for older people and psychotherapeutic or similar 'personal development' initiatives for children and young people.

Intervention by setting

5.17 The evidence available readily differentiates into the following settings:

- Community (92 studies start and 106 studies end with participants living in the community)
- In-patient open-ward (21 studies start and nine studies end in this setting)
- Outpatient unit (17 studies start and 21 end in this setting)
- School or high school (eight studies start and eight end in this setting)
- A&E (eight studies start and two end in this setting)
- 'Other' (settings with few available studies, studies recruiting participants from across a range of settings and studies failing to identify setting).

5.18 Studies evaluating outcomes for participants living in the community are the single largest group of studies in the literature. However, few statistically significant differences were observed in respect of outcomes in this setting compared to all other settings combined. Since the bulk of the evidence already reported relates to community settings we will not replicate this here. Interventions specific to school settings are reported in a subsequent section within this chapter. The diverse range of 'other' settings provided insufficient studies for each alternative setting to be of value in terms of highlighting interventions potentially appropriate to these settings. Therefore, we will focus here only on the three main clinical settings for which there is at least a slightly more substantive amount of specific information, namely in-patient wards, outpatient units and A&E. Studies focussing on A&E are rare given the prominence of this setting, as pointed out earlier, but to provide additional information we combine outcomes here for studies *either* starting *or* ending in each setting.

In-patient open wards

5.19 Of the available studies evaluating intervention in **in-patient open ward** settings (N=22), 7 quantitative studies reported positive outcomes supported by statistical analysis. Six of these evaluated pharmaceutical interventions. Reductions in both suicide and self-harm were reported for treatment with SSRIs (Barak et al 2006) and reductions in both attempted suicide and suicidal ideation were reported for treatment with paroxetine in comparison to amitriptyline (Moller & Steinmeyer 1994). Treatment with clozapine was reported to significantly reduce self-mutilation and related aggression in people experiencing psychosis (Chengappa et al 1999). As previously, it should be noted here that outcomes for clozapine across the full range of studies as a whole are rather equivocal. Three studies (Apter et al 1994, Baker et al 2004ps, Kudoh et al 2002) reported a reduction in suicidal ideation following treatment with, respectively, fluvoxamine, olanzapine and ketamine[8]. Finally, one of the seven studies reported outcomes for psychotherapeutic interventions (Patsiokas & Clum 1985). All three psychotherapeutic approaches (cognitive restructuring, problem solving and non-directive therapy) resulted in equivalent reductions in suicidal ideation.

[8] Note that ketamine is not currently used in the UK

5.20 As previously, a number of studies give limited additional support to these or other interventions via the narrative report of study authors, unsupported by statistical evidence. Specifically, there is additional narrative support for clozapine in reducing self-harm in people with borderline personality disorder (Ferreri et al 2004) and for lithium in reducing both suicide and attempted suicide in people with bipolar disorder (Thies-Flechtner et al 1996). The caveats regarding these two pharmaceutical interventions raised previously (concerns regarding the association of clozapine with agranulocytosis and reports of an increase in deaths by suicide following lithium treatment and an increase in risk of suicidal behaviour following discontinuation of treatment with lithium) should be borne in mind in evaluating overall outcomes for these interventions. In the context of non-pharmaceutical interventions, narrative support is provided for a reduction in self-harm following stress-inoculation training (Kaminer & Shahar 1987) and a reduction in suicidal ideation following short-term hospitalization in a crisis intervention unit (Yu-Chin & Arcuni 1990).

5.21 Finally, it is important to note that the remainder (one half) of the studies set in in-patient open wards failed to identify *any* impact, significant or otherwise, in respect of the interventions evaluated. These studies evaluated: DBT (Bohus et al 2004), Fluoxetine (Cornelius et al 1993), 'inpatient treatment' *per se* (Etzersdorfer 1993, treatment involved both pharmacological and psychotherapeutic approaches at different points in time), 'any psycho-pharmacotherapy' (Gaertner et al 2002), matching or mismatching treatments to patterns of cognitive impairment (Miller et al 2005), ECT (Milstein et al 1986), mianserin (Montgomery et al 1983), intensive psychosocial intervention (Van et al 1997), a psycho-educational initiative for young, initially hospitalized, adolescents reported on earlier in the context of interventions for children (King et al 2006) and, finally, two studies reporting treatment with unspecified 'anti-depressants' (Oquendo et al 1999 and 2002).

5.22 **In summary**, positive outcomes for interventions taking place in in-patient open ward settings are not wholly lacking, but it is again the case that the majority of interventions evaluated receive either no support or support which can only be regarded as equivocal. The range of distinct interventions reliably evaluated and found to result in reductions in suicidal behaviour or ideation are so diverse that further replication of individual studies would be required before any robust conclusions regarding efficacy could be reached. The over-riding focus of evaluations taking place in in-patient settings is on pharmaceutical intervention. However, the range of individual pharmaceutical agents evaluated is quite broad and this again results in an evidence base which fails to provide substantive support for any specific intervention. As the evidence currently stands, there is some support for pharmacological treatment of in-patient depression as a mechanism to reduce suicidal behaviour and ideation. However, further confirmatory studies are required and it would be helpful if the research base was expanded to address mental health problems other than depression. It would also be useful for future research to explore alternative non-pharmaceutical interventions which have some evidence of effectiveness in other contexts (e.g. DBT), in order to increase the range of options available for in-patient treatment.

Outpatient settings

5.23 Twenty-two studies evaluated outcomes for interventions focussed on people attending **outpatient units** at either the start or end of the study. A number of these studies are also referred to in other contexts, as the outpatient context is relevant to a number of populations and overlaps a range of circumstances. For example, three of the studies were educational interventions to train staff and/or to modify family expectations. These studies (reported in Rotherham-Borus et al 1996 and 2000) are referred to also in relation to interventions in the A&E setting and in relation to interventions for children. Although, strictly speaking, the primary intervention took place whilst the patients were still in the A&E setting, evaluation tracked the children through to an outpatient clinic and the outcomes are relevant in all three contexts.

5.24 As was the case for interventions relevant to the in-patient setting, fewer than half of the studies addressing interventions relevant to treatment in outpatient units (N=9) reported positive outcomes supported by statistical analysis. Also as previously, these 'successful' studies reported on outcomes for a diverse range of interventions. Six of the nine studies reporting positive outcomes focussed on suicidal ideation. Reductions in suicidal ideation were reported for evaluations of an A&E-based educational video intervention targeting either staff or the patient's family in A&E (two studies reported in Rotherham-Borus et al 1996) and for a range of pharmaceutical interventions. With regard to the latter, reductions in suicidal ideation were reported as a consequence of treatment with fluoxetine (Heiligenstein et al 1993), fluoxetine plus CBT (March et al 2004), nortriptyline (Papakostas et al 2003) and sertraline (Lapierre 1991b).

5.25 Three studies focussed on suicidal behaviour reported positive outcomes supported by statistical analysis (Evans et al 1999, Kleindienst & Greil 2000, Bateman & Fonagy 1999). The first of these was a study of manual-assisted CBT which reported a reduction in suicide attempts and, by narrative report only, also a reduction in suicidal ideation. The second study reported greater reductions in both suicide and attempted suicide for treatment with lithium in comparison with treatment using carbamazepine (this outcome should be set against the fact that other studies of lithium treatment in this setting reported no positive effect). The third study reported reductions in attempted suicide and self-harm following (unspecified) outpatient treatment supplemented by partial hospitalisation.

5.26 Additional narrative support for the interventions evaluated included a further report of the study evaluating an educational video for families (Rotherham-Borus et al 2000), which reported reductions in suicide attempts and suicidal ideation and studies reporting reductions in self-harm as a result of a behaviour therapy intervention based on differential reinforcement (Cowdery et al 1990, a single case study referred to also in the context of interventions for children); reductions in suicidal ideation based on informal social support for brain injured patients (Kuipers & Lancaster 2000) and on electromagnetic field therapy for patients with multiple-sclerosis (Sandyk 1996) and reductions in both suicide attempts and suicidal ideation based on treatment with naltrexone (Krupitsky et al 2001).

5.27 Interventions failing to find any support, narrative or statistical, for their impact on suicidal behaviour or ideation in outpatient settings included treatment with lithium (three studies: Nilsson & Axelsson 1989, Coppen et al 1991, Kleindienst & Greil 2000), problem-solving therapies (two studies, also referred to in the context of interventions for young adults: Rudd et al 1996, Wingate et al 2005), DBT (Bohus 2004), CBT (Hengeveld et al 1996) and a multidisciplinary collaborative initiative across services (Jobes et al 2005).

5.28 **In summary**, outcomes for a diverse range of interventions evaluated wholly or in part in out-patient settings provide little firm evidence for the effectiveness of any specific intervention. Purely on the basis that there has been a successful attempt to replicate outcomes, it may be of value to explore further the use of educational video training, for staff or family members. Similarly, there are some grounds for concluding that out-patient anti-depressant treatment may be of value, since a number of studies evaluating anti-depressants, albeit using distinct drug types, reported positive outcomes. However, beyond this, all evaluated initiatives require, at best, further validation. It should also be noted that the majority of successful evaluations addressed the relatively 'soft' target of suicidal ideation, rather than providing evidence of a successful outcome relating to a reduction in suicidal behaviour. The outpatient setting provides a unique point of contact between health service providers and people experiencing suicidal behaviour or suicidal ideation. Since such contact can easily be lost, it is of particular importance that the interventions experienced in the outpatient setting provide positive outcomes. Given that the structure of outpatient services differs quite widely in different areas, this is a context in which locally targeted evaluations may be of particular value in increasing the existing evidence base.

A&E

5.29 The A&E setting is the first point of contact for a substantial proportion of patients presenting with suicidal behaviour. It is also, in effect, a potential springboard to other services. Despite the importance of this setting in the prevention of suicidal behaviour and suicidal ideation, only two of the studies identified for the review addressed interventions specifically designed for the A&E setting (Rotherham-Borus 1996 and 2000). Outcomes from these studies have been presented in respect of follow-up in the outpatient setting and in relation to interventions for children. Both of these studies reported reductions in suicidal ideation following a video-based educational training intervention for staff and the families of patients respectively, with the latter study also providing narrative support of a reduction in attempted suicide. In addition to these two 'purpose-designed' studies, a further eight studies addressed interventions either evaluated in the A&E setting or which followed up patients on discharge from the A&E setting.

5.30 Of the eight additional studies, five reported positive outcomes. Of these, two studies (Kapur et al 2002 and 2004) evaluated the impact of A&E management practices. No difference in outcomes was reported for people who were or were not given a psychosocial assessment, but specialist follow-up resulted in a reduction in further self-harm in both studies. One study (Carter et al 2005) reported a reduction in self-harm as a result of maintaining regular contact with people discharged from A&E via brief postcards asking after their welfare. The two remaining studies are less directly relevant to the A&E setting, but report outcomes for different treatment options offered on discharge from A&E. One reported a greater reduction in attempted suicide,

self-harm and suicidal ideation following DBT in comparison to a more generalised client-centered therapy (Turner 2000), the other reported a reduction in suicide attempts following treatment with paroxetine (Verkes et al 1998). Of the three studies failing to find any positive impact on suicidal behaviour or ideation, two evaluated a nurse-led case management approach (Clarke et al 2002, Congdon & Clarke 2005). The third compared general hospital admission following presentation to A&E with discharge home (Waterhouse & Platt 1990).

5.31 The available evidence for interventions specific to the A&E setting is very limited. This represents a significant gap in the research base in respect of a setting which is a critical point in the care pathway. There is therefore an urgent need for further research studies in this area. Of the most pertinent evidence available, it is worth noting that, as in other contexts, there is support both for maintaining ongoing contact and for providing specialist care.

5.32 **In summary**, we have very little evidence to suggest which interventions specifically focussed on the A&E setting are likely to prove effective in reducing suicidal behaviour or ideation. It is crucial to effective service delivery that this very significant gap in the evidence base is addressed, since A&E is the first point of contact with services for many people who self-harm or who are suicidal. Considering the limited evidence which is available, the approaches most pertinent to this setting which find support in the literature are purpose-designed training and educational videos for staff and family members; the maintenance of ongoing contact following discharge and the provision of specialist follow-up care. All of these approaches, however, would require further evaluation to confirm their effectiveness in reducing self-harm, attempted suicide and suicidal ideation. There are currently no interventions which have been evaluated in the A&E context and shown to prevent suicide. In addition to the evident need for additional evidence regarding interventions in the A&E setting, further studies directly comparing different treatment options post-discharge could be of value.

Intervention for people with mental health problems

5.33 Broad outcomes for those with and without a mental illness are reported in the Scoping Review presented in Annex G. Here we focus more specifically on those studies which evaluated interventions for particular psychiatric populations. The populations for which such specific information is available are limited to the following diagnostic categories:

Major depression/Depression	(33 studies)
Personality Disorder/Borderline Personality Disorder	(23 studies)
Schizophrenia/schizo-affective disorder	(10 studies)
Bipolar affective disorder	(4 studies)
Other affective disorder	(10 studies)

Depression

5.34 Comparing across the full range of 'priority populations' of interest to *Choose Life*, people with depression are the best served, both in terms of the numbers of studies available and the quality of these studies. A high proportion of studies evaluating interventions for depression are RCTs and six of the 20 studies identified as of relatively high quality evaluated outcomes for participants diagnosed with depression. The proportion of studies reporting positive outcomes supported by statistical analysis (N=15, 45%) is, however, no greater than that found for other priority groups. Furthermore, only two of these studies identified a statistically significant reduction in suicidal behaviour, the remainder reporting reductions only for suicidal ideation or providing purely narrative support for the interventions addressed.

5.35 The two studies reporting a significant reduction in suicidal behaviour report a reduction in both self-harm and suicidal ideation following treatment with paroxetine versus amitriptyline (Moller & Steinmeyer 1994) and a reduction in suicide and attempted suicide following treatment with SSRIs (Barak et al 2006). Studies reporting statistically significant reductions in suicidal ideation following pharmaceutical intervention supported treatment with sertraline (Lapierre 1991a, 1991b), fluoxetine and fluoxetine plus CBT (Heiligenstein & et al 1993, March et al 2004), moclobemide (Gagiano et al 1995), duloxetine (Hirschfeld et al 2005), fluvoxamine (Kasper et al 1995), paroxetine (Smith & Glaudin 1992) and ketamine (Kudoh et al 2002).

5.36 Four studies report positive outcomes for non-pharmaceutical interventions. These provide support for the following interventions in reducing suicidal ideation: telephone counselling (King et al 2003); CBT, systemic behaviour family therapy and non-directive support (Brent et al 1997, all three interventions significantly reduced suicidal ideation, with no significant differences in outcomes between the three therapies); primary care treatment guidelines and care management (Bruce et al 2004) and a school-based support group to enhance coping skills (Houck et al 2002). The latter study also reported outcomes for attempted suicide, but no significant reduction in this behavioural measure of intervention outcomes was found.

5.37 Limited additional support is provided for pharmaceutical intervention by studies failing to provide statistical analysis. Specifically, there are narrative reports of a reduction in both suicide (Isacsson et al 1996) and suicidal ideation (Kugaya et al 1999) following treatment with anti-depressants and of a reduction in suicidal ideation alone following treatment with sertraline (Lapierre 1991), viloxazine (Corona et al 1987) or fluvoxamine (Gonella et al 1990).

5.38 In contrast to the positive outcomes for treatment with anti-depressants reported above, a number of studies failed to find any reduction in suicidal behaviour or suicidal ideation following treatment with anti-depressants. These studies reported combined outcomes for the use of any anti-depressant (evaluated by three studies reported in five papers: Khan et al 2001 and 2006; Oquendo et al 1999 and 2002; Valuck et al 2004), outcomes for fluoxetine and venlafaxine in head-to-head comparison (Mitchell et al 2004) and escitalopram compared to placebo (Wagner et al 2006). A number of studies evaluating non-pharmaceutical interventions also failed to find reductions in suicidal behaviour or ideation. These studies evaluated matching or mismatching treatment to patterns of cognitive impairment (Miller et al 2005), interpersonal psychotherapy (Mufson et al 2004), brief training of GPs (Nutting et al 2005) and the provision of mental health services in rural areas (Rost et al 1998b).

5.39 **In summary**, substantive attention has been paid to interventions for depression in this literature and the overall quality of the studies available in this context is relatively high. This notwithstanding, there are again few consistent pointers to effective intervention. The chief focus of research in respect of interventions for depressed patients has been on pharmaceutical intervention. A wide range of individual drugs, primarily anti-depressants, have been evaluated in this context, with somewhat equivocal outcomes. Despite the comparatively large number of studies addressing treatment for depression, only two studies have reported positive outcomes for suicidal behaviour (paroxetine to prevent self-harm and SSRIs to prevent suicide and attempted suicide), the remaining studies have either failed to find any evidence of a reduction in suicidal behaviour or have focussed on suicidal ideation alone. The ambiguity in overall outcomes for anti-depressant treatment may well be dependent on distinctions between individual drug types, but given the current state of the evidence base, outcomes could as easily be dependent on differences in study methodology, differences in treatment context and/or differences in the response of particular individuals or groups to the anti-depressants evaluated. Future research focussed on anti-depressant treatment would benefit from more careful targeting.

5.40 A number of studies have provided evidence in favour of *non*-pharmaceutical intervention for people with depression. However, the diverse range of interventions considered and the limited number of studies overall again precludes any firm conclusions being reached regarding the effectiveness of any specific intervention. As in other contexts, there is some evidence for the effectiveness of maintaining ongoing contact and providing support to the depressed person, with more equivocal support for psychotherapeutic interventions. As is the case for pharmaceutical intervention, the positive outcomes reported are primarily for suicidal ideation. Future research focussed on treatment for depression should evaluate interventions against outcomes for suicidal behaviour as well as for suicidal ideation.

Personality disorder or borderline personality disorder (BPD)

5.41 In contrast to outcomes for other 'priority' groups, the majority (65%) of studies evaluating interventions for suicidal behaviour and ideation in people with personality disorder or borderline personality disorder reported positive outcomes supported by statistical analysis. In contrast to the approach adopted with other mental health populations, the primary focus in this context was on non-pharmaceutical intervention. Reductions in attempted suicide are reported following partial hospitalization (Bateman & Fonagy1999), 'step down' care management following inpatient treatment (Chiesa & Fonagy 2003), psycho-analytically oriented residential treatment (Chiesa et al 2004), manual-assisted CBT (Evans et al 1999), and DBT (Linehan et al 1993 and 2006, Turner 2000).

5.42 A number of the above studies reported similarly promising outcomes for the same interventions in respect of a reduction both in self-harm and in suicidal ideation. Additional studies found reductions *only* in either self-harm or suicidal ideation for DBT (Bohus et al 2004, Low et al 2001) and CBT (Brown et al 2004). The more limited range of studies evaluating pharmaceutical interventions for people with BPD provide support for clozapine in reducing self-mutilation (Chengappa et al 1999), lithium, in comparison to carbamazepine, in reducing suicide and attempted suicide (Kleindienst & Greil 2000), nortriptyline in reducing suicidal ideation (Papakostas et al 2003) and both imipramine and fluoxetine in reducing suicidal ideation (Tollefson et al 1994).

5.43 Additional narrative accounts of intervention provide further support for the efficacy of DBT in reducing attempted suicide, self-harm and suicidal ideation in this population (Perseius et al 2003); clozapine in reducing self-mutilating behaviour (Ferreri et al 2004) and venlafaxine (Markovitz & Wagner 1995) and behaviour therapy (Bloxham et al 1993) in reducing self-harm. In contrast to the general run of evidence, one study failed to find any impact of DBT on attempted suicide (Verheul et al 2003) although the same study did find a significant reduction in self-harm. One other study also failed to find any statistically significant reduction in either attempted suicide or self-harm following treatment with transference-focussed psychotherapy (Clarkin et al 2001). In the case of the latter study, the authors noted that both behaviours did decrease in absolute terms in the treatment group and the very small sample size (only 17 cases were available for analysis at the endpoint) may well have been an issue here. Finally, one study, as previously reported, found significant *increases* in self-harm following intervention with mianserin (Hopko et al 2003).

5.44 **In summary**, clients diagnosed with borderline personality disorder represent a rare instance in which a sizeable number of studies, following distinct methodologies, have reported fairly consistent outcomes in favour of a single intervention (DBT). It is currently unclear whether the overall more positive tone of studies reporting outcomes for people with personality disorder or borderline personality disorder is due to features of the disorder itself or perhaps to the greater focus on cognitive and behavioural interventions that is found in this context. Both possibilities are worth pursuing in future research. In respect of current practice however, there does seem to be some concrete evidence in favour of DBT and possibly also other cognitive and/or behavioural approaches in reducing suicidal ideation and suicidal behaviour in people with personality disorder. This notwithstanding, the specific parameters of the studies cited did vary and some replication of outcomes would still be of value. Available support for pharmaceutical intervention in this context is limited and further replication of the individual studies supporting particular drug types (in particular clozapine for self-mutilating behaviour and anti-depressants for suicidal ideation) would be required before such interventions could be recommended.

Schizophrenia or schizoaffective disorder

5.45 Counter to the pattern observed in the evaluation of treatment for personality disorder, the primary focus of the rather more limited number of studies evaluating interventions for people with schizophrenia or schizoaffective disorder was firmly on pharmaceutical intervention. Seven out of 10 studies addressed pharmaceutical intervention, with two further studies evaluating outcomes for ECT. The one remaining study (Cunningham-Owens et al 2001) evaluated an educational intervention, but this study reported a statistically significant *increase* in suicidal ideation following the intervention.

5.46 Overall, outcomes for schizophrenia matched those for other priority groups, with fewer than half of the available studies reporting positive outcomes supported by statistical analysis. The five studies which did provide such evidence reported reductions in both suicide and attempted suicide following the use of concomitant psychotropic medication (Glick et al 2004) and atypical anti-psychotics (Barak et al 2004) and reductions in attempted suicide following treatment with clozapine, either versus olanzapine (Meltzer et al 2003, Potkin et al 2003) or versus traditional anti-psychotics (Spivak et al 1999). Additional narrative support was provided for both the efficacy of clozapine in reducing suicide (Reid et al 1998) and its cost-effectiveness (Duggan et al 2003ps). In respect of the latter study, there are, however, some concerns regarding the assumptions made in modelling outcomes, for example the assumption that clozapine is cost neutral in comparison to the use of comparable pharmaceutical interventions, despite the established need to monitor people taking the drug for agranulocytosis. Of the two studies evaluating the use of ECT, one provided no evidence for a reduction in suicides (Tsuang et al 1979), the other provided a purely narrative report of reductions in self-harm following maintenance therapy with ECT for people with treatment-resistant schizophrenia (Dean 2000).

5.47 **In summary**, studies evaluating treatment for people with schizophrenia or schizoaffective disorder focussed almost exclusively on treatment with clozapine, or, to a lesser extent, other pharmaceutical therapies. Whilst outcomes for treatment with clozapine were universally favourable, none of the available studies chose to evaluate clozapine against either a placebo or against treatment as usual (TAU) and only three of five studies provided statistical evidence of reductions in suicidal behaviour. Given the known side effects of clozapine, there is some virtue in taking a cautious approach to its use and further studies providing statistical evidence of its effectiveness in comparison to placebo or to non-pharmaceutical options for treatment would be of value. The limited range of studies evaluating other treatment options to reduce suicidal behaviour and suicidal ideation in people with schizophrenia restricts both current practice and directions for future research. It would clearly be of value to broaden the range of interventions evaluated but it is currently unclear which direction research should take. Exploratory pilot studies of alternative pharmaceutical and non-pharmaceutical treatment options would be of value in this context. As the evidence currently stands, treatment with clozapine appears promising, but, as stated, this option would also benefit from further evaluation against placebo or other non-pharmaceutical interventions.

Bipolar disorder

5.48 Only four studies specifically evaluated interventions for people with bipolar disorder. All of these studies evaluated treatment with lithium, either as a main treatment or as an adjunct. The two studies evaluating lithium alone reported statistically significant reductions in suicide and attempted suicide (Goodwin et al 2003) and in 'suicidal acts' (Tondo et al 1998). As previously discussed, some concerns are raised by the latter study and by an additional study (Oerlinghausen et al 1994) which, respectively, give evidence of possible *increases* in suicide following discontinuation of lithium treatment and following initial treatment with lithium. A study evaluating lithium (together with a limited range of other pharmaceutical interventions) as an adjunct to interpersonal and social rhythm therapy and primarily focussed on the latter treatment (Rucci et al 2002) reported no significant impact of the combined therapy on any measure of suicidal behaviour or suicidal ideation. Finally, one study (Baker et al 2004) comparing treatment with olanzapine plus adjunctive lithium with olanzapine plus adjunctive valproate failed to find any significant differences between the two adjunctive treatments but did find a statistically significant reduction in suicidal ideation in both conditions. These very limited outcomes provide clinicians with few choices in treating people with bipolar disorder for suicidal behaviour or suicidal ideation. It is important that further research is carried out if therapy for this diagnostic group is seen as a priority.

5.49 **In summary,** there are very few available studies evaluating treatment options to prevent suicidal behaviour and suicidal ideation in people with bipolar disorder. There is some support for treatment with lithium in potentially reducing suicidal behaviour, but significant caveats are raised by one high quality study which also reported initial increases in suicide and subsequent regression to base rates of suicide following discontinuation of long-term treatment. If people with bipolar disorder are seen as a priority group in respect of intervention for suicidal behaviour and suicidal ideation, further evidence is needed regarding outcomes for treatment with lithium and additional pilot research exploring other treatment options should urgently be carried out.

Other affective disorders

5.50 Finally, we were able to identify 10 studies which focussed on people with other affective disorders, or which combined outcomes for one or more different affective disorders. All 10 studies evaluated outcomes for pharmaceutical intervention and six studies again focussed on the impact of lithium. Of the four studies not focussed on lithium, three evaluated the impact of anti-depressant treatment by combining outcomes for all types of anti-depressants being prescribed for their participants, one evaluated the impact of treatment with fluoxetine compared to any other anti-depressant treatment and to no treatment at all. The latter study, evaluating fluoxetine, (Leon et al 1999) aimed to address outcomes for completed suicide, but was unable to do so since in the event only one completed suicide occurred, despite the comparatively large sample size of individuals perceived to be at risk (N=643 at endpoint) and long follow-up period (15 years). The study also evaluated fluoxetine in respect of outcomes for attempted suicide. Here the outcomes were equivocal, but certainly not in favour of fluoxetine. Whilst the numbers of attempted suicides in those continuing to take fluoxetine subsequent to the trial end-point reduced significantly, during the course of the trial the proportion of suicide attempts was significantly higher in the fluoxetine group than in either the group administered other anti-depressants or in the group receiving no treatment at all.

5.51 All three studies focussed on anti-depressant treatment as such (that is, regardless of the type of anti-depressant used) reported a statistically significant reduction either in population rates of suicide (two studies evaluated the same population at different periods in time, Isacsson et al 1997, Isacsson et al 2000) or in the incidence of suicide during naturalistic follow-up (Coryell et al 2001). In respect of lithium treatment, two of three linked studies by the same author identified a statistically significant reduction in suicide following treatment with lithium (Ahrens et al 1995a, 1995b), the third study failed to differentiate between deaths attributable to suicide and to other causes (Ahrens et al 1993). One additional independent study (Kessing et al 2005) also reported a statistically significant reduction in suicide following treatment with lithium. Limited additional support for a reduction in suicide following lithium treatment was provided by a single study (Thies-Flechtner et al 1996) providing only a narrative report of outcomes, whilst a study of long-term lithium treatment (Nilsson et al 1989) failed to find any positive outcomes for suicidal ideation.

5.52 **In summary**, studies addressing interventions for suicidal behaviour and suicidal ideation in people with affective disorders other than depression or bipolar disorder, or combining outcomes across different forms of affective disorder, have focussed exclusively on pharmaceutical intervention. The available research suggests, on balance, that outcomes for lithium therapy are promising. However, as previously, the diverse range of study designs, approaches to treatment evaluation (e.g. short term versus long term treatment) and tendency to combine outcomes for distinct demographic and clinical groups suggests that further research is needed in order to target lithium treatment appropriately. Similarly, outcomes for treatment with anti-depressants are positive where these combine across a wide range of distinct drug types, but the one available study focussed on a single anti-depressant (fluoextine) was not favourable. This also argues for further targeted studies focussed on specific drug types evaluated in the context of more clearly defined clinical groups. Further research exploring the use of non-pharmaceutical treatment options could also be of value in increasing the treatment options available.

Intervention for people who abuse substances

5.53 The available evidence for interventions to reduce suicidal behaviour or ideation in people who abuse substances represents a significant 'missed opportunity'. Epidemiological research (cf. Leitner & Barr 2003, Hawton et al 2005) suggests that a not insubstantial proportion of the people taking part in the available intervention studies are likely to have a history of substance abuse. It is clear that people who abuse substances represent a special case in clinical terms, both in respect of their risk profile and in respect of the range of interventions which are likely to be appropriate to their needs. Unfortunately, the issue of substance abuse was poorly addressed by the studies identified for inclusion in the review. Only one fifth of studies (21.6%) either reported whether or not participants had a substance abuse diagnosis or were using alcohol or illicit substances during the course of the study or explicitly excluded people who misused substances. Of the studies which explicitly *included* people with diagnosed substance abuse alongside other participants, not a single study carried out sub-group analyses to distinguish outcomes for substance users from outcomes for those not using substances.

5.54 Only three studies were identified which specifically focussed on interventions to prevent suicidal behaviour and suicidal ideation in people who misuse substances. None of these studies provided either narrative or statistical support for the effectiveness of the interventions evaluated. The interventions focussed on were fluoxetine for the treatment of depression presenting with co-morbid alcohol abuse (Cornelius et al 1993), an unspecified 'drug misuse treatment programme' (Magruder-Habib 1992) and an unspecified programme of 'aftercare' for alcoholic patients known to self-harm (Haw et al 2001). In the fluoxetine study, significant improvements in self- and other-report depression were noted, but no indication of any impact on suicidal behaviour or ideation was presented, despite a high reported incidence of suicidal ideation at baseline.

5.55 The unspecified 'drug treatment programme' reported no significant improvement in rates of attempted suicide or suicidal ideation as a result of the programme and, similarly, the aftercare programme for people diagnosed as suffering from alcoholism failed to find any improvements in self-harm as a result of the programme. In the absence of further individual data taken from the comparatively large number of studies known to include people with substance abuse, these outcomes provide virtually no information to help practitioners in making decisions regarding intervention with people who abuse substances. Given the clear importance of this issue in the context of suicidal behaviour and ideation, secondary research using available data or novel studies specifically focussed on this group are a clear priority for future research.

5.56 **In summary,** only three studies included in the review focussed on interventions for suicidal behaviour or suicidal ideation in people who misuse substances. None of these studies reported successful outcomes. Despite known associations between acute and chronic substance abuse and suicidal behaviour, only one fifth of studies identified whether or not participants had any current or recent history of substance abuse. Studies including participants with and without a history of substance misuse consistently failed to carry out sub-group analyses to distinguish outcomes for the two groups. The lack of evidence indicating appropriate treatment options for people who misuse substances is a critical gap in this literature. It is of particular importance that research is carried out in the short-term to inform clinical decision making in this context.

Intervention for people in contact with the Criminal Justice System

5.57 The available evidence in respect of effective interventions for people within the criminal justice system, who again are identified by the epidemiological evidence (cf. Wilson 2005) as a key group for preventive initiatives, is also sparse. Whilst it is possible that a number of the studies identified had participants who may have been in contact with the prison service, either during the course of the study or previously, we were able to identify only one experimental study which focussed specifically on interventions for suicidal behaviour and suicidal ideation in this population. This study (Condelli et al 1997) evaluated the novel approach of providing intermediate care (akin to psychiatric admission) within the prison setting and reported a statistically significant reduction in attempted suicide. In the absence of further evidence, this programme may be one which is worth pursuing both in future research and perhaps also in practice, given the weight of evidence supporting the likelihood of a high incidence of mental ill health in people within the criminal justice system.

5.58 Reviewing evidence drawn from our previous systematic review of interventions for other-directed violence, it seems likely that further information of relevance to intervention for suicidal behaviour and ideation in the prison population can be gleaned from the secondary outcomes and sub-analyses reported for studies primarily addressing other-directed violence. It may also be that other intervention literatures have included suicidal behaviour and suicidal ideation as subsidiary outcomes. Additional secondary analysis of these types of data may be a way forward in the short-term, but the paucity of studies specifically focussed on evaluating interventions for suicidal behaviour and ideation in the prison population is nevertheless disappointing.

5.59 **In summary**, only one of the studies included in the review specifically focussed on interventions for suicidal behaviour and ideation in people in contact with the Criminal Justice System. This represents a further significant gap in the literature, since people in this context are known to have a substantially increased risk of suicide. It is likely that additional evidence can be drawn from the literature on other-directed violence, or from other literatures including suicidal behaviour and suicidal ideation as secondary measures. Nevertheless, additional purpose-designed experimental research on interventions for suicidal behaviour and suicidal ideation within the Criminal Justice setting remains a clear priority. In the absence of further evidence, 'real world' evaluation of the approach taken in the one study identified in this review would be justified. This study evaluated an intermediate care service, similar to psychiatric admission, but located within the prison setting and reported a statistically significant reduction in attempted suicide.

What is known about intervention for other priority groups?

5.60 The Research Advisory Group identified a range of other priority groups for which we identified a similar paucity of information. Searches within the database containing all downloaded citations suggest that information relating to risk assessment is likely to be more common for these groups (notably for the unemployed, socio-economically deprived and for ethnic minorities) and that purely polemical discussions of both intervention and risk assessment are also likely to be relatively prevalent. However, concrete, experimental evaluation of specific interventions is scarce at best. We were unable to identify any intervention studies specifically addressing interventions with the following identified priority groups: asylum seekers, lesbian, gay, bisexual or transgender people, the recently bereaved (note here that studies addressing only postvention are not within the remit of the review), or socio-economically deprived, unemployed and homeless populations. Outcomes for the limited range of studies which addressed other priority populations specified by the Research Advisory Group are set out below. It is important to note here that within the studies included in the review, participants who are members of the above groups will undoubtedly exist, however study authors have not chosen to single out these groups for specific analysis. Secondary analysis of existing individual-level data may therefore provide additional evidence relating to these population groups in the short term if researchers are willing to volunteer their data for this purpose.

Interventions for ethnic minorities

5.61 Six of the studies identified for inclusion in the review specifically focussed on ethnic minority groups. Of these, one reported adverse outcomes, with a statistically significant increase in self-harm following treatment with mianserin (Hopko et al 2003). Three reported statistically significant positive outcomes. Of these, one study is the previously referred to video-focussed educational intervention aiming to modify family expectations regarding self-harm (Rotherham-Borus et al 1996). This study focussed on Latin-American families and reported a significant reduction in suicidal ideation. A second study by the same authors in the same population group provides narrative support for a reduction in attempted suicide and suicidal ideation. The second study reported on a broad based and culturally tailored community-wide intervention with Native Americans. This resulted in statistically significant reductions in attempted suicide and suicidal ideation (LaFromboise & Howard 1995) but, as mentioned previously, the components of the intervention are not outlined in sufficient detail and no attempt has been made to link specific components of the programme with the outcomes identified. The third study reported statistically significant reductions in attempted suicide and suicidal ideation for a community-wide public health oriented programme targeted at ethnic minorities (May et al 2005). Similar limitations apply to this study in terms of transferring the intervention to other community settings. Finally, one additional study (Zenere & Lazarus 1997) provided a narrative report of reductions in suicides, suicide attempts and suicidal ideation following a school-based initiative involving training of school staff and students to respond to suicidal crises. This study focussed primarily, although not wholly, on black ethnic minority groups .

Interventions for survivors of sexual abuse

5.62 The review failed to identify any studies which focussed specifically on intervention with survivors of sexual abuse to reduce suicidal behaviour or ideation. The *Choose Life* National Implementation Support Team flagged one very recent study, unpublished at the time this review was undertaken (Haslam, 2006) which addressed an intervention for male survivors of sexual abuse at low risk of suicide. However, the one report available for this study focuses primarily on process and implementation issues rather than providing an outcomes-based evaluation.

Interventions for rural populations

5.63 Four studies specifically evaluated interventions for rural populations. None of the studies provided statistical evidence of significant reductions in suicidal behaviour or suicidal ideation. Three of the studies were linked studies by the same author (Oyama et al 2004, 2006a, 2006b) focussing on similar community-based intervention programmes targeted at older people living in rural settings. Two of these studies provide narrative support for reductions in suicide. These programmes focussed, respectively, on psychoeducational interventions and on depression screening together with psychiatric or other health care and health education. The third study, which combined depression screening with group activity for the elderly, failed to demonstrate any reduction in suicide following the intervention. One final study (Rost et al 1998) evaluated the adequacy of provision of mental health services in rural areas but found no grounds for the assumption that inadequate facilities in rural areas were responsible for higher rates of attempted suicide.

5.64 **In summary,** the available evidence in respect of intervention with a broad range of population groups identified as a priority by *Choose Life* (asylum seekers, lesbian, gay, bisexual or transgender people, the recently bereaved, survivors of sexual abuse, socio-economically deprived, unemployed and homeless people) is extremely limited. No single intervention with any of these groups can currently be regarded as evidence based. The available evidence for intervention with other identified priority groups (ethnic minorities, rural populations) is also sparse. In respect of ethnic minority populations, there is some measure of support for a number of interventions (culturally tailored programmes, video-based educational and training initiatives, and educational public health programmes). However each intervention has been addressed by only one study and each in a different ethnic minority population. This provides little clear direction for targeted prevention strategies.

5.65 With regard to rural populations, there is some evidence that a range of support programmes for older people in rural areas may help to reduce suicide. However, the studies evaluating these outcomes failed to provide statistical evidence of a reduction in suicide and further evaluations would be necessary to confirm outcomes. It is clear that prevention strategies focussed on the priority groups identified for *Choose Life* are likely to be hampered by a lack of research evidence. In the short term, additional evidence may be obtained by an analysis of individual-level data from existing studies. In the longer term however, if prevention is to be targeted at the priority groups identified , the only solution will be to focus substantive additional resources on research addressing intervention in these groups.

Interventions

5.66 Outcomes for the very wide range of interventions which have been evaluated in the literature have been discussed from various perspectives throughout the report. Here we aim to provide a brief overview of outcomes for the interventions highlighted by the Research Advisory Group as of particular importance to the Scottish suicide prevention initiative. It should be noted that a number of these priority interventions overlap to some extent (for example gun control is a whole population initiative but is also a means of restricting access to lethal means in the individual case). We will discuss specific interventions under the heading which seems most appropriate given the primary focus identified by the study authors.

Whole population interventions

5.67 The vast majority of studies identified for inclusion in the review focussed on intervention with individuals. Aside from national initiatives targeting the restriction of access to means, which will be reported on later in this section of the report, only four studies evaluated interventions which could truly be referred to as 'whole population' initiatives. Three of these studies evaluated the introduction of suicide prevention centres. These in and of themselves could be regarded as service-based initiatives rather than whole population initiatives, but the focus of the studies was on national or state reductions in suicidal behaviour as a result of the decision to establish programmes for the introduction of suicide prevention centres. All three studies reported positive outcomes substantiated by statistical analysis, two studies reporting significant reductions in completed suicides (Leenaars & Lester 2004, Miller et al 1984) and one (Nordentoft et al 2005) a reduction in attempted suicides. The fourth study addressing a 'whole population' initiative (Metha et al 1998) evaluated all available legislative, public health and other state-level initiatives directed at youth suicide prevention in fifty US states. This exhaustive study of available whole population youth initiatives failed to find any evidence of a consequent reduction in completed suicide. The authors concluded that this was, at least in part, due to inadequate implementation of many of the initiatives.

Community-wide interventions aimed at the general population

5.68 Eight studies focussed specifically on community-wide initiatives. Two of these studies have been discussed above in the context of interventions for ethnic minority populations (LaFromboise & Howard 1995, May et al 2005). These studies report, respectively, reductions in both attempted suicide and suicidal ideation and suicidal ideation alone for community programmes targeted at ethnic minority groups. Three further studies evaluating programmes targeted at the rural elderly have also been discussed above, in the context of interventions for older people and for rural populations, two of these three studies (Oyama 2004, 2006a) provide some narrative support for the efficacy of the interventions evaluated. Both of the additional studies identified for inclusion and evaluating community-wide interventions focussed on programmes targeted at young people. Neither provided substantive support for the efficacy of these programmes. One study evaluating the 'Stop Youth' suicide campaign (Omar 2005) provided narrative support of a reduction in suicidal ideation only, the second study (Deykin et al 1986) failed to provide any evidence of a reduction in suicide as a consequence of a community-based educational initiative.

Reducing access to lethal means

5.69 Three studies specifically focussed on the impact of a restriction of access to means. All three reported positive outcomes. One of the studies focussed on national-level legislation relating to the control of firearms and evaluated outcomes on the basis of population statistics (Leenaars et al 2003). A second (Brent et al 1993) focussed more closely on the impact of access to firearms at the individual-level, using a community case-control approach. Both reported statistically significant reductions in rates of suicide. The third study (Landers 1981) focussed on state legislation regarding carbon monoxide emissions, but evaluated outcomes with reference to a single case study only. This study provides a physiological and clinical account of how deaths from suicide may be reduced by controlling carbon monoxide emissions but gives only limited insight into the likely impact of legislation on completed suicide.

5.70 Finally, 2 studies included an evaluation of the impact of restriction of access to means alongside a broader-based evaluation of a range of alternative options. One of these, identified as one of the 'highest quality' qualitative studies (Kuipers & Lancaster 2000), found that individualised restriction of access to 'preferred' means of self-harm was reported by people who had self-harmed to have been an important mechanism in helping them to stop their self-harming behaviour. The final study, also referred to in the context of whole population initiatives (Metha et al 1998), evaluated a very comprehensive range of national and state-level initiatives to prevent youth suicide. Amongst these initiatives, the researchers included a number of different approaches to the restriction of access to means, including control of firearms and control of access to drugs. The authors concluded that whilst such approaches appeared promising, they had in the main been poorly implemented and this resulted in disappointing outcomes in respect of their impact on suicide.

Media reporting

5.71 We were unable to find any study specifically addressing the impact of media reporting on suicidal behaviour or suicidal ideation. Searches of the full citation database initially downloaded indicates that several studies are available which refer to or evaluate this type of intervention, but none provide evidence of direct relevance to the outcomes considered here. This issue tends to be one which is extensively discussed but which is in fact rarely evaluated using concrete outcome measures.

Awareness raising / encouraging help-seeking

5.72 A number of interventions which are outlined here under other headings, in particular school-based programmes, could be regarded as focussed on awareness raising or encouraging help-seeking. However, four studies focussed more explicitly on the possible benefits of these approaches. Two of these studies evaluated very broad-based initiatives targeting military personnel. The interventions evaluated combined a package of training for higher level staff in recognising and providing support for suicidal behaviour and ideation, together with educational and awareness raising initiatives throughout the military population plus specific encouragement for individuals to seek help. One of these studies (Mcdaniel et al 1990) reported a statistically significant reduction in suicide attempts over the course of the programme and narrative support for a reduction in suicidal ideation. In respect of suicide attempts the outcomes should be treated with some caution however, since base rates of attempted suicide were in fact very low. The second study (Rozanov et al 2002) provided a purely narrative report of reductions in suicide.

5.73 Of the two other studies addressing awareness raising/help-seeking interventions, one focussed on empowerment-based parent education groups (Toumbourou & Gregg 2002) and reported no significant change in either self-harm or suicidal ideation. The other focussed on motivational visits by nurses to the homes of 'non-compliant' patients. This study (Vanheeringen et al 1995) reported a statistically significant reduction in attempted suicide. However, ethical concerns may be raised in respect of any widespread implementation of the intervention. Identifying people who have, in effect, refused the treatment offered and targeting these people for further contact may be seen both as undermining patient autonomy and as an invasion of privacy.

Mental health improvement

5.74 To a greater or lesser extent, virtually all of the interventions included in the review could be considered as interventions to improve mental health, if only by the very nature of the outcomes they focus on. However, no one study specifically addressed the issue of whether mental health improvement *per se* had any impact on outcomes. Studies understandably focussed instead on the more specific effect of particular mental health interventions on outcomes. The approach taken by two such studies does provide some indirect insight into whether or not mental health improvement *as such* associates with reductions in suicidal behaviour or ideation.

5.75 One of these studies (Etzsersdorfer 1993) reported unsuccessful outcomes for a single case study of fairly intensive inpatient treatment for suicidal behaviour, the second study (Suominen et al 1998) evaluated the impact of *any* treatment for depression on suicidal behaviour and reported no statistically significant differences in outcome between those who were treated and those who remained untreated. The question of whether interventions which succeed in improving mental ill health also result in reductions in suicidal behaviour and/or suicidal ideation remains an issue urgently requiring further elucidation. Evidence from the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness (e.g. Appleby et al 1999) may be able to address this issue to some extent, but to date the papers resulting from this study have not provided evidence to this effect. Given the clear focus on mental ill health as a precursor to suicidal behaviour in both research and practice, it is perhaps surprising that this issue has not been addressed in any great depth in the literature to date.

School-based programmes

5.76 A number of initiatives targeting school-age children and/or their families have been considered in other contexts, similarly, studies focussed on psychotherapeutic and psychoeducational interventions which happen to take place in the school setting are considered elsewhere. Five studies identified for inclusion in the review evaluated programmes which were specially designed for the school setting. These focussed on quite distinct approaches to addressing the problem of youth suicide. Only one of the studies reported statistically significant reductions in suicidal behaviour or ideation. This study (Aseltine & DeMartino 2004) focussed on the SOS programme, which involved teaching young people to recognise signs of suicidal behaviour or ideation in themselves or in their peers. Significant reductions in attempted suicide over the course of the above programme were reported, although no change in suicidal ideation was identified.

5.77 Two other studies (Ross 1980, Zenere & Lazarus 1997) provided narrative support for reductions in self-harm. The first of these studies evaluated a training initiative for school personnel, the second study, which in addition gave narrative report of reductions in suicide and suicidal ideation, evaluated a programme focussed on crisis intervention and management. The final two studies evaluating interventions specifically designed for the school setting failed to report any impact on outcomes for either suicidal behaviour or ideation. The first of these (Randell et al 2001) evaluated coping and support training, with or without the addition of counselling provision, the second evaluated a purely educational initiative (Vieland et al 1991).

Training and peer-education

5.78 Training and peer-education programmes for families, individuals and other key non-health professionals such as school staff have already been discussed in other contexts. Here we focus on the eight studies which evaluated interventions focussed on the training of frontline health care professionals. One of these (Rotherham-Borus et al 2000) has been mentioned in a number of previous sections of the report. This study focussed on video-based training of emergency room staff. The authors provide narrative support for a reduction in self-harm and suicidal ideation as a consequence of staff training. Interestingly, this is the only study of training for health care professionals which focuses on any professional group other than staff in primary care general practice settings.

5.79 Three studies focused specifically on training GPs to recognise and treat depression or other mental ill health. None of these studies (Rutz & Walinder 1992, Owens et al 2004, Alexopoulos et al 2005) reported any change in outcomes for suicidal behaviour or ideation either with or without the support of statistical analysis. Three studies provided evaluations of more broadly based GP and nurse training initiatives, based on encouraging staff to follow a care management approach. One of these studies reported statistically significant reductions in suicidal ideation (Bruce et al 2004ps), one provided narrative support of a reduction in suicides (Rutz 2001), the third (Nutting et al 2005) failed to find any change in suicidal ideation as a consequence of the intervention (STORM). Finally, one study (Morriss et al 2005) evaluated a brief educational intervention for a range of health professionals (but primarily GP practice staff) but failed to find any significant reductions in completed suicide.

Dialectical Behaviour Therapy (DBT)

5.80 DBT was evaluated by eight studies and appears to be one of the more promising interventions identified. Only two of the eight studies failed to report any statistically significant outcomes relating to suicidal behaviour or ideation and of these, one study (Perseius et al 2003) was a relatively high quality qualitative study providing narrative report of a reduction in suicide attempts, self-harm and suicidal ideation. Whilst none of the studies reported outcomes for completed suicide, two reported statistically significant reductions in attempted suicide (Linehan et al 2006ps, Turner 2000), six reported significant reductions in self-harm (Bohus et al 2004, Linehan et al 1993, Linehan et al 2006, Low et al 2001, Turner 2000, Verheul et al 2003) and three reported significant reductions in suicidal ideation (Linehan et al 2006, Low et al 2001, Turner 2000). As previously noted, the majority of these outcomes were achieved in studies focussing on people with borderline personality disorder. It would be of interest to evaluate this intervention more widely outside of this population and also to evaluate whether the cognitive or behavioural components are primarily responsible for successful outcomes.

Cognitive Behaviour Therapy (CBT)

5.81 A number of studies included in the review evaluated interventions based to some extent on a CBT model, or evaluated interventions which involved CBT as one element in a multi-modal approach. Here we consider outcomes only for those studies which specifically aimed to evaluate the efficacy of CBT alone. Eight studies provide outcomes on this basis. Of these, four reported statistically significant reductions in suicidal behaviour or ideation as a consequence of treatment with CBT, the remainder failed to provide any support, narrative or otherwise for the intervention. None of the studies reporting positive outcomes address reductions in completed suicide.

5.82 Two studies (Brown et al 2005, Salkovskis et al 1990) reported significant reductions in attempted suicide, one (Tyrer et al 2004) reported significant reductions in self-harm and one (Brown et al 2004) reported statistically significant reductions in suicidal ideation. An additional unpublished study, flagged to the review team by NIST (Gerber et al 2003) referred to reductions in suicidal ideation as a possible outcome of a study evaluating CBT, but provided no outcome data. The three studies which failed to identify positive outcomes for CBT compared brief manual assisted cognitive behavioural therapy with treatment as usual for the prevention of self-harm (Tyrer et al 2003); CBT with CBT plus fluoxetine and fluoxetine alone for attempted suicide and suicidal ideation (March et al 2004) and CBT for the prevention of attempted suicide and suicidal ideation in women who repeatedly attempted suicide (Hengeveld et al 1996).

Psychodynamic Interpersonal therapy

5.83 Two studies evaluated psychodynamic interpersonal therapy as a sole intervention rather than as part of a multi-modal intervention. The first of these studies provided evidence of a statistically significant reduction in self-harm and suicidal ideation (Guthrie et al 2001), the second found no significant reduction in either attempted suicide or suicidal ideation (Mufson et al 2004). A third study (Clarkin et al 2001) evaluating a transference focussed psychotherapy containing some elements of the interpersonal approach also failed to find significant reductions in suicidal behaviours or interventions. It is unclear if differences in protocol, differences in the therapeutic approach or differences between people account for the difference in outcomes between these studies.

Flupenthixol

5.84 None of the studies included in the review specifically addressed intervention with flupenthixol. Other related pharmaceutical approaches are evaluated and outcomes discussed within the report and a search of the full range of citations initially downloaded suggests that a number of studies have evaluated flupenthixol in the treatment of depression or other mental health problems, but none of these studies have specifically addressed the outcomes of interest here.

Crisis cards

5.85 One study, focussed on preventing attempted suicide (Cotgrove et al 1995), evaluated the efficacy of providing a green card/token for readmission to hospital. Although outcomes from this study look promising, no statistically significant differences were noted and the authors made no narrative claims regarding efficacy. The crisis card approach may, however, be worth pursuing in additional studies and in the context of other measures of suicidal behaviour and ideation. Although the difference in outcomes for people with and without a green card did not reach statistical significance, only three out of forty-seven people (6%) given a green card attempted suicide on a subsequent occasion compared to seven out of fifty-eight people (12%) *not* given a green card. Furthermore, a *post-hoc* analysis carried out by the authors demonstrated that people allocated to the green card group were at significantly greater risk of further suicide attempts than those allocated to the group not receiving a green card. It is possible that a combination of the comparatively small sample size (outcomes for one hundred and five people were available for analysis at the study end-point), the unintended bias in the distribution of risk between groups and the focus on a relatively rare behaviour (attempted suicide) accounted for the failure to identify a statistically significant difference in outcomes. Indirect support for crisis card initiatives is also provided by the small additional number of studies evaluating ongoing contact as outlined below.

Telephone and other contact

5.86 Four studies evaluated the efficacy of the simple intervention of staying in regular contact with a person known to be subject to suicidal behaviour or suicidal ideation. A fifth study, which has already been referred to in the context of the provision of services to rural populations (De et al 1995), evaluated the efficacy of telephone contact offering support to older people. Of these five studies, three reported statistically significant improvements in suicidal behaviour and only one study (Cedereke et al 2002a) failed to report positive outcomes for either suicidal behaviour or suicidal ideation. This latter study evaluated a very limited form of telephone-based contact (two phone calls at four month intervals). Two linked studies reporting positive outcomes also evaluated fairly minimal levels of contact (Motto1976, Motto & Bostrom 2001). These compared contact versus no contact options for patients refusing follow-up treatment. The first of these two studies provides only narrative support for a reduction in completed suicide following the intervention, but the second reported a statistically significant reduction in completed suicide in the contact group. One study (Carter et al 2005ps) evaluating very frequent contact post-discharge with people known to have engaged in suicidal behaviour reports statistically significant reductions in subsequent self-harm. Finally, the evaluation of telephone-based support for older people (De et al 1995) reported statistically significant reductions in completed suicide. It should be noted that the latter study offered additional support rather than simply contact alone. The simplicity and potential cost-effectiveness of maintaining contact, with or without additional provision of support, as an intervention, combined with the relatively promising outcomes outlined, suggest that this may well be an approach which is worth pursuing. Further 'real world' evaluations of this approach in clinical and other settings would be of particular value.

Service re-structuring and case management

5.87 A number of the interventions evaluated can be described as service-based interventions. However, the studies we focus on here are those which either involved a change in current service provisions, or which explicitly compared two or more options for service delivery. Eight studies evaluated interventions falling within these criteria. Two linked studies (Aoun 1999, Aoun & Johnson 2001) focussed on the introduction of intensive outreach services provided by a suicide intervention counsellor. Aoun (1999) reported statistically significant reductions in suicide attempts following the introduction of this form of service delivery, Aoun & Johnson (2001) provide narrative support for a reduction in attempted suicide and suicidal ideation based on further details from a consumer survey. Four studies compare the introduction of a service with 'treatment-as usual'. Three of these studies, two reporting on nurse-led case management (Clarke et al 2002, Congdon & Clarke 2005) and one on integrated treatment (Nordentoft et al 2002) failed to identify any reductions in suicidal behaviour or ideation.

5.88 Two additional studies by the same author identified statistically significant reductions in suicide attempts and self-harm in participants allocated to medium stay inpatient care plus subsequent 'step-down' planned care (Chiesa et al 2003ps) and in participants allocated to a phased step-down programme instead of a psychoanalytically oriented speciality treatment programme (Chiesa et al 2004). Finally, one study (Waterhouse & Platt 1990) failed to find any significant differences in outcomes between general hospital admission and discharge home. Although there are some promising outcomes here, the limited number of studies combined with the diverse range of service interventions evaluated provides no clear direction either for future research or for clinical practice. An appropriate and, in respect of the existing literature, novel way forward may be to use in-depth qualitative research with service users, carers and people involved in service delivery to identify aspects of service delivery which are seen as helpful or unhelpful and develop further pilot evaluations around themes identified in this way.

5.89 **In summary**, the number of studies addressing each individual approach to intervention is very limited. As the evidence currently stands, the interventions which have been highlighted by NIST as of particular interest to the Scottish suicide prevention strategy and which find the most consistent and substantive support in the literature are DBT (for people with personality disorder) and restriction of the access to means of suicide or self-harm. In the latter case, further exploration in contexts other than firearms control would be of value, as would studies exploring individual-level approaches to restricting the access to means. The minimalist intervention of simply maintaining ongoing contact with people known to be subject to suicidal behaviour or suicidal ideation also finds quite consistent support in the limited number of studies available. This approach could have additional merit in respect of its likely cost-effectiveness. Looking more broadly at national-level and service-based initiatives, which are identified as a priority for *Choose Life*, there is support for service provision based around specialist centres. In terms of service re-structuring at the local level, there is some evidence of positive impact, but existing studies are too small in number and focussed on too diverse a range of service initiatives to provide a clear direction either for current practice or for future research. Broader national initiatives such as school-based educational initiatives, public education and media campaigns and training initiatives for health care professionals have been under-evaluated in the literature and are lacking in consistent support where they have been evaluated.

Relevance to the Scottish Context

5.90 Part of the remit of the review was to assess the relevance of the available research evidence to the Scottish situation. We have addressed this issue as follows: firstly, by evaluating outcomes from any studies directly focussed on the Scottish population; secondly, by comparing demographic profiles for suicidal behaviour and ideation in Scotland with the profile of the available intervention studies; finally, by setting known outcomes against recent evidence addressing intervention priorities or constraints in the Scottish context.

Studies directly addressing the Scottish context

5.91 Of the 38 studies carried out in the UK, 8 related directly to the Scottish population. However, of these, four studies (Davidson et al 2004, Evans et al 1999, Tyrer et al 2003 and Tyrer et al 2004) reported on different aspects of the same multicentre trial (the POPMACT study). Only one of the five centres taking part in the study was sited in Scotland. Four additional and independent Scottish studies (Cunningham-Owens et al 2001, Eagles et al 2003, Gerber 2003 and Thrive Initiative 2006) have been carried out, but one of these (Gerber 2003) although referring to suicidal ideation as a potential outcome of the CBT intervention evaluated, in fact provided no data addressing this issue. It can be seen therefore that the direct evidence for intervention in the Scottish context is very limited.

5.92 Taking the evidence as it stands, the POPMACT study (a multi-centre RCT) failed overall to find any statistically significant outcomes favouring a brief form of manual-assisted cognitive behaviour therapy (CBT) over treatment as usual in reducing self-harm. The study did report potential economic benefits of the treatment in comparison to TAU, but in the absence of convincing evidence of the intervention's effectiveness this information is of limited value. Of the three additional independent studies reporting relevant outcomes, one study (Cunningham-Owens et al 2001) found statistically significant evidence of an *increase* in suicidal ideation following a brief educational intervention for people with schizophrenia.

5.93 A second study (Eagles et al 2003) reported more promising outcomes, with evidence of a significant decrease in suicidal ideation following some if not all of the interventions addressed. This study surveyed people with serious mental health problems to identify which of the interventions they had experienced had served to reduce their suicidal ideation. On the basis of self-report, informal social networks and support by psychiatrists had proven substantially more helpful than contact with a GP. Outcomes from this study are interesting, but would need to be replicated using more objective measures of outcome and a larger sample size before any clear policy decisions could be taken in respect of service-based initiatives.

5.94 Finally, one study evaluated a counselling and support service focussed on male survivors of childhood sexual abuse at low risk of suicide (Haslam, 2006) and reported positive outcomes in relation to a reduction in suicidal ideation. However, this study was beset by pragmatic and ethical constraints and to date the evidence for a reduction in suicidal ideation is based solely on spontaneous reports of a reduction in suicidal ideation by 10 participants. The bulk of the data reported by this study in the one available report are focussed on issues relating to service process and service delivery rather than on the outcomes of interest here.

5.95 **In summary**, the direct evidence we were able to identify for intervention in the Scottish context provides few if any firm pointers towards initiatives which would be of particular value. Since there is little reason to assume that the Scottish context, except perhaps in terms of protocols for service delivery, is distinct from either the rest of the UK or from other countries, the interventions identified as promising in other populations may be equally applicable to the Scottish situation. In support of this assumption, we found few significant differences between outcomes in studies evaluating similar interventions in quite diverse countries. It is likely that both the triggers for suicidal behaviour and ideation and the interventions needed to resolve these behaviours are largely universal. However, if studies focussed explicitly on the Scottish population are seen as a priority, then it is clear that the current evidence base poorly serves this need.

Profile of suicidal behaviour in Scotland

5.96 In the background to the report we briefly outlined the known profile of suicidal behaviour and ideation in Scotland. Here we map what is known about this profile onto the available evidence base for intervention, to explore how well the existing evidence base fits the needs of the Scottish population. Given, in particular, the poor reporting of demographic and other characteristics in the studies included in the review and also the limited range of national statistics relating to suicide and self-harm available for Scotland[9], the picture we are able to paint is of necessity somewhat limited. Nevertheless, it provides at least a crude account of how informative the available evidence is likely to be for Scottish prevention and intervention initiatives.

Overview

5.97 The most pertinent and recent national statistics available to us for comparison were General Register Office for Scotland (GROS) figures for deaths by suicide and events of undetermined intent in 2006; statistics for discharges from Scottish acute hospitals with a diagnosis of deliberate self-harm in 2004 collated by the Information Services Division (ISD, Scotland's national organisation for health information and statistics) and Community Health Index (ISD Scotland) figures for self-harm presentations to GPs and GP Practice Teams during 2004. The GP Practice self-harm figures represent a composite of presentations for self-harm and attempted suicide as the two are not separated out. No formal national figures specific to Scotland are available in respect of suicidal ideation, so in this context we have drawn on the one available UK-wide survey (Singleton *op cit*) which included a large general population random sample drawn from Scotland.

5.98 As noted above, the data available for comparison are limited. The national statistics used to assess the profile of suicide and attempted suicide/self-harm provide, respectively, summative figures for suicide set out by age categories and by gender and method of suicide and summative figures for self-harm/attempted suicide set out by age categories and broad method (poisoning versus other or unknown method) alone. The available survey providing an indicative profile for suicidal ideation gives summative data for a wider range of demographic characteristics, but few detailed statistics are given. Since we do not have access to individual participant data for the intervention studies included in the review, we are also dependent on the data provided by study authors to draw comparisons between the actual profile of suicidal behaviour and ideation in Scotland and the focus of the existing evidence base for intervention. Unfortunately, as outlined earlier, a particular problem in the literature is the poor reporting of basic participant characteristics.

[9] The data sources available to us provided only summary figures for broad demographic and other categories. Such data are not sufficiently flexible to explore the profile of suicidal behaviour in any depth. The level of detail needed to provide a more sophisticated account of how the available evidence regarding interventions may be used to address current population patterns of suicidal behaviour requires both disaggregate (anonymised individual-level) data for the profile of suicidal behaviour and ideation and also similarly disaggregated data for the participants in the available studies. Analyses drawing on these types of data should be used to underpin future prevention initiatives.

5.99 It is important to recognise that the *lack* of information available, both with regards to the included studies and more generally, in itself gives a valuable insight into how readily, or otherwise, the existing evidence base can be used to inform national or local initiatives for prevention and intervention. It is clear, for example, that there is a mismatch between the general tendency in the intervention literature to recruit participants from a wide spectrum of demographic and other groups and the emphasis of national initiatives such as *Choose Life* on intervention tailored to the needs of priority groups. What works *for whom* is an issue rarely addressed in the literature and this, combined with generally poor reporting of participant characteristics, means that we have little evidence to inform targeted prevention and intervention strategies. In addition to focusing on the particular demographic characteristics of individuals, both national statistics and prevention and intervention initiatives also commonly focus on methods of self-harm and suicide. Again, studies evaluating interventions in contrast generally fail to draw distinctions between different methods, combining outcomes across participants whose distinct choice of methods may in fact indicate the presence of other important differences of relevance to effective prevention.

5.100 One other notable gap between the available evidence and the requirements of an effective prevention and intervention strategy is the lack of information regarding 'hidden' populations. It is apparent from self-report surveys (e.g. Hawton et al 2002) that only a comparatively small proportion of incidents of self-harm result in presentation to services. Formal counts of the incidence and also, potentially, of the distribution of self-harm within the population in Scotland and elsewhere are therefore likely to be inaccurate and this has quite significant implications for prevention. Yet, to date, there has been little research effort directed towards establishing the extent and profile of this unknown and hence hard to reach population. Future research intended to inform prevention and intervention initiatives could benefit from taking on board the approaches used in other fields which deal with hidden as well as explicit behaviours (e.g. the 'capture-recapture' methods used in identifying populations using illicit drugs but not presenting to services). These, and other mismatches between the nature of the existing evidence base and the profile and needs of the populations experiencing suicidal behaviour and suicidal ideation, support the need for a significant expansion of research effort and also closer liaison between policy makers, practitioners and the research community.

Suicide

5.101 The General Register Office for Scotland (GROS) provides publicly accessible annual summary figures for the number of deaths caused by intentional self-harm and events of undetermined intent in Scotland. The classification of cause of death is based on information taken from the death certificate, together with any additional information provided subsequently by the certifying doctor and is coded as *per* the relevant International Classification of Diseases (ICD-9/ICD-10) codes. The figures do not relate to the actual year of death, but to deaths registered within the given year, although in the majority of cases these two will be the same. The rationale for including events of undetermined intent is to allow for the possibility of undercounting in the recognition of and/or reporting of a death as being due to self-harm. Tables 5.1-5.3 below set out the profile of suicide in Scotland in 2006 as represented in the GROS figures.

Table 5.1 Age and gender profile of deaths by suicide and deaths of undetermined intent in Scotland in 2006

		10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	Total
Males	N	31	97	141	147	83	56	25	10	592
	%	**5.2**	**16.4**	**23.8**	**24.8**	**14.0**	**9.4**	**4.2**	**1.7**	
Females	N	5	18	30	48	42	20	6	2	173
	%	**2.9**	**10.4**	**17.3**	**27.7**	**24.3**	**11.6**	**3.5**	**1.1**	
All	N	36	115	171	195	125	76	31	12	**765**
	%	**4.7**	**15.0**	**22.3**	**25.5**	**16.3**	**9.9**	**4.0**	**1.6**	

Notes to Table
Column figures do not sum to the totals. These figures are as presented by GROS and presumably indicate that the age at death of two males and two females was not established.

5.102 There has been a consistent downward trend in suicide rates between 2001-2006 (the Scottish Public Health Observatory reports a 14% decrease for males and a 9% decrease for females). However, Scotland's suicide rate remains higher than rates in all other parts of the UK and the longer-term general trend (last 25 years) has been upwards (cf. Platt et al 2007). Both the absolute figures (Table 5.1) and rates per 100,000 (Table 5.2) suggest that, within the age categories set by GROS, the peak age range for completed suicide in Scotland is currently between 30-49 years of age. The Scottish Public Health Observatory in addition cites suicide as a leading cause of death in people aged under 35 years.

5.103 It is worth bearing in mind that whilst the absolute number of deaths at both ends of the age spectrum (19 or younger and 60 or older) is substantially smaller than the number of deaths in the mid-range age categories, taken together the oldest and youngest age groups nevertheless account for one-fifth of all completed suicides. Current gender differences in suicide are, however, more marked than age differences, with the rate for males in 2006 almost four times that for females. Males show higher rates of suicide than females across all age categories, although this is most notable in the youngest (10-19) and oldest (80-89) age categories. One final demographic difference of note is the clear association of suicide with economic deprivation (reported in Platt et al *op cit*). The most deprived areas in Scotland have a risk of suicide double that of the Scottish average. Geographic variation in suicide rates is also evident across health board and local authority areas.

Table 5.2 Deaths by suicide and deaths of undetermined intent in Scotland in 2006 combined rates per 100,000 by age and gender

	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	Total
Males	9.5	29.6	41.6	38.9	24.8	22.5	15.2	15.8	24.0
Females	1.6	5.6	8.3	11.9	12.1	7.3	2.8	1.7	6.5
All	5.7	17.7	24.4	24.9	18.4	14.5	8.1	6.6	15.0

5.104 The methods used to commit suicide have the potential to be highly informative in respect of mechanisms for intervention and prevention. The profile for Scotland, in terms of the rank ordering of methods used, has remained broadly similar over time to the national profile for the UK as a whole (Platt et al *op cit*). Comparing the most recent national figures available for Scotland (Table 5.3) with those for England and Wales (Table 5.4) however, there *are* some absolute differences in the distribution of the most common methods currently used. In Scotland deaths by both drowning and jumping from a high place are roughly twice that noted in England and Wales, albeit still a relatively small absolute proportion of total deaths.

5.105 The proportion of deaths due to poisoning is also slightly higher in Scotland than in England and Wales. In contrast, deaths by hanging, by use of firearms and by 'other and unspecified' means are lower in Scotland than in England and Wales. These differences, although minor in absolute terms, are indicative of the need to tailor the Scottish strategy to the Scottish situation. The depth of information required to achieve this, however, is currently lacking. A targeted prevention strategy requires detailed information both about people and methods of self-harm beginning far earlier in the chain of events leading to an eventual death. Routine collection of cross-service data with attention to the methods used in self-harm would have the potential to significantly improve the effectiveness of future prevention initiatives.

Table 5.3 Specific causes of deaths by suicide and deaths of undetermined intent in Scotland in 2006

		Poisoning	Hanging, Strangulation /suffocation	Drowning and submersion	Firearms and Explosives	Jumping from a high place	Other and unspecified means	Total
Males	**N**	176	249	53	10	35	69	592
	%	**29.7**	**42.1**	**8.9**	**1.7**	**5.9**	**11.6**	
Females	**N**	89	37	19	0	11	17	173
	%	**51.4**	**21.4**	**11.0**	**0**	**6.3**	**9.8**	
All	**N**	265	286	72	10	46	86	**765**
	%	**34.6**	**37.4**	**9.4**	**1.3**	**6.0**	**11.2**	

5.106 The broad profile of methods used by males and females in Scotland compared to England and Wales is also, in terms of rank order, quite similar. Again, however, there are slight, but, in terms of prevention, potentially important differences. Overall, a higher proportion of males commit suicide by either hanging or use of firearms than females and a higher proportion of females commit suicide by self-poisoning. In Scotland, however, death by poisoning accounts for a higher proportion of deaths overall (34.6% versus 27%) and also shows a greater disparity between men and women than is found in England and Wales (a difference in proportions of 21.7% between males and females in Scotland compared to 17.5% in England and Wales). In contrast to the pattern for poisoning, the proportion of females committing suicide by either drowning or jumping from high places is slightly closer to the proportion of males doing in so in Scotland than is the case for England and Wales.

Table 5.4 Specific causes of deaths by suicide and deaths of undetermined intent in England and Wales in 2005

		Poisoning	Hanging, Strangulation /suffocation	Drowning and submersion	Firearms and Explosives	Jumping from a high place	Other and unspecified means	Total
Males	**N**	777	1664	132	93	91	699	3456
	%	**22.5**	**48.1**	**3.8**	**2.7**	**2.6**	**20.2**	
Females	**N**	483	351	91	6	48	226	1205
	%	**40.0**	**29.1**	**7.5**	**0.5**	**4.0**	**18.7**	
All	**N**	1260	2015	223	99	139	925	**4661**
	%	**27.0**	**43.2**	**4.8**	**2.1**	**3.0**	**19.8**	

5.107 Roughly one third of all the studies included in the review (33%) evaluated outcomes for completed suicide. In terms of the age distribution of studies, where this was adequately reported, the focus of the intervention literature broadly matched the age distribution noted for suicide in Scotland. Around half of the studies giving sufficient information to allow a comparison to be drawn (N=27) focussed on the 30-49 age group also identified in GROS figures as accounting for around half of the completed suicides identified in 2006, with 22% of studies focussed on people aged 29 or younger, who accounted for around 20% of deaths in the GROS figures.

5.108 In drawing comparisons purely between the focus of the available informative literature and current profiles for the age distribution of completed suicide, the most poorly served population are those aged 60 and over, who accounted for 15% of deaths in Scotland in 2006. Only 7% of studies providing adequate information regarding the age of their participants focussed on this age group in evaluating interventions. Although the gender of participants was better reported than their age (61 studies addressing completed suicide gave details of their participants' gender), all but four studies (three focussed solely on males, one on females) reported outcomes for mixed participant groups. There is therefore very limited available information to inform gender specific interventions for suicide. Attempts to target intervention initiatives at even the quite basic level of focussing on distinct methods of self harm for males and females are currently severely hampered by the lack of specific evidence. The intervention studies as a whole provide too little information regarding distinct methods of suicide even to draw meaningful comparisons between the methods focussed on in the literature and the methods of greatest prominence in recorded deaths in Scotland. This is a notable gap which needs addressing in future research.

5.109 Aside from the broad focus of the literature, the pertinence of the available evidence base to the development of effective interventions, suited to the needs of the population, can be gauged from the profile of those interventions for which there is evidence of possible efficacy. A more detailed account of these studies has been given earlier, here we are concerned rather with the extent to which the profile of successful interventions fits the needs of a Scottish strategy for prevention and intervention. One third of the studies evaluating interventions for suicide reported successful outcomes. Putting aside the issue of study quality (the highest quality studies provided only equivocal evidence of effectiveness), just over half of the interventions reported as having successful outcomes (53%) evaluated drug treatments. Specifically, anti-manics (lithium), anti-depressants (SSRIs were evaluated in one study, but in general studies combined across distinct types of anti-depressant) and anti-psychotics (clozapine, atypicals combined together). Understandably, these studies focus almost exclusively on people with a diagnosis of mental illness (affective disorders, primarily major depression, but also schizophrenia and borderline personality disorder).

5.110 Whilst there are strong associations between suicide and mental ill health (cf. Mann 2002), the nuances of this association are not currently well understood and suicide is by no means restricted to people diagnosed with a mental health disorder. In pursuing a strategy to prevent suicide, Scotland cannot focus solely on providing medication for people with a mental health disorder. Given also the equivocal outcomes of high quality pharmaceutical studies and some evidence of possible adverse outcomes from drug treatments, strategies for pharmaceutical intervention in Scotland should be regarded as an opportunity for gaining more extensive and concrete data on outcomes for specific treatments in specific mental health populations.

5.111 Studies with successful outcomes evaluating interventions which are more generally applicable than pharmaceutical treatment are spread rather thinly across a fairly broad range of interventions. This means that including any one of these interventions in a national or local strategy for suicide prevention and intervention should currently be viewed in the light of a 'real world' evaluation rather than a guaranteed mechanism for reducing suicide.

5.112 Aside from a small number of studies which happen to have focussed on participants aged 65 and older (three studies reporting on various support programmes for older people, primarily in rural settings, one study evaluating palliative care for cancer patients) and one study focussed on individual-level restrictions on access to firearms for adolescents, evaluations aimed at interventions for the general population have not chosen to explore which sections of the population respond best to the interventions evaluated. Targeted suicide prevention and intervention based on the existing evidence is therefore not a realistic option at this point. One possible exception to this is the focus on providing community-based support for older people, as, taken across all three studies, this has been evaluated in a comparatively large and homogenous group of older people. The evidence is based primarily on the narrative report of study authors, but since older people have in the main been poorly served by the literature to date, this one notable exception is worth pursuing in developing future evaluations of relevance to Scottish prevention initiatives.

5.113 Given the 'experimental' nature of most successful interventions to date, there would also be some merit in Scottish strategies focussing initially on those interventions which are comparatively simple to implement and hence likely to be cost effective and easy to reverse if they prove less effective than predicted. For example, maintaining contact with people known to have self-harmed and providing points of contact or other mechanisms to pre-empt impulsive suicides at key locations (cf. King et al 2005). Introducing interventions which require significant re-structuring of services (e.g. suicide prevention centres), added legislation (e.g. further firearm restrictions or regulations regarding carbon-monoxide and other substances), or resource-intensive procedures (e.g. training of GPs or other professionals) is less likely to be viable and will be more difficult to reverse if the evidence of success to date proves not to be transferable to the Scottish situation.

5.114 One viable way to explore the above types of intervention further without over-committing resources would be to carry out 'real world' evaluations in a small number of areas or with smaller randomly chosen populations in Scotland. For example, the likely impact of further firearm restrictions and/or other restrictions on access to means could first be explored at the individual level (e.g. following studies which have restricted access in the home to 'preferred' means of self-harm). Similarly, fundamental changes to service provision, such as the introduction of suicide prevention centres, could be explored using smaller scale changes to services which mimic the opportunities offered by more fundamental structural changes (for example, evaluating co-ordinated care initiatives which improve pathways through existing services using a small specialist team to form the 'hub' of service delivery).

5.115 Finally, it is worth noting that the vast majority of interventions reported to have had successful outcomes in reducing suicide to date have been evaluated in the community. This may well indicate that the general community is the most appropriate setting in which to place interventions. However, in practice, this leaves health and other professionals working in institutional settings (including the full range of in-patient, outpatient, general and mental health care settings, nursing homes, prisons etc.) with something of a dilemma in trying to contribute directly to a Scottish strategy for suicide prevention. This is not an issue which can be resolved without further evaluation. A reasonable first step would be to evaluate the transferability of community-based interventions to the institutional setting. For example, further evaluation of peer support in prisons or social network interventions located within the in-patient setting could be useful.

5.116 **In summary:** If future research is to usefully inform intervention strategies based on the current profile of **suicide** in Scotland, additional studies specifically evaluating interventions for older people are required. More generally, a far greater attention to potential gender and other demographic differences and to differences reflecting choice of method is required in evaluating which interventions may be effective for which sections of the population. Further evaluation is also required of promising interventions for people who are at risk but have *not* been identified as having mental health problems. Increasing the range of treatment options for people with a mental health problem beyond pharmaceutical intervention would also be helpful.

5.117 In terms of the options for prevention and intervention currently flagged by the literature, a pragmatic approach would be to focus Scottish suicide prevention efforts initially on interventions with evidence of effectiveness that are also comparatively simple to implement. For example, contact-based initiatives and initiatives to pre-empt suicide in high risk locations (e.g. signs offering telephone support). More complex interventions which would involve significant re-structuring of services or which would be resource intensive should be implemented initially on a trial basis, using individual-level intervention or local models of a potential broader national strategy.

5.118 Finally, it is apparent that current options for effective intervention in institutional settings are extremely limited. A reasonable first step to resolve this issue would be to evaluate the transferability of interventions found to show promise in the community. For example, further evaluation of peer support in prisons or social network interventions located within the in-patient setting.

Attempted Suicide and Self-Harm

5.119 National data specific to attempted suicide and self-harm are less routinely collected and collated than is the case for data relating to suicide and, also in contrast to suicide, publicly available data relating to the national profile of self-harm in Scotland is sparse. Annual figures for hospital admissions and discharges due to self-harm in Scotland are available via the Information Services Division (ISD, Scotland's national organisation for health information and statistics). However, due to the way in which hospital data are currently collected[10] and also to issues in the diagnosis and recording of self-harm in hospital records (cf. Rhodes et al *op cit*) admission and discharge figures for self-harm/attempted suicide should be regarded as an approximation and, in all likelihood, an underestimate of actual presentations to hospital resulting from self-harm.

5.120 We use here the most recent published figures for self-harm/attempted suicide based on hospital discharge records (NHS Scotland Improving Mental Health Information Programme 2006). These figures provide estimated summary information on discharges from Scottish acute hospitals with a diagnosis of deliberate self-harm in 2004, divided by age and gender[11]. Hospital admission and discharge data provide at best an incomplete profile of the extent and nature of self-harm (cf. Hawton et al 2002). Information relating to self-harm presentations to *other* services and presentations to hospitals *not* involving in-patient admission is, however, even less readily available at the national level.

5.121 The closest and most recent approximation we were able to identify for current national patterns of presentations for attempted suicide and self-harm to services other than hospitals in Scotland were Community Health Index figures for self-harm (including attempted suicide classified as self-harm) presentations to General Practitioners (GPs) and to GP Practice Teams. These data are, strictly speaking, not directly comparable with either the profile of suicide in Scotland as presented earlier or with the summative figures for hospital data, since the data are standardised by the age, gender and deprivation distribution of the Scottish population. However, they can be used to contribute to the broad picture of likely patterns of self-harm in Scotland and we draw rough comparisons here between the available data sources, with the caveat that more detailed information collected to a standard format would be needed to provide a true picture of self-harm in Scotland. The age profile of self-harm as represented by hospital discharge and GP practice figures is set out in Table 5.5 below.

[10] Hospital records are based on patient 'episodes'. Episodes in effect record a point of contact between a patient and the NHS, for example admission to a particular hospital or the provision of a particular treatment. There is currently no attempt to link episodes back to people within the hospital record system. This creates problems in counting the number of people who have presented with a particular diagnosis. Over-counting may occur if, for example, a patient is admitted to one hospital but then transferred to another (this appears as two episodes). Under-counting can occur if episodes which in fact relate to separate people are incorrectly linked back to one person. NHS numbers for individual patients are not used with sufficient frequency or accuracy to allow linkage of episodes to people using this identifier, so any linkage has to be carried out using probability matching via other key identifiers such as age, gender, date of birth and these, although reasonably discriminating, are not failsafe.

[11] We are very grateful to Mike Muirhead of ISD Scotland for his help in providing us with these figures.

5.122 To date, there has been little attempt made to co-ordinate data collection relating to self-harm/attempted suicide *across* services, either in Scotland or elsewhere. It is therefore not currently possible to gauge the extent of overlap between services in patterns of presentation. For example, it is not possible to identify presentations which are 'first time' presentations to services and presentations which are repeat presentations either to the same *or* to a different service. By the same token, it is, as suggested earlier, also not currently possible to establish the size of the 'hidden' population which may engage in self-harm or attempted suicide but not present to services. Analysis of the largest available self-report survey including participants from Scotland (Meltzer et al 2000) suggests a lifetime prevalence for attempted suicide of 4.4% with an additional 2% of people stating that they have at some point harmed themselves *without* intending to commit suicide. This implies that the size of the 'hidden' population may be quite substantial. The lack of information regarding this population and also, more generally, the scarcity of reliable routinely collected cross-service data for attempted suicide and self-harm is unfortunate, since such data are of necessity the cornerstone of any effective prevention and intervention strategy. This fact in itself suggests one obvious mechanism for improving outcomes for self-harm and attempted suicide which could readily be incorporated into future prevention and intervention strategies for Scotland, namely improving the quality and depth of routine data collection.

Table 5.5 Presentations to GP and GP Practice Teams (PTI) and hospital discharges in Scotland for self-harm/attempted suicide during 2004

Information Source	Method	0-14	15-19	20-44	45-64	65+
GP	Poisoning	60	100	640	230	20
	Other	20	0	60	20	0
	Unknown method	190	970	860	310	20
	Total [3500]	**270 (7.7%)**	**1070 (30.6%)**	**1560 (44.6%)**	**560 (16.0%)**	**40 (11.4%)**
PTI	Poisoning	60	100	700	230	20
	Other	20	0	60	20	0
	Unknown method	210	990	1120	310	20
	Total [3860]	**290 (7.5%)**	**1090 (28.2%)**	**1880 (48.7%)**	**560 (14.5%)**	**40 (10.4%)**
Hospital Discharge	**Total [13,430]**	**351 (2.6%)**	**1737 (12.9%)**	**8277 (61.6%)**	**2703 (20.1%)**	**362 (2.7%)**

5.123 To summarise what can be gleaned from the available national data for self-harm and attempted suicide, presentations to GP practices and to A&E show broadly similar age profiles, which are not too dissimilar to the distribution of completed suicide across the age ranges. The majority of the 2004 hospital discharge figures relate to people in the 20-44 age category. The proportion of all presentations accounted for by this age group is higher than is the case for the same age group presenting to GP practices, but suggests a broadly similar demographic split. Although the age distributions for GP and hospital presentations are similar overall, there are differences in particular age groups which may be of relevance to prevention. Even taking into account the standardisation used in these figures, presentations to GP practices reported for the youngest (0-14) and oldest (65+) age groups and, even more noticeably, for the older teenage group (15-19 year olds), are substantially higher than figures reported for hospital discharge.

5.124 The age profile for self-harm suggested by these two sets of data also differs from that for completed suicide, again in respect of the youngest and oldest age categories. Completed suicide within the 19 and under age groups accounts for a much smaller proportion of total suicides than the proportion of identified self-harm accounted for by this group in either GP practice or hospital records. In contrast, the proportion of suicides accounted for by the 65 and older age group is greater than would be anticipated from hospital figures, but smaller than would be estimated on the basis of presentations to GP practices. As previously, it should be borne in mind that the above figures provide only a rough approximation of actual patterns of self-harm. Nevertheless, if these patterns hold true, then there are some grounds for suggesting that Scottish prevention initiatives may benefit from a targeted approach to interventions for self-harm in different age groups. For example, GP surgeries may be a particularly useful point of access for initiatives addressing self-harm in children, teenagers and older people.

5.125 The differences in particular age categories for profiles of self-harm and suicide can also be indicative of where current prevention initiatives are failing. Again with regard to older people, for example, lower figures for hospital discharge compared to both GP presentations and eventual suicide may imply that where intervention fails in the early stages of an older individual's pathway to suicide there are fewer 'second chances' than is the case for other age groups. As previously, the depth of information to confirm any such assumptions is lacking, but comparing across the available figures suggests how further more detailed information could serve to inform a targeted intervention strategy for Scotland.

5.126 With regard to methods of self-harm, the available published data is particularly limited, but figures for presentations to GP practices provide an indication of the proportion of presentations due to poisoning. These figures suggest that self-poisoning is a more common method in the older age groups (accounting for around 40% of presentations in the 20-44 and 45-64 age categories and for 50% of presentations in the 65 and older age category). Older teenagers in comparison show a substantially lower proportion of self-harm presentations to GPs due to self-poisoning (9%). Finally, hospital discharge figures based on gender confirm the generally held view that women, in Scotland as elsewhere, account for a higher proportion of self-harm (57% in the case of these figures) than of completed suicide (22.6%).

5.127 Just under one half (46%) of the intervention studies evaluated outcomes for self-harm and/or attempted suicide. Comparing the focus of these intervention studies with what is known about the *likely* profile of self-harm and attempted suicide in Scotland, both the youngest and oldest age groups are poorly served in terms of the extent of available evidence. The majority (66.7%) of studies evaluating outcomes for self-harm or attempted suicide and providing adequate information regarding the age of their participants (N=57) focussed on the 20-44 age group. Whilst this age group also appears to be the key age group represented in GP and A&E figures recording self-harm, the lack of attention in the literature to the 14 and under age group (accounting for only 5.3% of relevant studies) and the 65+ age group (accounting for only 1.7% of relevant studies) represents a lost opportunity to establish an evidence base for sections of the population which current estimates suggest are, together, likely to account for around one fifth of known incidents of self-harm/attempted suicide in Scotland. Both the 15-19 and 45-64 age ranges are also underserved by the literature, albeit not to the same extent.

5.128 Whilst gender-specific studies were more common in the context of self-harm/attempted suicide than in the context of completed suicide (16 studies, 18% of those studies providing information regarding the gender of participants focussed on either males or females) the majority of studies again evaluated outcomes for males and females combined, providing little room for targeted intervention. Where studies did choose to focus on one gender, the emphasis also seemed to be on self-harm/attempted suicide by women, with 12 of 16 single gender studies evaluating outcomes for women. In comparison to the known profile of identified self-harm in Scotland (we have no way of evaluating the gender distribution of the 'hidden' population) this may represent an imbalance in the available evidence compared to the distribution of actual self-harm, or at least an imbalance in respect of self-harm with relatively severe physical consequences. Hospital statistics for 2004 suggest that men accounted for around 43% of all incidents of self-harm.

5.129 Finally, as with studies evaluating outcomes for suicide, there was little attempt in the literature to partition outcomes with respect to the methods of self-harm used by participants. Again, this impacts adversely on the opportunity for Scotland to develop a targeted strategy for intervention and prevention. Although the national profile of known methods of self-harm we present here is very limited, broad comparisons between GP practice presentations (around 70% of which were for methods of self-harm *other* than poisoning) and the methods reported to be used by participants in the intervention studies suggest that self-poisoning is over-emphasised in the literature at the expense of populations engaging in other forms of self-harm.

5.130 Future research contributing to the further development of a Scottish prevention and intervention strategy for self-harm/attempted suicide could usefully focus on targeted intervention both in respect of demographic variables and methods of self-harm. In particular, it would be useful to expand the evidence base relating to interventions for self-cutting and also for self-harm involving the use of multiple methods across time. The latter category is hardly touched on in the intervention literature, yet there is evidence from longitudinal studies (cf. Leitner & Barr 2003) that 'crossover' from one method to another indicates a trigger point for the move to more physically threatening forms of self-harm and to eventual completed suicide. The implicit assumption in the intervention literature that it is appropriate to combine outcomes for people using distinct methods of self-harm pre-empts targeted intervention.

5.131 A higher proportion of studies evaluating interventions for self-harm and/or attempted suicide (68%) report positive outcomes than is the case for studies evaluating interventions for suicide. To assess the likely 'fit' between the needs of the Scottish population and Scottish prevention and intervention initiatives and the type of interventions with some evidence of effectiveness, we again considered the profile of all studies reporting successful outcomes. A first point to note is that studies reporting successful outcomes for self-harm/attempted suicide were more likely than the general run of studies to provide details of the age of their participants (75% noted either mean age or age range) and also to describe the population they had focussed on in greater detail. This gives some potential at least for the development of targeted prevention strategies for different age groups based on these interventions. Of the 47 studies reporting successful outcomes for specified age groups, 40 (85%) reported outcomes for people aged 45 or under. 18 (38%) reported outcomes for people aged 30 and under.

5.132 It is reasonable to conclude again that older populations are, in the main, poorly served by the available evidence. However, there is sufficient evidence to begin targeting a small number of populations, in particular, given outcomes from high quality studies, young women (aged 20-45) with borderline personality disorder who may benefit from DBT. Studies evaluating treatment with lithium, which also have supportive higher quality evidence, although with the caveats outlined previously, have focussed on a slightly older age group (40-65) with affective disorders, primarily bipolar disorder. In this case there is no additional information suggesting whether outcomes may be dependent on gender, but at least evidence is available of the broad age range within which lithium treatment for affective disorders is appropriate.

5.133 Considering the issue of targeting at a broader level, studies reporting successful outcomes for self-harm/attempted suicide have tended to focus on a rather limited range of population groups. As is the case for suicide, the primary focus is on populations with a mental health problem. Specifically, people with affective disorders (in particular, depression), schizophrenia or borderline personality disorder. With the exception of borderline personality disorder, the available evidence to inform a Scottish strategy for people with mental health problems is also limited to pharmaceutical intervention addressing middle-aged to older populations.

5.134 There is little evidence suggesting which interventions (pharmaceutical or otherwise) may be promising for younger and very young people with mental health problems and equally, there is little evidence to suggest whether the success of pharmaceutical intervention varies with gender or with other demographic factors. As is the case for suicide, there is also a need to develop an evidence base which goes beyond the treatment of mental health problems and provides solutions for people who present with self-harm but without a mental health diagnosis. Equally, although to a lesser extent than is the case for suicide, there is a need to broaden the range of evidence-based options for people *with* a mental health problem.

5.135 Outside the mental health context, studies with successful outcomes have focussed on either school children or people seen as being at 'high risk' of self-harm/attempted suicide (generally defined by reference to a history of previous self-harm). For school students, the focus of successful and, for that matter, unsuccessful interventions has been on psycho-educational or crisis intervention programmes. To date, these programmes have commonly been developed as complex multi-component initiatives which have proven difficult to evaluate and would prove equally difficult to implement at a national level. There would be some merit in future 'real world' research evaluating simpler school-based interventions. The available higher quality evidence suggests that an appropriate way forward for school-based strategies in Scotland would be to further evaluate on-site crisis support and/or training children and young people to recognise 'warning signs' in relation to their own behaviour and that of their peers. Local implementation of this type of programme tailored to the Scottish school setting and with 'built in' evaluation could provide valuable further evidence for future national programmes.

5.136 In the case of people seen as at high risk of self-harm, the focus - again both for those studies reporting successful outcomes and more widely - appears to be age-dependent, with pharmacological intervention for older age groups (40-59) and psychological or outreach interventions for younger age groups (12-30). Neither set of outcomes provides sufficiently strong evidence to support national level interventions along these lines for the identified populations and future intervention and prevention initiatives in Scotland could benefit from further exploration of options for intervening with high risk groups. Since there is no *a priori* reason to assume that intervention strategies which have worked in other contexts would not also be useful in the context of repeat self-harm, one option would be to evaluate interventions such as ongoing contact, development of social networks and DBT as part of a local strategy specifically targeting such 'at risk' individuals.

5.137 The evidence available to *inform* either initiatives aimed at the general population *or* initiatives aimed at specific groups other than those outlined above is extremely limited. As suggested before, this does not sit well with the *Choose Life* initiative, which makes strong reference to the need to address general population and community level interventions and to target priority groups. Substantial additional research is required to meet this need with a range of options for effective intervention, including intervention in the context of self-harm and attempted suicide. It is also worth noting here, that whilst the range of settings in which outcomes for self-harm and attempted suicide have been evaluated is broader than is the case for suicide, the number of studies reporting successful outcomes in institutional settings (both within and outside the community) remains small. This again leaves professionals working in the context of healthcare and other institutions with few evidence-based options for intervention.

5.138 **In summary:** the available evidence for interventions for **self-harm** and **attempted suicide** derives primarily from populations within the 20-44 age group. Whilst this mirrors available age statistics for the Scottish profile of self-harm and attempted suicide, it means that both the youngest (14 and under) and oldest (65 and older) age groups are poorly served by the existing evidence base. There is little evidence to inform national or local strategies addressing these groups, despite the fact that together they account for around one fifth of identified self-harm/attempted suicide in Scotland. As with the evidence base for suicide, targeted intervention is also hampered by a lack of evidence specific to other demographic and/or priority groups. Although existing studies tend in any case to combine outcomes for populations using different methods of self-harm, the available evidence base also relies to too great an extent on outcomes primarily relevant to people who self-poison. Compared to the likely prevalence of self-cutting, relatively few studies either include or separately evaluate outcomes for people using this method of self-harm. Similarly, there is inadequate information available to address the needs of people who use multiple methods of self-harm over time, despite some evidence that these people may be at particular risk of subsequent severe outcomes including completed suicide.

5.139 The above issues notwithstanding, targeted intervention is a more viable strategy, given the current state of the evidence base, in the context of self-harm/attempted suicide than is the case for completed suicide. For example, it would be justified to include within a Scottish intervention and prevention strategy further, perhaps localised, evaluation of DBT for young (20-45) women with borderline personality disorder, lithium for slightly older (40-65) individuals with affective disorders[12] and simplified programmes based on the evidence for crisis support and training around the recognition of 'warning signs' for school children. More evidence is needed to identify interventions which can justifiably be included in prevention strategies for young people with mental health problems, for people at high risk of self-harm (defined for example by reference to a previous history of self-harm) and for other priority groups. The lack of evidence relating to interventions for the general population, nationally and in local community settings is a particular problem for the current *Choose Life* initiative and there is also a need to broaden the evidence base in order to expand the options which are available for intervention in institutional settings and for intervention with people with mental health problems.

[12] As previously, caution should be exercised in using this intervention given reports by two studies of potential increases in suicide and in suicidal behaviour. Better targeting of the treatment may help resolve this.

Suicidal Ideation

5.140 We were unable to identify national-level statistics regarding the profile of suicidal ideation in Scotland. However, since comparative analysis (cf. Weissman et al 1999) suggests that the demographic *profile* (if not the absolute prevalence) of suicidal ideation is relatively constant across countries, we draw on the findings of the UK wide survey referred to earlier (Singleton et al *op cit*, further analyses reported in Meltzer et al 2002) to suggest the *likely* profile of suicidal ideation in Scotland. The survey found a lifetime prevalence of suicidal ideation of 14.9%, with 30% of those who had experienced suicidal ideation reporting that they had subsequently gone on to attempt suicide. The prevalence of suicidal ideation was higher in females than in males (17% versus 13%) and this held true across all age groups.

5.141 As with both suicide and self-harm/attempted suicide, suicidal ideation seems to be more common in the young than in older age groups. Around 17% of survey respondents aged 16-44 stated that they had had suicidal thoughts *in their lifetime*, compared with only 6% of those aged 65-74. This is a somewhat paradoxical statistic, however, since it seems unlikely that the prevalence of suicidal ideation has increased quite so dramatically across time. It is probable that there is under-reporting in the older age groups. The reported age gradient followed the same pattern for males and females.

5.142 The survey figures used to evaluate patterns of suicidal ideation provide a more detailed account of demographic variation than the national figures for suicide and self-harm/attempted suicide. Analysis of the survey data showed a higher prevalence of suicidal ideation in white than in black or south Asian respondents (15% versus 8%), this held true for both males and females. Separated and divorced respondents were more likely to report suicidal ideation than married or widowed respondents (28% versus 13% for women, 25% versus 9% for men). Economic deprivation also had a significant impact on the likelihood of having experienced suicidal ideation. People who had suicidal thoughts were more likely to be economically inactive (33% versus 29%), to come from lower social classes and to be in rented accommodation. No significant association between educational qualifications and the prevalence of suicidal ideation was identified.

5.143 Close to half of the intervention studies (47%) evaluated outcomes for suicidal ideation. Overall, demographic characteristics were better reported in these studies than in studies addressing either suicide or self-harm/attempted suicide, but again the majority of studies tended to combine across demographic groups in evaluating outcomes. The number of studies reporting outcomes separately for different ethnic or socioeconomic groups remains too limited to draw comparisons with the likely profile of suicidal ideation in Scotland, so the broad comparisons we can make are, as previously, limited to comparisons based on age and, to a lesser extent, gender. 63 studies (67% of studies focussed on suicidal ideation) provided age details for their participants. Of these, 53 (56%) provided an age breakdown suited to comparison with the survey data.

5.144 Table 5.6 below compares the age distribution within the above studies to the suggested age profile for self-report suicidal ideation taken from the survey analysis carried out by Meltzer et al (2000)[13]. The latter also divided available age statistics by gender. It is not possible to do this for the intervention studies, since only 15 studies separated out outcomes by gender and of these only 8 also reported the age of their participants, so the comparisons which can be drawn again provide only a 'broad brush' picture of the likely match between the existing evidence base and the likely profile of suicidal ideation in Scotland.

Table 5.6 Estimated distribution of suicidal ideation in the UK by age group

	16-24	**25-34**	**35-44**	**45-54**	**55-64**	**65-74**
Survey males (% prevalence)	13	17	13	13	11	4
Survey females (% prevalence)	22	19	20	17	13	7
% of intervention studies	*28*	*19*	*17*	*11*	*2*	*1*

5.145 Bearing in mind the limitations of this comparison, the general patterns outlined above and in Table 5.6 suggest that, in comparison with the likely prevalence of suicidal ideation in the Scottish population, the available intervention studies 'over-emphasise' suicidal ideation in the youngest age categories (16-24). This comes at the expense of a significant dearth of evidence addressing suicidal ideation in older people (only 3 intervention studies both report adequate details of the age of their participants and focus on people aged 55 and older). As noted above, there is also little gender-specific evidence available to inform targeted intervention, although the gender distribution of the 15 studies providing outcomes specific to one or other gender (10 focussed on females, 5 on males) is at least broadly in line with the suggestion from survey findings that women are much more likely to report experiencing suicidal ideation than men.

5.146 As previously, we also evaluated the profile of those studies which reported successful outcomes, to assess how informative current evidence regarding potentially effective interventions for suicidal ideation is for prevention initiatives in the Scottish context. A fairly high proportion of studies evaluating outcomes for suicidal ideation (62%) reported positive outcomes, with the majority of these (67%) also providing statistical evidence to support their findings. The major focus of the studies showing evidence of effectiveness, as well as of the broader range of studies, was on treatment for depression (36% evaluated outcomes for people with depression or major depression). With regard to the profile of suicidal ideation in Scotland, this may also represent something of an over-emphasis on one particular population group. The estimated prevalence of suicidal ideation taken from the survey figures reported earlier is around 15%, the estimated prevalence of clinical depression in Scotland is closer to 6%[14]. The existing evidence base therefore fails to provide for the needs of a potentially quite large group of the population who experience suicidal ideation but are not clinically depressed.

[13] Note that the survey figures are taken from graphed data and are therefore approximate figures only.
[14] Based on 2004 figures collated by the Depression Alliance Scotland.

5.147 In terms of targeting intervention strategies for people *with* depression, the existing evidence, despite the attention given by the literature to this condition, is also somewhat limited. Studies evaluating outcomes for people with depression and providing further participant details were evenly spread across the age ranges outlined above and similarly distributed across inpatient, outpatient and community settings. All but two studies reported outcomes for males and females combined and the vast majority (81%) evaluated outcomes for pharmaceutical intervention. Drawing on the evidence of the highest quality studies, the most promising pharmaceutical treatments for reducing suicidal ideation in people with depression are fluvoxamine and sertraline, but there is little evidence to suggest which demographic groups may benefit most from these treatments.

5.148 In respect of options other than pharmaceutical intervention for people with depression, there is some limited evidence for the effectiveness of telephone counselling. In terms of informing Scottish strategies for a reduction in suicidal ideation this profile indicates that the available options for intervention are currently quite limited even in respect of the population group to which the literature has paid greatest attention to date. Targeting of interventions in the context of depression is not possible as there is little evidence suited to establishing which demographic or other groups are likely to respond best to which intervention. Evidence-based options for non-pharmaceutical intervention are particularly limited in this context.

5.149 Other population groups which the literature has paid particular attention to in respect of suicidal ideation are young people and adolescents (10 of the studies with successful outcomes focussed specifically on outcomes for young people), people perceived as at 'high risk' of self-harm or suicide (9 studies) and people with borderline personality disorder (5 studies). The choice of interventions evaluated for the reduction of suicidal ideation in young people and adolescents is extremely broad and the range of options for which successful outcomes have been reported is similarly extensive, including treatment with fluvoxamine, psychoanalysis, problem-solving therapy and a number of school-based programmes with diverse components.

5.150 The above outcomes may suggest that suicidal ideation in young people is comparatively responsive to intervention, but, equally, the diversity of interventions evaluated and the pattern of reported outcomes provides little insight into which specific components of the diverse interventions evaluated produce the positive outcomes reported in the literature.. All but one of the studies (an inpatient trial of fluvoxamine for adolescents with obsessive-compulsive disorder) also reported outcomes for young people living in the community. There is very little evidence to suggest which strategies may be effective in reducing suicidal ideation in young people living in institutional settings such as hospitals, secure units or prisons despite the fact that suicidal ideation in these settings is known to be particularly prevalent (e.g. Liebling & Krarup 1993).

5.151 The focus of studies reporting successful outcomes for intervention with people seen as being at high risk of suicide or self-harm is similarly broad, including pharmaceutical intervention, intervention via outreach work and staff training, occupational therapy and again multi-component school-based programmes for at risk youth. The range of settings in which interventions for suicidal ideation in the 'at risk' population has been evaluated is slightly broader than that for young people generally. However the existing evidence relating to intervention in institutional settings is again too sparse to usefully inform intervention strategies aimed at these settings. There is also little high quality evidence to inform intervention with people experiencing suicidal ideation who are at high risk of self-harm or suicide. Finally, the definition of 'at risk' used in the studies reporting successful outcomes for suicidal ideation also varies quite considerably, with some studies identifying risk on the basis of prior behaviour and others referring instead to current professional judgement or to the predicted risk of future behaviours. This further limits the consistency of the evidence available for intervention with this key group.

5.152 In contrast, the population focus of the studies reporting successful outcomes for people with borderline personality disorder is quite tightly defined, with 3 of 5 studies evaluating the effectiveness of DBT in women aged between 18-45. As is the case for self-harm/attempted suicide, this gives some grounds for further evaluation of DBT as part of a targeted strategy for this population in the context of Scottish prevention initiatives. The remaining two studies evaluated DBT and CBT respectively for young people (mean ages 22 and 29) with outcomes for males and females combined. The setting in which intervention for people with borderline personality disorder was evaluated differed for each of the five studies reporting successful outcomes, providing little evidence of where to site any further evaluations.

5.153 Finally, looking across the full range of studies reporting successful outcomes, it is again the case, as with self-harm/attempted suicide and completed suicide, that younger people are far better served by the existing evidence than older people. Only one study (an evaluation of improved treatment guidelines for older patients with depression) reported successful outcomes for suicidal ideation in people aged 65 and older. Children are equally poorly served however, with again only one study (a home-based family intervention) reporting successful outcomes for intervention with children aged 14 and under. There is also little evidence from studies with successful outcomes to inform intervention specifically targeted at either women or men. Aside from people with depression or borderline personality disorder, there is also little evidence from these studies to inform intervention with people with mental health problems.

5.154 **In summary:** Available figures regarding the actual prevalence of **suicidal ideation** in the Scottish population are limited. Figures from a UK wide survey suggest a lifetime prevalence of around 15%, with women and younger people reporting higher rates of suicidal ideation. In comparison with the likely profile of suicidal ideation in Scotland, the available evidence from intervention studies 'over-emphasises' suicidal ideation in young people (aged 16-24) and in people with depression. Populations which are poorly served by the available evidence are older people (in particular people aged 65 and older) children (aged 14 and under) and people either without a mental health diagnosis or with a mental health diagnosis other than depression or borderline personality disorder. Although a number of studies, including studies reporting successful outcomes, have focussed on people with suicidal ideation seen as being at high risk of self-harm or suicide, the different ways of defining 'at risk' used in the literature and similarly the diversity of interventions which have been evaluated means that there is little consistent evidence to suggest how intervention should be taken forward in this key group. There is also little evidence to allow targeted intervention for either women or men or for people living in institutional settings.

5.155 The primary focus of the literature in terms of the mode of intervention has been on pharmaceutical intervention. There is evidence to support further 'real world' evaluations of treatment for depression with either sertraline or fluvoxamine as part of a Scottish prevention strategy. Evidence supporting non-pharmaceutical intervention is limited, further restricting the options for intervention which are available to people experiencing suicidal ideation in the absence of any mental health diagnosis. In part this is due to the diversity of non-pharmaceutical interventions evaluated in the literature, which again fails to provide a consistent body of evidence suggesting which approaches to intervention are likely to prove effective. There is some evidence that 'real world' evaluation of DBT as part of a targeted strategy for intervention with young women (18-45) could also justifiably be included in a Scottish prevention strategy for reducing suicidal ideation.

Identified priorities and constraints in the Scottish context

5.156 In Chapter Five, we compared the profile of the available evidence with specific priorities for *Choose Life* identified by the Research Advisory Group. In the main, this comparison established that populations and interventions which are seen as a current priority for the Scottish prevention strategy are, justifiably or otherwise, under-researched in the literature. As a brief end note regarding the likely match between the existing evidence base and the requirements of the Scottish prevention strategy, we summarise here additional issues which are likely to impact on future prevention and intervention initiatives. These issues have been identified in a recent epidemiological report provided to us by NIST (Platt et al 2007). The report makes a number of points relating to the profile of suicidal behaviour in Scotland which need to be taken into account in developing future initiatives. Specifically:

- the profile and rate of suicide shows significant differences between men and women, including differences in forms and methods of suicide and differences in associated demographic patterns such as age and location

- social class at an individual level and socio-economic deprivation at an area level are important contributory factors for suicidal behaviour and should be given a higher priority in national prevention and intervention initiatives

- methods of suicide show rates which vary independently over time, for example rates of suicide by hanging are increasing, whilst rates of suicide by gassing have significantly declined

- given the comparative rarity of suicide, non-fatal self-harm may be a more viable outcome measure for the evaluation of interventions.

5.157 Comparing the report's recommendations with the existing state of the evidence base highlights a number of issues which need to be urgently addressed in future research if this is to usefully inform the national prevention and intervention strategy. It is clear that patterns of suicide and also self-harm vary within and between demographic groups. Yet, the available evidence base provides little opportunity to identify which interventions work for whom. The issue of socio-economic deprivation highlighted in the report as of particular importance in the Scottish context is barely touched on in the intervention literature. Studies consistently fail to report basic demographic information for their participants and rarely aim to evaluate interventions in specific population groups. A particular gap in the literature is the failure to differentiate between methods of suicide and self-harm, either with regard to participant recruitment or with regard to the targeting of particular modes and forms of intervention. Yet, variations in the prevalence of different methods alone indicates the importance of targeted prevention. This is an issue which needs to be urgently addressed, as it impacts not only on the options for intervention but also on our understanding of suicidal behaviour as a whole.

5.158 Finally, whilst the report is correct in pointing out that the comparative rarity of suicide makes this behaviour a difficult outcome measure to use, the suggested use of self-harm as a 'proxy' measure is problematic. Firstly, because self-harm is currently the least well-evaluated and therefore least well-defined and understood behaviour within the spectrum of suicidal behaviour and ideation. Secondly, because suicide and self-harm are not contiguous behaviours. The available evidence suggests that rather than forming a simple continuum of behaviours, suicide and self-harm may be carried out by different sections of the population for different reasons. As also with methods of suicide and self-harm this issue needs further exploration, but, in any event, self-harm cannot be taken as a direct proxy in evaluating outcomes for suicide.

5.159 In addition, as recognised by the report's authors, the most accessible measure of self-harm (hospital admission) is likely to significantly under-estimate the actual prevalence of self-harm in the population. Using hospital admissions for self-harm as the sole outcome measure in evaluating the impact of interventions on suicide and self-harm will therefore give only a partial picture of the true impact of any initiative on suicidal behaviour. Whilst again the range of information allowing us to contrast the available evidence with the identified needs and priorities of the Scottish prevention strategy is sparse, this brief comparison alone provides clear messages for the commissioning of future research if current priority objectives are to be met.

CHAPTER SIX RECOMMENDATIONS FOR FUTURE RESEARCH & PRACTICE

Research

Current state of the evidence base

6.1 There has been a rapid expansion in published research in the field of suicide and self-harm over recent years, with over half of the available intervention studies (54%) published between 2000 and 2006. However, research in this area to date has adopted a 'scattergun' approach and if useful insights for policy and practice are to be taken from the research evidence, there is an urgent need for a more co-ordinated and focussed research effort. Precisely where this effort should be directed remains an issue for further consideration, since there are currently few unequivocal pointers towards interventions which are likely to be consistently effective. In part, this is due to the lack of specific focus in the literature to date. The literature has evaluated an extremely broad range of interventions, but each intervention has been addressed only by a very small number of studies (we found a total of 200 studies evaluating 150 distinct interventions). In addition, studies have tended to combine outcomes for participants drawn from a range of diverse demographic groups and similarly have tended to combine outcomes for people using quite distinct methods of self-harm and suicide. Targeted intervention based on the current evidence is therefore not a particularly viable option.

6.2 In contrast to the lack of information available for clearly defined populations, the weight of evidence suggests that the literature has clear biases in focus. Nearly half of the available studies (46%) evaluated interventions for psychiatric populations, focussing in particular on people with depression or, to a lesser extent, borderline personality disorder. Whilst the attention given to these populations is understandable, it is disproportionate in respect of the actual distribution of suicidal behaviour in the population. As a consequence of this 'bias' in the literature, we currently have little insight into interventions which may be effective for the general population or for specific populations other than people with depression or borderline personality disorder.

6.3 In spite of the focus on psychiatric populations, the majority of studies (56%) evaluated outcomes for people living in the community and we also have little evidence available to address intervention in institutional settings, in particular, A&E settings, outpatient units and residential facilities such as nursing homes and prisons or secure units. Although there has been a recent shift of emphasis away from the evaluation of pharmaceutical interventions, with an increasing emphasis on psychotherapeutic and service delivery initiatives, the mode of intervention for which there is currently the greatest bulk of evidence is pharmaceutical intervention. Unfortunately, for the most part, the focus of the literature on pharmaceutical intervention has not been rewarded by substantive evidence of effectiveness for the majority of individual drug types evaluated. Finally, with regard to the spectrum of suicidal behaviour which has been explored in the literature, the main focus (47% of studies) appears to have been on suicidal ideation. Attempted suicide (37% of studies) and completed suicide (33% of studies) have received slightly less attention and interventions for self-harm (22% of studies) are substantially under-evaluated given the relative prevalence of this form of behaviour.

Specific outcomes and issues

6.4 Looking in greater detail at the populations and particular forms of suicidal behaviour and ideation which the literature has chosen to address, it is apparent that certain areas of need are poorly served. Interventions addressing self-harm and, in particular, self-cutting are under-represented. This appears to be a general feature of this literature as a whole rather than an issue which is specific to the evaluation of interventions. From a population perspective, both ends of the age continuum (under 15 and, notably, over 65) are under-represented in comparison to the incidence of suicidal behaviour and ideation noted for these populations. In this context also it is of considerable importance that research studies define their participant populations more clearly in future.

6.5 The tendency of studies to recruit participants from a wide variety of demographic groups and to combine across a number of distinct modes of suicidal behaviour is exacerbated by poor reporting of population characteristics. This includes poor reporting of basic demographic characteristics and characteristics of relevance to both the mode of suicidal behaviour or ideation and the outcome measures used. The evidence base would benefit substantially from improvements in this aspect of study design and reporting. In addition, researchers recruiting people experiencing mental health problems should be encouraged to focus on single diagnostic groups rather than recruiting from a range of sub-populations. The potential benefits of targeted intervention are often obscured by a tendency to recruit study participants from a broad range of very diverse sub-groups without either the sample size necessary to carry out sub-group analyses or any attempt to control for inherent variation.

6.6 As noted above, pharmaceutical interventions are the single most prominent focus of the literature to date, with 30% of the identified studies evaluating individual drug treatments or comparing different drugs in head-to head trials. Despite their relative popularity as a research focus and, arguably, also in clinical practice, pharmaceutical interventions did not outperform non-pharmaceutical interventions overall (19.7% of pharmaceutical studies reported successful outcomes compared to 25.2% of studies evaluating non-pharmaceutical interventions). The main focus of attention in respect of pharmaceutical intervention to date has been on treatment with either lithium (in the context of affective disorder, including bipolar disorder) or anti-depressants (both for the treatment of depression and more widely). Whilst there is evidence that both lithium and anti-depressants can have a positive impact on outcomes for suicidal behaviour and ideation, studies reporting successful outcomes need to be weighed against a smaller number of well-conducted studies reporting *increases* in completed and attempted suicide associated with these therapies. Comparatively few pharmaceutical studies have evaluated the impact of treatment on self-harm and those which have report outcomes which compare unfavourably with outcomes reported for non-pharmaceutical interventions. The failure of the majority of pharmaceutical studies to compare drug treatments with either placebo or non-pharmaceutical treatment as usual' options also serves to undermine confidence in the use of these therapies.

6.7 With regard to the highest quality studies available, outcomes supporting the effectiveness of pharmaceutical intervention rely on scale-based evaluations of outcomes for suicidal ideation. Outcomes for suicidal behaviour are largely equivocal. Future evaluation of pharmaceutical intervention would benefit from following the methods adopted by the more successful trials in this area. These trials have tended to adopt a specific focus, with a limited number of well-defined outcome measures and a single, clearly defined, client population (e.g. specified doses of lithium in long- versus short-term treatment of bipolar disorder). Additional improvements to the utility of research outcomes could be made if studies evaluating pharmaceutical interventions based the choice of drug to be evaluated on clearly articulated theoretical principles regarding the mechanism of action with specific regard to suicidal behaviour and used *behavioural* outcome measures rather than purely scale-based outcomes.

6.8 The range and diversity of *non*-pharmaceutical interventions is such that few direct comparisons between modes of intervention can be made *within* this broader grouping. However, the most prominent focus in the literature to date has been on either psychological/psycho-social interventions (16% of all intervention studies) or service delivery initiatives (10% of all intervention studies). Of these two broad categories, service delivery initiatives were the least likely overall to show positive outcomes when evaluated (14.3% of service delivery initiatives were reported as having positive outcomes, compared to 18.2% of psychological/psycho-social initiatives and 30.6% of 'other' non-pharmaceutical initiatives). In respect of the highest quality studies available, outcomes favour DBT within the category of psychological interventions and either the restriction of access to means or contact-based initiatives in respect of the eclectic category of 'other' interventions.

6.9 The only initiative broadly relating to service delivery and supported by the outcomes of higher quality studies was the introduction of specialist centres. It is important to recognize that the number of studies addressed in this context is small in absolute terms. Nevertheless, there is some consistency in the nature of the interventions which have resulted in positive outcomes. The successful service delivery initiatives, for example, are in effect also either 'contact-based' initiatives (intensive outreach support; introduction of telephone support) or 'specialist centre' service provision (specifically, hospitalization in a specialist crisis centre). To date, research focussed on non-pharmaceutical intervention has suffered both from an over-complexity in the design and/or implementation of interventions and equally from a consistent failure to identify the discrete components within a complex intervention and to evaluate *which* component(s) are responsible for achieving the outcomes observed.

6.10 Since the evidence to date suggests that relatively simple interventions such as providing a person with ongoing contact and support may achieve significant improvements in suicidal behaviour and ideation, future research would benefit from going 'back to basics' and exploring in greater depth this type of minimalist approach. Where more complex and/or intensive approaches have been shown to work (DBT; restriction of access to means; specialist centres or specialist care) future research could similarly benefit from 'unpacking' both the concepts behind the interventions and the components involved in successful intervention.

6.11 In the case of DBT, 'unpacking' the intervention would, for example, establish the relative contribution to outcomes of the behavioural and cognitive components of therapy. Similarly, further comparative research could establish whether any form of intensive one-to-one support could achieve the same outcomes or whether the therapy as constituted is required to achieve positive outcomes. In respect of the apparently simple intervention of restricting a person's access to the means of suicide or self-harm, it is equally important to establish which 'means' are amenable to restriction, at what level (individual, community, population) and in which contexts. In the case of specialist centres, it would be of value to establish which features of this form of service structure produce improved outcomes and whether these key characteristics could be emulated using less resource-intensive mechanisms for service delivery, for example by better co-ordination of existing care pathways.

6.12 A number of the more specifically methodological points raised in respect of pharmaceutical studies also apply equally to non-pharmaceutical studies. In particular, the need to use a smaller number of more tightly defined outcome measures and to develop in greater depth the theoretical underpinning of the intervention evaluated. In contrast to pharmaceutical studies, studies evaluating non-pharmaceutical interventions also seem to have shied away from the evaluation of outcomes in respect of completed suicide. This is particularly true for studies focussed on psychological interventions. If such therapies are to act as primary rather than adjunctive interventions, this gap in the research evidence needs to be addressed.

Issues of particular relevance to the Scottish context

6.13 Currently, there is very limited evidence specific to the Scottish population available. Only 5 independent studies to date have evaluated interventions for suicidal behaviour and suicidal ideation in exclusively Scottish populations. Compared to available information suggesting the likely profile of suicidal behaviour and ideation in Scotland, the literature in general 'over-emphasises' suicidal ideation in young people (aged 16-24) and suicidal behaviour in slightly older groups (20-44) at the cost of failing to explore interventions for the youngest (14 and under) and oldest (aged 65 and older) age groups. The general failing to evaluate interventions for clearly defined population groups and to explore interventions specific to particular demographic groups affects Scotland as it does intervention in all other locations. There is, for example, very little and in some cases no evidence for effective intervention in population groups identified as a priority by *Choose Life.* For example, rural populations, ethnic minorities, asylum seekers, lesbian, gay, bisexual or transgender people, the recently bereaved, survivors of sexual abuse, socio-economically deprived, unemployed and homeless people.

6.14 There has also been little attention in the literature to date on the type of interventions which have been highlighted as of importance to *Choose Life*. In particular, few studies have evaluated whole population or whole community initiatives and, where these have been evaluated, there is little evidence of their effectiveness. Since there is little reason to assume that the effectiveness of individual interventions varies significantly between locations, intervention in Scotland can, in the short term, draw on the existing evidence base for other countries. In doing so, a pragmatic approach would be first to evaluate in the Scottish context those interventions which are comparatively simple to implement and which can easily be withdrawn or reversed if they fail to transfer successfully to the Scottish context. In particular, 'minimalist' interventions such as the maintenance of ongoing contact with people known to be experiencing suicidal behaviour or suicidal ideation, provision of informal social support, including for example the provision of telephone helplines and short-term targeted interventions with individuals, such as DBT for people with borderline personality disorder or treatment with sertraline or fluvoxamine for people with depression.

Focus of Future Research

6.15 In order to serve the needs of existing and future prevention and intervention initiatives, research needs to address the issues which have been outlined above and also to explore in greater depth and, ideally, in a 'real world' context interventions which the existing literature suggests show some promise of effectiveness. With regard to addressing gaps in the existing evidence base, additional studies are needed to explore outcomes for:

- clearly defined populations, in particular specific demographic groups and psychiatric populations other than people with depression or borderline personality disorder

- populations identified as a priority for national initiatives

- populations which have been under-researched compared to their known prevalence of suicidal behaviour, in particular children (aged 14 and under), older people (aged 65 and older), people who misuse substances and people who do not have a mental health diagnosis

- settings other than the community, in particular A&E, oupatient units and institutional settings such as prisons, secure units and in-patient open wards

- suicidal behaviour differentiated by method, in particular interventions for self-harm, notably self-cutting and self-harm involving the use of multiple methods

- *modes* of intervention which have been under-evaluated to date, for example, whole population interventions such as educational initiatives and individual interventions such as behaviour therapy.

6.16 Drawing on the existing evidence base and, in particular, on the limited number of high quality studies available, the following interventions are likely to be worth pursuing in future evaluations:

For the prevention of suicide:

- restriction of access to means (this approach needs further evaluation in contexts other than firearms control)
- maintenance of ongoing contact with the suicidal person
- service delivery via specialist centres with appropriately trained staff. [15]

For the prevention of attempted suicide:

- restriction of access to means (with further evaluation as above)
- informal social support and support in developing social networks
- treatment with lithium for people with bipolar disorder (this approach needs further cautious evaluation given reports of possible increases in suicide and suicidal behaviour associated with it, research focussed on better targeting of lithium treatment could be beneficial)
- dialectical behaviour therapy (this approach needs further evaluation in people who have not been diagnosed with borderline personality disorder).

For the prevention of self-harm:

- dialectical behaviour therapy (with further evaluation as above)
- maintenance of ongoing contact.

For the prevention of suicidal ideation:

- treatment with fluvoxamine for people with depression
- treatment with sertraline for people with depression
- telephone support for people experiencing a suicidal crisis (further evaluation of the long-term efficacy of this intervention is needed).

[15] In the absence of the resources needed to fund specialist centres, a pragmatic alternative would be a move towards better co-ordination of care pathways across services. Specialist teams put in place to monitor and support co-ordinated care could have the potential to provide the same level of client-focussed care as specialist centres.

6.17 It is important to note that the above recommendations regarding particular interventions which show some promise of effectiveness are based on a very restricted evidence base. Currently no one intervention finds extensive and concrete support in the literature. Implementation of any of the above interventions either in the context of individual clinical practice or in the broader context of national initiatives must consequently be regarded in the light of a 'real world' evaluation rather than a truly evidence-based approach to prevention and intervention. Implementation should therefore involve appropriate evaluation of outcomes. Whilst it is crucial that the intervention literature becomes more focussed, there is also a need to expand the treatment options available for people with and without a diagnosed mental health problem. Well conducted pilot evaluations of novel or under-researched interventions should therefore also be seen as a priority for future research.

Methodological considerations

6.18 In order to improve the relevance of the existing evidence base to future prevention and intervention initiatives, it is also important to improve the methodological quality of future studies. Whilst this literature compares favourably with other public health literatures in this regard, a number of issues nevertheless need to be resolved. Qualitative research in this area is sparse and is also, in the main, poorly carried out, with few attempts to follow protocols for well-established qualitative methodologies. Future qualitative research should improve on current methods and would, ideally, 'piggy-back' with larger scale quantitative studies to allow interventions to be addressed from distinct perspectives. This would offer both objective and subjective insight into what works and how and, indeed, how *acceptable* individual interventions are to people experiencing suicidal behaviour or suicidal ideation, their carers and service providers.

6.19 Particular problems for the quantitative research base, which should be addressed in future studies, are comparatively high drop-out rates (notably in studies evaluating interventions for suicide), a failure to blind investigators to assignment and, where possible, to blind participants to interventions, adequate controls on the fidelity of implementation of an intervention and, in particular with regard to pharmaceutical studies, a failure to evaluate outcomes against placebo, or against non-pharmaceutical treatment as usual and a failure to provide a true 'washout' period in order to evaluate interventions in isolation from the impact of ongoing treatment. Whilst in respect of the latter issues it is clear that ethical concerns may be raised, it is fair to reason that providing a client with an ineffective intervention which may have adverse outcomes poses at least as great an ethical dilemma.

6.20 There is no indication from the outcomes of available studies that complex, multi-component interventions are needed to prevent and treat suicidal behaviour and ideation. Indeed, as outlined above, the vast majority of the more successful interventions evaluated to date are conceptually quite simple. This notwithstanding, between one quarter (24%) and one half (49%) of the available studies evaluated interventions for suicidal behaviour and suicidal ideation which would fall within the Medical Research Council's (MRC) definition of a 'complex intervention' (Campbell 2000)[16]. Not one of these studies, whether conducted before or after the publication of the MRC's 'Framework for the development and evaluation of RCTs for complex interventions to improve health', followed the recommended pathway for development and evaluation of a complex intervention.

[16] MRC guidelines (Campbell 2000) define a complex intervention as one which is "built up from a number of components, which may act both independently and inter-dependently".

6.21 Putting aside the potentially controversial issues of whether the MRC's admittedly rather broad-ranging definition of 'complex' is viable in the current context[17] and whether or not RCTs are always the best approach to evaluation, the core tenets of the MRC guidelines are well established and failure to adhere to these raises concerns regarding the robustness of the available evidence base. To paraphrase the guidelines, studies should ideally follow the following stages:

Stage 1 (Theory) Identify or develop an adequate theoretical underpinning to support the choice of intervention and identify major confounders and strategic design issues.

Stage 2 (Modelling) Identify the components of the intervention and the underlying mechanisms by which they will influence outcomes directly or via identifiable interactions.

Stage 3 (Exploratory Trial) Identify (and test) a replicable intervention and a feasible protocol for evaluating the intervention against an appropriate alternative.

Stage 4 (Definitive 'RCT') Compare the intervention with one or more appropriate alternatives using a theoretically defensible protocol that is reproducible and adequately controlled in a study with appropriate statistical power.

Stage 5 (Implementation) Determine whether (positive) outcomes form the intervention can be replicated outside the controlled research setting *over the longer term.*

6.22 The stages in evaluation most commonly overlooked by the studies evaluating complex (and indeed also 'simple' interventions) for the prevention of suicidal behaviour and suicidal ideation were the preliminary and final stages (theory/modelling and implementation). This is not to say that the literature as such is lacking in theoretical analysis or that clinical practice is entirely lacking in the implementation of novel approaches. The problem seems rather to be that the three components (theory/modelling; experimental evaluation; implementation) rarely follow the well-established sequence recommended by the MRC. Interventions without clear theoretical underpinnings are evaluated, with the result that even if they work it is unclear why; interventions may reach the stage of a pilot evaluation, with promising results, but only rarely then progress to a full-scale evaluation; interventions which have successfully progressed through the relevant theory/modelling and full-scale evaluation phases are then not implemented or further evaluated over the long term in 'real world' settings and finally, interventions are implemented in clinical practice without the benefit of either detailed theoretical development or evaluation.

[17] Suicidal behaviour and ideation are in and of themselves complex behaviours and very little is, in fact, known about the mechanisms behind these behaviours, hence *any* intervention however simple in format could be defined as 'complex' in terms of its operation.

6.23 The above widespread failure to follow an apparently straightforward and well established pathway to developing and implementing effective interventions is not uncommon in respect of the health care disciplines. 'Evidence-based' health care is a surprisingly recent concept (cf. Cochrane 1972) and neither the funding nor the broader administrative control of research in the UK and internationally (cf. Gellert et al 1993; Geuna et al 1999, Holdcroft 2006) are well-aligned with the quite extensive demands which need to be met if health care is to be truly evidence-based. If anything, the research literature relating to suicidal behaviour and ideation, despite its failings, is comparatively sophisticated in its approach. Nevertheless, both the 'scattergun' approach to evaluating interventions and the general failure to take interventions through all essential stages of development suggest an urgent need for a well thought out, focussed and adequately funded national programme of intervention research. Since adequate funding is likely to be the key to the successful development and roll-out of such a programme, it is critical to the future prevention of suicidal behaviour and ideation that issues of resource allocation, encompassing all aspects of the pathway from initial theoretical research to final long-term implementation are addressed in the near future.

Practice

General issues

6.24 The concrete messages which can be drawn from the available evidence to inform practice are, sadly, rather more limited than the very clear messages which the evidence provides for researchers. Interventions for suicidal behaviour and ideation remain in their infancy at the current date. This does, however, suggest two broad points which should be taken on board. Firstly, intervention and prevention should begin with the least 'invasive' and most readily reversible options available to the practitioner. In the case of individual clients, this suggests approaches which are the least likely to result in adverse side effects and are also the least disruptive or disturbing for the client. Since there is little conclusive evidence for any given intervention, there are few grounds for escalating treatment without cause. That is, comparatively simple interventions which are also found to be acceptable to individual clients should in the first instance be favoured over complex interventions or interventions which the client is uncomfortable with. Secondly, both individual level intervention practice and intervention and prevention in the wider public health sphere should be more closely tied to ongoing research. A closer liaison between practitioners and the research community would be of substantial value and the key to this relationship is likely to be access to data.

6.25 Consistent collection of accurate day-to-day clinical information, including individual demographic and other relevant client details and details of the implementation and outcomes of any interventions used with a particular client or client group will serve to extensively supplement the available evidence base. It is unlikely that the number of funded research studies will be sufficiently great to increase the available evidence at the rate which is required if we are to improve outcomes in the short term. Clinical data have the potential to plug this gap, but, historically, clinicians and researchers have rarely worked together on an ongoing basis and the collection of routine data has been sketchy and often inaccurate. It is important that these issues are addressed. Initial pilot schemes evaluating the cost implications and most effective mechanisms for improving routine data collection in clinical settings would be of value. It is equally important that pertinent population-level data are recorded and collated in a way which can usefully inform prevention efforts across the full spectrum of suicidal behaviours. Currently, reliably collected information is largely restricted to national summary data for the prevalence of suicide.

6.26 There is a particular need for consistently collected and collated figures regarding the prevalence and profile of non-fatal self-harm and equally there is a need to establish the size and characteristics of the 'hidden' population of people engaging in self-harm but not presenting to services. Whilst there are increasing concerns regarding access to individual, non-summative, information for research purposes, the loss of such information represents a very significant obstacle to the development of effective prevention and intervention. Provision should be made for national level and local service level 'pseudonymised'[18] data to be made more readily available to researchers in this field.

[18] 'Pseudonymised' data is individual level data which is anonymised to the extent that it does not allow identification of an individual, but still retains sufficient individual-level information to allow statistical modelling.

Specific recommendations

Mode and type of intervention

6.27 One of the most prominent modes of intervention currently used for suicidal behaviour and ideation is pharmaceutical intervention. Given the ubiquity of this approach to treatment, it is important that clinicians recognise that the evidence base for this approach is in fact rather equivocal. It is clear that positive outcomes have been identified for pharmaceutical intervention within clearly defined clinical groups, for example lithium treatment in the context of affective disorders including bipolar disorder and fluvoxamine and sertraline in the treatment of depression. However, research outcomes overall are disappointing and individual studies, including studies evaluating lithium, have flagged concerns regarding possible adverse impacts associated with pharmacotherapy[19].

6.28 This situation is not purely the result of a lack of research evidence. A substantial number of studies have, for example, evaluated the use of anti-depressants (specifically as a means of reducing suicidal behaviour and ideation, as opposed to treating for depression) and yet there is no clear evidence that these drugs are consistently effective in preventing either suicidal behaviour or suicidal ideation. Even within the context of a single type of anti-depressant, studies can be found which report increases, decreases and no change in the same forms of suicidal behaviour. Such inconsistent outcomes could well be due to the need for more sophisticated theorising regarding the mode of action of particular drug types and, in line with this, better targeting of drug types to specific populations. Nevertheless, as the evidence currently stands no single pharmaceutical intervention can be recommended *without caveat* on the basis of the existing evidence. Clinicians wanting to use pharmaceutical therapies would currently be justified in using lithium to prevent attempted suicide in people with bipolar disorder (but should exercise caution given reports of adverse outcomes) and either fluvoxamine or sertraline to prevent suicidal ideation in people with depression, but beyond these rather limited options the available evidence becomes decidedly equivocal.

6.29 Non-pharmaceutical interventions have fared slightly better in the literature to date, but it would still be cavalier to recommend any specific intervention as being truly evidence-based. Bearing this in mind, there are a number of broad approaches to non-pharmaceutical intervention which have shown consistently positive outcomes in the small number of studies available. These are the restriction of access to means (currently only well-evaluated in respect of firearms control), the maintenance of ongoing contact with a person known to be subject to suicidal behaviour or to suicidal ideation, the provision of specialist services (either via specialist centres or through specialist follow-up of individual clients) and treatment with intensive cognitive/behavioural therapies, in particular dialectical behaviour therapy (DBT). It should be noted that whilst the first three of these approaches are likely to be generally applicable, the last approach (DBT) has been evaluated almost exclusively in the treatment of people with borderline personality disorder and further research would therefore be required to justify its use as a treatment for other populations.

For example, hospital data which has had names, addresses and detailed postcode data removed but which allows a researcher to correlate age with method of self-harm.

[19] Most notably increases in suicidal behaviour as a result of treatment with either lithium, mianserin or SSRIs.

6.30 It is also worth noting that, with the partial exception of the restriction of access to means[20], none of these promising approaches are currently routinely used either in Scotland or in the UK as a whole. In the case of ongoing contact and specialist service provision, structural or cultural issues may need to be addressed to ensure that such approaches become more widespread. In the case of DBT, the primary limiting factor is likely to be resource allocation, as there are already waiting lists for the therapy, but currently too few trained therapists to satisfy existing demand.

6.31 The range of evidence-based non-pharmaceutical options for clinicians working with clients at the individual level may seem limited, but the options for practitioners aiming to address prevention at the level of whole communities or the general population are even more restricted. Three of the four broad approaches to intervention outlined above (restriction of the access to means, maintenance of contact and specialist service provision) can be applied at the level of entire populations. For example via legislative initiatives, national telephone-based services, re-structuring of existing formats for NHS service provision etc. However, effective interventions specifically designed as national initiatives are in very short supply. The forms of national initiative identified as a priority by *Choose Life*, for example, (general population educational campaigns and, to a lesser extent, *curriculum-based* initiatives in schools) have barely been considered in the literature to date and, where evaluations have taken place, these have rarely supported the effectiveness of such approaches.

6.32 There is an urgent need to explore in greater depth suitable approaches to national-level prevention and intervention. However, both the development of such approaches and their evaluation would need to be based on more detailed information regarding the prevalence and profile of suicidal behaviour and suicidal ideation than is currently available. Despite the paucity of existing evidence of effectiveness overall, a good start-point in developing suitable initiatives may be to consider what works at the individual level.

[20] Clearly the UK does have regulations restricting access to firearms and other lethal means and recommendations are now in place to restrict access to ligature points in heath care settings, however more widespread use of this approach, such as, for example, clinicians working with individual clients and carers to restrict individual access to 'prefered' means of self-harm is not yet in place.

Population

6.33 Practitioners working with people who have identified mental health problems have a greater range of evidence available to them than practitioners working with other populations. This having been said, the treatment options which have been evaluated for people with mental health problems are primarily pharmaceutical and, outside of the very limited number of options referred to above, there is only equivocal evidence regarding their effectiveness. Practitioners working with people who have bipolar disorder, depression or borderline personality disorder have some relatively well supported mechanisms for intervention, respectively, lithium, sertraline or fluvoxamine and DBT, although again there are some significant caveats around the first of these options. Despite the prominence of schizophrenia/schizo-affective disorder in studies focussed on populations with mental health problems, the one intervention which has been fairly widely evaluated in this context (clozapine) receives insufficient support from the existing literature to justify its widespread use, notably given the known side-effect of agranulocytosis. The available evidence to inform practitioners working with clients who have other mental health problems currently precludes evidence based-practice defined in the strictest sense.

6.34 Outside the mental health context, the most extensive evidence available for practitioners working with particular groups is the evidence relating to interventions for 'high risk' groups, defined by their previous experience of engaging in self-harm. In this context the focus of the literature appears to be age-dependent, with pharmacological intervention evaluated for older age groups (40-59) and psychological or outreach interventions evaluated for younger age groups (12-30). Neither set of outcomes receives sufficiently strong support to guide evidence-based practice. Since, currently, there is also no evidence to suggest that interventions used successfully with other populations will not work with 'high risk' populations, clinicians would be justified in using the limited range of interventions identified in other contexts with similar 'high risk' clients. Treatment with lithium is an exception here, given concerns outlined previously.

6.35 With regard to interventions for particular demographic groups, the available evidence is even more restricted. Practitioners working with particular age groups have the greatest weight of evidence to support their practice, but even here the evidence for some key groups (specifically children aged 14 and under and people aged 65 and older) is sparse to say the least. The majority of interventions have been evaluated with people aged between 20-44 and hence recommendations made in other contexts apply largely to this group. Practitioners aiming to provide interventions for children (aged up to 15) and young people (aged 16-24) are limited to lower quality evidence suggesting that a surprisingly broad range of psychotherapeutic approaches may be effective. Practitioners aiming to provide interventions for people aged 65 and older are limited to evidence, based largely on the narrative report of study authors, that support-based interventions (for older people in rural environments at least) may be effective.

6.36 Practitioners addressing intervention with other demographic groups, including practitioners attempting to target interventions at either males or females, have no clear evidence to guide their treatment options. There is a particular dearth of evidence in respect of populations which have been highlighted by *Choose Life* as priority groups, including groups known to have a high prevalence of self-harming behaviour, for example, people who misuse substances and people within the Criminal Justice System. Essentially, targeted intervention cannot currently be usefully informed by the existing evidence base in the context of most demographic groups.

Setting

6.37 Practitioners working with people living in the community are comparatively well served by the existing literature. Over half of all studies (53%) evaluated outcomes for people living in the community and in the case of interventions for suicide these studies were also more likely overall to report positive outcomes. The range of interventions reported as having positive outcomes in community settings includes the full range of interventions outlined previously in other contexts. In respect of outcomes reported by the highest quality studies, practitioners intervening to prevent suicidal *behaviour* in community settings have reliable, if limited, evidence to support the maintenance of ongoing contact and specialist follow-up and, again with caveats as outlined previously, treatment with lithium for people with bipolar disorder and treatment with clozapine (*in preference to olanzapine*) for people with schizophrenia. With regard to the latter recommendation, it should be noted that the general run of studies in other settings do *not* provide consistent support for the use of clozapine as such. The evidence cited here therefore relates specifically to situations in which there is, for other reasons, a choice between treatment with olanzapine and clozapine in the community setting and a client is known to be experiencing suicidal behaviour or suicidal ideation.

6.38 In the case of practitioners working to prevent suicidal *ideation* in people living in the community, the two higher quality studies available provide some support for the generic use of telephone counselling and for treatment with moclobemide specifically for people with major depression. One clear point of contact for people living in the community and experiencing suicidal behaviour or suicidal ideation is the GP surgery. Unfortunately, although there have been a number of studies, including high quality studies, addressing intervention based on service provision by GP practices, there is currently no substantive evidence to support the interventions evaluated. The majority of studies in this context to date have evaluated some form of training programme for GPs. It may be that future research needs to evaluate other options, for example provision by GP practices of interventions which have some evidence of effectiveness in other contexts.

6.39 The tendency of the literature to focus on intervention in the community may be justified in terms of the absolute prevalence of suicidal behaviour occurring in this setting. However, it leaves practitioners working in settings where there is a high relative prevalence of suicidal behaviour and suicidal ideation (for example prisons, secure units) with very sparse evidence to inform their practice. Similarly, it leaves a dearth of information relevant to settings which form the point of first contact for many people who engage in suicidal behaviour, in particular A&E. Considering the limited evidence which is available, practitioners would be justified in introducing ongoing contact and specialist follow-up care in the A&E setting and there is some evidence that training and educational videos for staff and family members may have the potential to improve outcomes for young people attending A&E.

6.40 In the secure in-patient setting, individual evaluations suggest that DBT, anti-depressant therapy and behaviour therapy *may* be beneficial in reducing suicidal behaviour. Options derived from the current literature for practitioners working with people within the Criminal Justice System (CJS) are very limited indeed. There is support from one study for the provision of intermediate care, similar to psychiatric admission, in the prison setting, but beyond this option any interventions are largely speculative. It is likely that further options have in fact been explored as secondary outcomes in research which is primarily focussed on, for example, other-directed violent behaviour in people within the CJS. However, except where authors have flagged secondary outcomes in the titles or keywords of their research reports, this literature will have fallen outside the remit of the current review.

6.41 Considering the evidence which is available to inform practitioners working in other settings, there is some support for the use of pharmaceutical intervention (as previously, lithium for people with bipolar disorder, again with caveats regarding possible adverse outcomes and either fluvoxamine or sertraline for people with depression) with people in open in-patient psychiatric wards. Practitioners aiming to provide people in in-patient settings with non-pharmaceutical interventions are particularly poorly served by the existing evidence. Evidence-based options for intervention in the out-patient setting are equally limited, although a more diverse range of interventions have been evaluated. There is some indication, as in the A&E setting, that educational videos for staff and family members may help to reduce suicidal *ideation* and there is also evidence to support treatment with anti-depressants in this context. There are no firm pointers towards interventions to reduce suicidal *behaviour* in the outpatient setting.

6.42 Intervention in the context of residential units set in the community, for example nursing homes, or during general hospital admission, has not been specifically addressed in the literature to date. A number of studies have addressed intervention in schools, primarily using complex multi-component initiatives based around educational or psycho-educational programmes. The limited number of positive outcomes reported for these studies suggest that practitioners working within schools may be justified in taking a simpler approach to intervention. In particular, basing interventions around the provision of crisis support and/or training school students to recognise the signs of suicidal behaviour and suicidal ideation in themselves and others.

6.43 Individual studies have addressed a range of other settings, including, for example, military bases and palliative care units, but additional research would be required in these settings to provide reliable evidence to inform practice. Whilst there is currently no reason to believe that an intervention delivered in one setting will not be as effective if delivered in another, the lack of information specific to particular contexts leaves practitioners with the challenge of exporting interventions from one context to another without certain knowledge that this is appropriate.

Form of behaviour

6.44 Defining suicidal behaviour and suicidal ideation is not straightforward and few studies included in the review provided clear and precise descriptions of the particular forms of suicidal behaviour and/or ideation engaged in by their participants. The broad descriptors we have used ('suicide', 'attempted suicide', 'self-harm', 'suicidal ideation') track the labels commonly used by study authors. The absence of more detailed descriptions in the intervention literature and the general tendency to combine outcomes for people engaging in potentially quite distinct behaviours (e.g. self-poisoning versus self-cutting) is likely to be frustrating for practitioners. Practitioners need information which is specific to their client group. The reality, however, is that interventions have largely been evaluated against generic outcomes with participants drawn from a wide range of population groups.

6.45 Taking at face value the broad categories used both in this report and within the literature as a whole, practitioners working with people experiencing **suicidal ideation** (addressed by 47% of studies) have the most extensive evidence base to draw on in taking forward their practice. The range of interventions supported by this evidence base is nevertheless limited. Specifically, there is reasonable evidence to suggest that treating people with depression with either fluvoxamine or sertraline may be effective in reducing suicidal ideation. There is also some limited evidence that providing telephone support may resolve suicidal ideation in the context of a short crises-driven telephone call, although currently there is no further evidence to determine whether positive outcomes persist over the longer term.

6.46 Practitioners working with clients at risk of **attempted suicide** are possibly best served overall, with access to a relatively broad evidence base (37% of studies addressed attempted suicide), but also to a number of interventions which are supported by comparatively strong evidence. Specific interventions finding favour in this context are the restriction of access to means (both at the population and, although on the basis of less substantive evidence, at the individual level), the provision of informal social support and/or help in developing supportive social networks, DBT for people with borderline personality disorder and treatment with lithium for people with bipolar disorder. Again, the latter recommendation comes with the caveat that adverse outcomes have also been reported for treatment with lithium.

6.47 There is a contrast in the above recommendations between interventions which are as yet supported only in specific diagnostic groups and interventions which are generally applicable. The more generally applicable interventions (restriction of access to means and support-based initiatives) have been shown to have positive outcomes also in respect of **suicide** prevention. Around one third of studies (33%) evaluated outcomes for suicide, with the available evidence favouring the restriction of access to means and 'support', in the sense of maintaining ongoing contact, with the suicidal person as effective approaches to intervention. The one other intervention finding fairly robust support in suicide prevention is service delivery via specialist centres. This is not an intervention which is generally within the purview of individual practitioners. However, re-structuring of care pathways or the setting up of specialist teams may be able to achieve a similar profile for service provision at the local level.

6.48 Practitioners working with people who **self-harm** are the least well served by the available evidence. The lack of focus on self-harm in comparison to completed suicide or behaviour seen as attempted suicide is a significant problem given the known prevalence of self-harming behaviour. This is exacerbated by the fact that few studies differentiate between distinct methods of self-harm, with the result that practitioners are again left with little specific evidence to inform their practice. Fewer than one quarter of studies (22%) evaluated outcomes for self-harm and the only intervention finding consistent support in the literature currently is DBT for people with borderline personality disorder. Although based on weaker evidence overall, outcomes from one high quality study suggest that it would be justifiable also for practitioners to use maintenance of ongoing contact as an intervention for people who self-harm.

6.49 The lack of evidence specific to particular forms of self-harm highlights a key issue for this literature as a whole. The relationship between different behaviours within the spectrum of suicidal behaviour and suicidal ideation is under-explored. Pathways both into and out of particular behaviours may not be the same and if intervention is to be effective, it is essential that the mechanisms behind individual forms of behaviour are well understood. The reality of clinical practice is that clients present with individual and quite specific problems and future research needs to be sufficiently well-focussed to allow targeted intervention based on finer-grained distinctions between different forms of suicidal behaviour and different population groups.

Limitations of the Review

6.50 The review had a very wide remit and needed to meet a tight timescale and budget. To achieve these goals certain pragmatic decisions were taken. The final searches were restricted to searches on the titles and specified key words of the research material identified. All searches depended on electronic access to data sources and we were unable to carry out hand-searching. We were also, largely, unable pro-actively to contact other researchers and practitioners in the field to canvass for additional material. Equally, we were unable to search through the bibliographies of all retrieved studies, searching was instead restricted to the bibliographies of articles specifically included in the review and, for the most part, was carried out by one reviewer alone. Whilst final decisions regarding the material identified as meeting our inclusion and exclusion criteria were based on at least two reviewers reading each paper identified, data extraction for this review was intensive given the number of articles included and only around 32% of the material was extracted by two reviewers. Finally, since our remit here was to provide a broad overview of the available evidence, we were unable to delve more deeply into individual studies or to canvass study authors for additional information or for individual level data.

Carer's Perspective

6.51 One of the key gaps in the literature identified by the review was the lack of studies addressing the lived experience of pathways into and out of suicidal behaviour and suicidal ideation. The lack of emphasis on the relevance of the individual's experience is highlighted by the fact that only one of the 200 studies included in the review actually focussed on asking people what had worked for them. The literature has similarly failed to take advantage of insights which may be gained through the experience and knowledge of people caring for friends or relatives experiencing suicidal behaviour or ideation. In conducting this review, we were fortunate to have working with us two people (KM and AF)[21] with direct experience of the impact of suicidal behaviour. These advisors have also had direct experience of how interventions for suicidal behaviour and suicidal ideation feel from the service user's and carer's perspective. We provide below the response of KM to the review outcomes, giving a verbatim account of how the current state of the literature and consequent evidence base is perceived by someone with personal experience of 'real world' outcomes.

Comments on review outcomes (KM)

6.52 At the start of the research, I expected there to be a large body of evidence and research which the team would need to look through. Given recent health policies acknowledging the large numbers of suicides and the need to decrease the number of deaths, I assumed that there would be well-researched evidence of interventions that work. I thought there would be evidence about a whole range of interventions, as well as consideration of specific groups. I thought there would have been studies targeting specific ages, cultures and diagnoses. Having been involved with carers' issues, I suspected that there may be less information about interventions involving the whole family. I commend the academic researchers for gathering the information based on 26085 original citations. As a lay person, I was surprised that within these, there were only 37 systematic reviews and 200 primary empirical studies which were of relevance to the study. I assumed then that these would be of a high standard and show some clear recommendations for specific interventions. It would seem commonsense that restriction of access to means and maintaining contact are likely to have some success in preventing suicides. This is what families do instinctively. I would have liked to have seen evidence of something more that could be done, especially for young people.

6.53 I was very surprised, though relieved at their honesty, that 2 of the systematic reviews described pharmaceutical interventions that actually made things worse. I was disappointed that there were such equivocal results from the reviews addressing psychosocial intervention and that there didn't seem to be any interventions consistently supported by the literature. I was disappointed that there weren't more studies about particular groups of people, considering specific ages, cultures or diagnoses. I had hoped that there would be something to learn from other cultures.

[21] Full names witheld to preserve privacy

6.54 I thought that there would be more evidence about interventions that would help known vulnerable groups, such as those with a dual diagnosis. And I assumed that children and young people would be a high priority for research. As a carer, I wanted to see studies that included more details about the whole family. Suicide affects the whole family and wider network. I hoped there would be evidence about how family and friends can intervene. I was surprised that more studies didn't include details about the family background and carers issues. I don't know how the studies ruled out the differences in support between families.

6.55 My conclusions and recommendations would emphasise the need for research which involves the whole family (in the widest sense to include a network of supportive friends). Are there 'supportive families' who have developed their own forms of intervention which work? Families are on the front-line of suicide intervention and most instinctively protect their loved one. It surprises me that no-one seems to have asked them. I also wonder about the impact that suicide attempts and ideation have on the family's mental health, and then back in a downwards spiral of a loop to the suicidal individual. Is there any intervention to reverse this by improving the emotional health of the family?

6.56 I would also like to see a lot more evidence about what can help for young people and for the elderly. Does the same intervention work across all age groups? Personally, I feel that if our family had had excellent support after the first crisis, then maybe our story would have ended differently. I would like to see clear guidelines for intervention following a first attempt, before behavioural habits have been developed. Any work which goes towards describing an ideal service which could prevent deaths is of interest internationally. Three aspects instinctively seem to offer potential: specialist crisis centres, on-going contact using peer support and informal networks, and training of health care workers and the wider community, including families. These would seem to provide a service which should help – I would like to see some evidence of their success.

6.57 I am impressed that the Scottish Executive have been so forward thinking to pursue this piece of work and thank you for the opportunity to be involved.

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ANNEX A PAPERS OUTSTANDING

The following papers were identified for *possible* inclusion in the review, but we were unable to retrieve full text copies at the time. We are very grateful to Professor Stephen Platt for subsequently forwarding the papers from *Crisis* to us. We have not been able to include these in the main text of the review, but we provide a summary of key details from each paper below. Outcomes from these papers would not have altered any conclusions or recommendations set out in this report.

Bergmans,Y., Links,P.S. A description of a psychosocial/psychoeducational intervention for persons with recurrent suicide attempts. *Crisis*, 2002, 23 (4), 156-160

This paper describes a Psychosocial/Psychoeducational intervention for people who have repeatedly attempted suicide. The intervention was developed for people without active psychosis or any history of interpersonal violence, with referrals typically being made from hospital and community settings following a suicidal crisis. The authors describe the intervention as a multi-modal approach based on the underlying principle of 'validating' the client's experience and expertise. The intervention has been set up primarily as a series of facilitated group sessions, although clients are also encouraged to call facilitators, within the parameters of pre-set rules, if they experience a crisis. The content of the group sessions includes modules on protective behaviours, education regarding the role of diagnoses in identifying suffering, affect regulation, interpersonal relations and problem solving. The paper presented very little evaluation of the therapy, as to date only 48 people have completed one cycle of the group intervention. The authors report that the intervention is promising on the basis of a 70% completion rate (excluding initial drop-outs), a median of 83% of sessions attended, a return rate of 44% for a second therapy cycle and self-report by 84% of people involved in a final group discussion to the effect that they believed their self-harm behaviours had "decreased or changed".

Bilsker,D., Forster,P. Problem-solving intervention for suicidal crises in the psychiatric emergency service. *Crisis*, 2003, 24 (3), 134-136

In this short paper, the authors discuss how a cognitive-behavioural problem-solving approach to intervention could be adapted for delivery in the setting of an emergency psychiatric unit. They illustrate the discussion with details of their own approach to this form of intervention. The paper provides additional background material, but would not have been included in the review as there was no attempt to provide an empirical evaluation of the approach described.

Brunet,A.F., Lemay,L.; Belliveau,G. Correspondence as adjunct to crisisline intervention in a suicide prevention center. *Crisis*, 1994, 15 (2), 65-76

This paper presents outcomes from a small (N=5) pilot study of a correspondence-based intervention offered by a telephone crisis line. Five frequent callers to the telephone service were offered the opportunity to enter into written correspondence with five volunteers manning the telephone lines. Over six months, the authors report that the mean number of crisis calls by the five frequent callers dropped from a mean of 21.8 per month to a mean of 9.1 calls per month. The urgency of the calls, as reported on the basis of a four point scale (with a score of 4 indicating that planning for suicide is underway) remained stable, reducing only slightly from a mean of 3.7 to a mean of 3.4. All five frequent callers expressed a high degree of satisfaction with the correspondence approach. The authors also report a case study of outcomes for one of the participants. Whilst this study is clearly very limited in terms of participant numbers, outcomes are in line with review outcomes supporting the likely positive benefits of ongoing contact and support.

Csernansky J 11th World Congress of Psychiatry, 6th Aug Hamburg, Germany, 1999. Risperidone vs Haloperidol: Relapse Prevention. 1999 Aug 6 11; Hamburg, Germany 1999:2.

We are still unable to retrieve a copy of this paper.

Gauthier S et al. The effects of a school-based suicide prevention program on teachers. *Apprentissage et Socialisation*. 1993 vol:16 pp:33-41

We are still unable to retrieve a copy of this paper.

Maltsberger JT. Suicide in old age: psychotherapeutic intervention. *Crisis* 1991 Sep.12(2):25-32

This paper presents a discussion of the author's understanding of pathways to suicide in older people and how certain aspects of the psychotherapeutic process may help to divert older people from suicide. The paper presents no empirical data and hence would not have met criteria for inclusion in the review.

Mulder AM, Methorst GJ, U, Diekstra RF. Prevention of suicidal behaviour in adolescents: the role and training of teachers. *Crisis* 1989 Apr . 10(1):36-51

This paper presents a non-systematic review of the literature for the prevention of adolescent suicidal behaviour. The authors also present preliminary evaluation data for an intervention they have developed for seriously depressed and suicidal adolescents. The intervention is described as an information and training programme directed at making teachers more aware of 'youth suicide problems'. Three versions of the programme were evaluated in the school setting. In the first version, the programme was presented as a one day seminar. In the second version, the programme took the form of a plenary group session providing information, followed by training and discussion in small group sessions. In the third version, the format was as *per* version one, but mental health care professionals were specifically trained to present the programme to small groups of teachers. Outcomes reported by the authors were restricted to a survey of respondents' perceptions of and satisfaction with the third version of the programme. 83% of participants rated a morning session (discussions around attitudes towards suicide) they had attended as good or very good and 70% of the same participants rated the afternoon session (how to recognise signs of depression and suicidal behaviour) as very good. 77% of participants considered themselves as 'fairly capable' of recognizing signs of depression following the programme. No empirical data relating to subsequent outcomes for suicidal behaviour or ideation amongst the participants' students are presented, so this paper would not have met the inclusion criteria for the current review.

Upanne M, A model for analyzing suicide prevention. *Crisis*, 2000, 21 (2), 80-89

This paper presents the outcomes from a small (N=31) long term (9 year) qualitative study of how the perceptions of psychologists regarding suicide prevention changed during the course of a 9 year National Suicide Prevention Project in Finland. The authors also discuss a theoretical model for analysing suicide prevention. The suicide prevention project was based on countrywide psychological autopsy investigations in which the psychologists took part. The authors report that the majority of participants (81%) stated that "some changes had taken place in their thinking over the project years". 39% reported that their thinking had "really changed" and 45% that it had "become more focussed but not essentially changed". The authors present further details of the changes which had taken place in the psychologists' thinking by presenting suicide 'foci' reported by at least 3 psychologists as having become more important to them. These foci included social marginalization, suicide risks, depression, suicides amongst children and young people, crises, Finnish life values and young people's healthy development. The paper did not present data regarding any outcomes for suicidal behaviour or suicidal ideation and so would not have met the inclusion criteria for the current review.

ANNEX B MEMBERSHIP OF THE RESEARCH ADVISORY GROUP

The review team would like to thank all members of the Research Advisory Group and also our co-applicants for their enthusiastic and lively discussion of issues arising during the course of the review; for helpful suggestions regarding the content and implications of the review and for their support during the review process. We are particularly grateful to KM and AF for their selfless support of the project and for their invaluable contribution in helping to inform the project from the perspective of people who have first-hand experience of service delivery.

Research Advisory Group Members

Trish Burnet, Service User Involvement Co-ordinator, Scottish Association for Mental Health
Ciara Byrne, Choose Life Development Co-ordinator (North Lanarkshire), Scottish Association for Mental Health
Sandra de Munoz, Choose Life Co-ordinator (City of Edinburgh), Royal Edinburgh Hospital
Jacki Gordon, National Information Manager, Choose Life
Dougie Paterson, National Operations Manager, Choose Life
Cameron Stark, Consultant in Public Health, NHS Highland, and Honorary Senior Lecturer, Centre for Rural Health, University of Aberdeen
Alison Stout, Senior Researcher, Scottish Executive Health Department
Brian Young, Choose Life Development Officer, Inverclyde

Co-applicants & Clinical, Carer and Service User Advisors to the Review Team

Nigel Crompton, Clinical Lead, Crisis Services, Royal Liverpool University Hospital
Russell Jones, Psychiatric Liaison Nurse Manager, Ablett Unit, Glan Clwyd Hospital
Sian Cartwright, Psychiatric Liaison Nurse, Ablett Unit, Glan Clwyd Hospital
KM (full name and details withheld for reasons of privacy)
AF (full name and details withheld for reasons of privacy)

ANNEX C ELECTRONIC DATABASES SEARCHED

Medline (Generic) 1966-2006
Medline (additional via Mesh terms) 1966-2006
C2Spectr (Campbell Collaboration) Not date limited, primarily RCTs
CINAHL 1982-2006
Cochrane Not date limited, primarily RCTs
DARE
Cochrane Reviews
CCTR
CMR
NCCHTA
NHSEED
Econlit 1969-2006
PsychInfo 1887-2006
Applied Social Sciences Index & Abstracts (ASSIA) 1987-2006
Social Sciences Citation Index 1956-2006
National Research Register **(**Includes Cochrane & CRD also included in Cochrane above) Ongoing and recently completed research only
NRR Research Programmes
NRR Research Centres (Single Centre Projects)
NRR Research Centres (Multi-Centre projects)
Participating Centres (Multi-Centre projects)
MRC Clinical Trials
PROQUEST Given time constraints, this database was searched with the additional restriction criterion that retrieved material had full text reprints available electronically 1997-2006
Current Controlled Trials Recently completed and ongoing research only
National Institute for Clinical Excellence (NICE) 1999-2006
AMED 1985-2006
APA PsychArticles 1988-2006
FADE Not restricted by date

ANNEX D GENERIC SEARCH STRATEGY AND OUTCOMES

Citations Retrieved *by* Database and Search Term *(no de-duplication)*

The following table summarises the outcome of the generic search as applied to each database searched. Where possible the total number of citations (the number of citations retrieved *prior* to the use of the intervention restriction terms) is given in addition to the search outcomes for individual terms to indicate the breadth of coverage of each database in respect to suicide and self-harm. It is not possible to provide this figure for all databases as some did not have the facility for a generic search and terms could only be entered individually with subsequent hand-searching to exclude citations not meeting the restriction criteria. To allow comparability between databases in the table, the number of citations given for each individual term therefore relates to the number of potentially relevant citations once the 'intervention' restriction terms had been applied.

Table D.1 Citations Retrieved *by* Database and Search Term *(no de-duplication)*

Database & Date Range	Focus of Database	Total Citations		Suicide	Self Harm	Self Injury	Self Poisoning	Self Mutilation	Self Laceration	Self Cutting	Parasuicide	Overdose
Medline (Generic) 1966-2006	Medical	70,371		10.396	1,462	3,349	573	321	52	1,028	56	271
Medline (Mesh terms) 1966-2006	Medical	*N/A*		8,182	0	0	3	626	0	0	2	3
C2Spectr (Campbell Collaboration) Not date limited, primarily RCTs	Criminological/ forensic	33		4	0	7	1	0	0	0	1	0
CINAHL 1982-2006	Nursing, adult health	6,731		1,669	560	1,848	76	38	22	227	34	31
Cochrane Not date limited, primarily RCTs	Medical	*646*		*605*	*75*	*198*	*34*	*32*	*1*	*21*	*35*	*9*
DARE	Medical reviews	21		14	1	4	0	1	0	0	0	0
Cochrane Reviews	Medical reviews	18		21	8	4	4	0	0	1	1	1
CCTR	Controlled (medical) trials	585		538	62	185	28	30	1	20	34	8

Table D.1 ***Continued***

Database & Date Range	Focus of Database	Total Citations		Suicide	Self Harm	Self Injury	Self Poisoning	Self Mutilation	Self Laceration	Self Cutting	Parasuicide	Overdose
CMR	Methodological issues	2		4	0	0	0	0	0	0	0	0
NCCHTA	Health Technology Assessment	20		13	2	2	0	0	0	0	0	0
NHSEED	Health Economics	20		15	2	3	2	1	0	0	0	0
Econlit 1969-2006	Economics	339		107	42	16	4	0	0	32	1	0
PsychInfo 1887-2006	Psychology, related behavioural sciences	30,382		10.729	1,523	2.524	187	392	15	453	280	84
Applied Social Sciences Index & Abstracts (ASSIA) 1987-2006	Social Sciences	27,760		3.024	575	393	55	67	4	99	77	27
Social Sciences Citation Index 1956-2006	Social Sciences	28.883		8,271	1,331	2,506	209	270	16	487	414	82

Table D.1 ***Continued***

Database & Date Range	Focus Of Database	Total Citations		Suicide	Self Harm	Self Injury	Self Poisoning	Self Mutilation	Self Laceration	Self Cutting	Parasuicide	Overdose
National Research Register (NRR) (Total : includes Cochrane & CRD also included in Cochrane above) Ongoing and recently completed research only	Current or recent/ ongoing research	*The NRR database does not currently provide the option of searching across all its component databases using a single search strategy, so there is no overall total count for citations – see instead the counts for individual data sets below*										
Total		*N/A*		*305*	*302*	*304*	*23*	*18*	*1*	*39*	*32*	*12*
NRR Research Programmes		*151*		*75*	47	47	9	2	0	9	8	6
NRR Research Centres (Single Centre Projects)		*693*		*178*	174	206	9	14	1	20	19	5
NRR Research Centres (Multi-Centre projects)		*47*		*18*	16	14	1	1	0	2	0	0
Participating Centres (Multi-Centre projects)		*168*		*58*	48	33	0	1	0	7	4	0
MRC Clinical Trials		*2*		*1*	1	0	0	0	0	0	0	0

Table D.1 ***Continued***

Database & Date Range	Focus of Database	Total Citations		Suicide	Self Harm	Self Injury	Self Poisoning	Self Mutilation	Self Laceration	Self Cutting	Parasuicide	Overdose
PROQUEST Given time constraints, this database was searched with the additional restriction criterion that retrieved material had full text reprints available electronically 1997-2006	International dissertations and theses	*Not available – search by individual terms only*		707	29	106	0	33	0	12	14	1
Current Controlled Trials Recently completed and ongoing research only	Controlled Medical Trials (additional to those available via Cochrane - CCTR)	*Not available – search by individual or limited Boolean terms only*		375	47	52	12	9	0	2	19	2
National Institute for Clinical Excellence (NICE) 1999-2006	Research Reviews (NHS)	*Not available – search by individual or limited Boolean terms only*		1 (only 1 pertinent review found, which was flagged by each of the above four terms)				0	0	0	0	0
AMED 1985-2006	Allied Health Professions & Complementary Health Research	*Not available – search by individual or limited Boolean terms only*		969	70	1022	4	68	3	4	6	1

Table D.1 ***Continued***

Database	Focus	Total		Suicide	Self Harm	Self Injury	Self Poisoning	Self Mutilation	Self Laceration	Self Cutting	Parasuicide	Overdose
APA PsychArticles 1988-2006	Social Sciences Database focussing in particular on articles in the field of psychology (incorporates 'PsychLit')	*Not available – search by individual or limited Boolean terms only*		658	109	110	7	14	0	63	12	0
FADE Not restricted by date	UK NHS Supported 'Grey' Literature Database	*Not available – search by individual or limited Boolean terms only*		98	35	6	1	0	0	0	0	0

ANNEX E OVERVIEW OF SYSTEMATIC REVIEWS RETRIEVED

E.1 It did not fall within the remit of the current review to provide an account of prior reviews or meta-analyses. However, we present here a basic overview of the systematic review and meta-analytic material retrieved, because it is comparatively extensive, because people may wish to refer back to earlier reviews, and because it provides some insight into the need for the more 'over-arching' approach adopted in the current review. Tables E1 to E4 below provide brief summary details of each of the reviews and meta-analyses retrieved. In the following discussion,we will not distinguish between meta-analyses and systematic reviews with or without meta-analysis, as the criteria for inclusion were the same for each. To draw in as wide a range of comparatively high quality prior reviews as possible we set the criteria for a 'systematic' approach fairly loosely, requiring only that reviews demonstrate a systematic and replicable search strategy, that the quality of included studies was addressed (but not necessarily that studies were excluded from the review on the basis of poor quality) and that either a narrative or quantitative synthesis of the included data was attempted.

E.2 As noted previously, systematic reviews not referring to suicide, self-harm or suicidal ideation as an explicit outcome are unlikely to have been included. The bulk (49%) of the systematic reviews identified as meeting our criteria addressed pharmaceutical intervention. Whilst a high proportion of primary studies also relate to pharmaceutical intervention, the research bias towards such interventions is more pronounced in systematic reviews. Only five of the reviews identified explored psychotherapeutic/psychosocial interventions and only one addressed educational interventions for the general population (adolescents). The remaining 13 reviews either sought, as with our own review, to identify and evaluate the evidence base for any type of intervention, or focussed on a diverse range of other specific options for intervention. Included within the latter category are reviews relating to the efficacy of suicide prevention centres, 'no-suicide' contracts, Electro-Convulsive Therapy (ECT), interventions in Accident and Emergency (A&E), contacts with health care and liaison psychiatry.

E.3 Around one third (35%) of the reviews included only material derived from RCTs. A further five reviews included only controlled trials (whether randomised or not). No review reported on outcomes from qualitative research, although nine reviews set their inclusion criteria to retrieve all available studies regardless of design. Nearly half of the reviews (46%) restricted their population of interest to people with a specific psychiatric disorder, primarily depression. Reviews addressing non-pharmaceutical interventions tended to set more open population criteria and were more likely to focus explicitly on people already known to be engaging in suicidal behaviours or ideation.

E.4 In total, 43% of the reviews reported positive outcomes in that they felt adequate evidence existed to conclude that an intervention was effective. The majority of these reviews (11 of 16) related to pharmaceutical interventions. To briefly summarise outcomes, of the 18 **pharmaceutical** reviews, 11 reported positive outcomes, 5 were equivocal or suggested that further evidence was needed and 2 reported a tendency for suicidal behaviour/ideation to worsen or to show higher incidence where the drug in question was administered. Positive outcomes related to the use of lithium for bipolar, affective and mood disorders; the use of alprazolam for depressed patients; the use of fluvoxamine or paroxetine in depression and fluoxetine in depression and mood disorders and the use of clozapine in patients with schizophrenia or schizoaffective disorders.

E.5 Adverse outcomes (suicidal symptoms increasing or becoming more prevalent during treatment) were reported for the use of levetiracetam in patients with epilepsy (although the authors themselves concluded this related to features of the epilepsy rather than of the drug itself) and naltrexone in opioid dependent individuals. Equivocal outcomes or calls for further evidence were reported for the most recent study of lithium in mood disorders (Burgess et al 2006), for lithium or fluoextine as adjunctive treatments to olanzapine; for SSRIs in the adult population in general and in depressed patients, and pharmacological treatment in general in people with Borderline Personality Disorder.

E.6 The conclusions reached by the authors of all five reviews identified as addressing **psychotherapeutic/psychosocial** interventions are equivocal at best. However, the use of Cognitive Behavioural Therapy (CBT) is supported by two reviews as either 'promising' or evidence-based in people already known to have self-harmed or attempted suicide. Other specific interventions cited as promising by one review are Dialectical Behaviour Therapy (DBT) and green card initiatives (providing a patient with a contact card to arrange readmission). The remaining two reviews in this category flag, respectively, a finding that psychosocial interventions generally may be more effective within higher risk groups and note that there is insufficient evidence available to justify the introduction of any psychosocial programmes for the treatment of depression.

E.7 The one review we identified addressing general population **educational** initiatives (Ploeg et al 1996) concluded that there is insufficient evidence currently available to support curriculum-based initiatives for adolescents. Within the rather broader category of reviews addressing **'any' or 'other'** interventions, there are also few positive messages. Only two reviews report unequivocally positive outcomes. These support the preventive benefits of physician education in recognising and treating depression; restriction of access to means and, in a generic review of all available interventions, CBT and interpersonal therapy. In addition, one review (Gunnell et al 2005b) provides evidence–based recommendations that strategies to reduce suicide by hanging should focus on controlled environments, the emergency management of 'near hanging' and on suicide prevention in general.

E.8 The remaining reviews either conclude that there is no convincing evidence base for any type of intervention, or cite a lack of evidence and need for more research in relation to specific options for prevention. Such options include suicide prevention centres, no-suicide contracts, prevention programmes in general hospital and A&E settings, ECT, contact with clinicians and liaison psychiatry. In the case of liaison psychiatry the review concludes more strongly (Rudd et al 2005) that many areas of liaison psychiatry are not evidence-based.

E.9 The above reviews provide useful outcomes which, in the main, do not differ from our own conclusions in respect of the specific evidence bases to which they refer. However, they are all comparatively narrow in focus in respect either of study design, population, or the number of studies included. One exception to this is Gunnell et al 2005a, which, although restricting study design to RCTs, otherwise goes to considerable lengths to identify all available relevant evidence. However, even in the latter case, the justifiable focus on a single intervention limits the usefulness of the review for practitioners and policy makers, who need to know not just whether any specific intervention option is effective, but also which approaches are, on balance, the best available.

E.10 A key advantage of broad approaches such as that used for the current review is that direct comparisons can be drawn between interventions, populations, settings and also types of evidence. This option for head-to-head comparison of outcomes modified by the key parameters which are of interest to practitioners and policy makers is a substantial advantage of an 'holistic' approach to the review process. Analogously to the advantage of collecting standardised data on two interventions in a single trial, the advantages of collecting evidence across a range of interventions and intervention parameters following a common paradigm for data collection at the same point in time, provides considerable insight into the current state of the evidence base which could not be drawn from a series of independent reviews on distinct interventions conducted in different ways and at different points in time.

Table E.1 Summary of Systematic Reviews Retrieved : Pharmaceutical Interventions

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Pharmaceutical					
Baldessarini et al 2003	Lithium	No specific design, reviews pharmaceutical studies whether or not lithium is evaluated	Bipolar Disorder	34	Major reductions in suicide attempts with lithium maintenance
Binks et al 2006	Pharmacological	RCTs	Borderline Personality disorder (BPD)	10	Current research provides inadequate evidence
Burgess et al 2006	Lithium	RCTs	Mood Disorders	9	No definitive evidence for whether or not lithium has an anti-suicidal effect
Cipriania et al 2005	Lithium	RCTs	Mood disorders	32	Data from 7 trials suggests patients receiving lithium less likely to die by suicide; composite measure of suicide plus self-harm also lower
Cramer et al 2003	Levetiracetam (LEV)	Placebo controlled trials	Adults with epilepsy, cognitive disorders or anxiety disorder	Not stated	Suicidal symptoms were significantly more common amongst patients with epilepsy treated with LEV than amongst similarly treated patients with cognitive disorders or anxiety disorders
Digiusto et al 2004	Pharmacotherapy	Prospective Longitudinal follow-up of post-trial data	Opioid dependent individuals	12	Clinicians should alert addicts taking naltrexone of the possible risks of heroin overdose
Filteau et al 1993	Selective Serotonin Re-uptake Inhibitors (SSRIs)	Double blind clinical trials	Depressed patients	11	Significant rapid and effective lessening of suicidal ideation during SSRI treatment
Gunnell et al 2005	SSRIs	RCTs	Adults	477 (including trials not specifically addressing suicide or self-harm but reporting on adverse events which include these)	Increased risks of suicide and self-harm caused by SSRIs cannot be ruled out, but the risks need to be weighed against the effectiveness of SSRIs in treating depression
Jonas & Hearron 1996	Alprazolam	Controlled trials	Depressed patients	22	There was no significant difference between alprazolam and other active comparators in either increasing or decreasing suicidal ideation; alprazolam is superior to placebo in reducing suicidal ideation

Table E.1 ***Continued***

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Khan et al 2003	Anti-depressants including SSRIs	FDA RCTs	Depressed patients	Unclear, but includes trials not directly addressing the issue of suicide or self-harm but reporting these as adverse events	There is no support for either an overall difference in suicide risk between anti-depressant and placebo treated subjects or for a difference between SSRIs and other types of anti-depressant
Letizia et al 1996	Fluvoxamine	RCTs	Major depressive disorder	19	Treatment with fluvoxamine is associated with a significantly greater improvement in suicidal ideation than placebo
Montgomery et al 1995	Paroxetine	Controlled and open trials	Major depression	Unclear, but includes studies not directly focussed on but reporting suicidal ideation as an adverse event	Fewer instances of suicidal ideation emerge in paroxetine treated patients compared with placebo
Szanto et al 2003	Paroxetine or nortriptyline	'federally funded treatment studies'	Depression in the elderly	3	Suicidal ideation resolves rapidly with pharmaceutical treatment but resolution of thoughts about death is more gradual
Tollefson et al 1993	fluoxetine	RCTs	Patients with mood disorders vs patients with non-mood disorders	63, including trails which did not address suicidality directly but report adverse incident data	Substantial suicidal ideation emerged less frequently with fluoxetine than with placebo in patients with mood disorders. Too few occurrences of suicidality in patients with non-mood disorders were noted to draw comparisons
Tondo et al 2001	lithium	Any design providing suicide rates during lithium maintenance therapy	Affective disorders	22	Suicide risk was consistently lower during long-term treatment with lithium in all identified studies
Vieta et al 2004	Olanzapine with adjunctive lithium or fluoxetine	Short-term blinded trials with open-label extensions	Rapid-cycling vs non-rapid cycling bipolar disorder	2	Adjunctive use of lithium or fluoxetine was not associated with suicide attempts, no significant differences were noted between rapid-cycling and non-rapid cycling bipolar disorder
Wagstaff & Perry 2003	clozapine	All available designs	Patients with schizophrenia or schizo-affective disorder	9 (1 RCT, 3 prospective studies, 5 retrospective studies)	In the one RCT available, (InterSEPT trial) clozapine had a greater preventive effect on suicidality at patients at high risk of suicidality than olanzapine
Wernicke et al 1997	Fluoxetine combined with adjunctive centrally-acting medication	RCTs	Depression	25, including studies not directly addressing suicide or self-harm but including adverse incident data	Fluoxetine is associated with a significantly superior reduction in suicidal acts and ideation than placebo, independently of concomitant medication. Fluoxetine is superior to TCAs in patients not taking concomitant medication in respect of suicidal acts and ideation

Table E.2 Summary of Systematic Reviews Retrieved: Psychotherapeutics/Psychosocial interventions

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Psychotherapeutic/Psychosocial					
Hepp et al 2004	Psychological & psychosocial interventions	RCTs	People who had attempted suicide or engaged in deliberate self-harm	25	Minimal interventions (e.g. green card initiatives) and psychodynamic interventions (e.g. CBT and DBT) show promise but more research is needed to provide adequate evidence
Linehan 1997	Psychosocial and behavioural interventions	RCTs and studies assigning participants using an alternating sequential design	Any reported population	20 (of which, 18 RCTs)	Psychosocial interventions appear to be most effective with the more high-risk individuals
Macgowan 2004	Psychosocial treatments	All available designs	Adolescents	10	A number of treatments are cited as promising, but the authors conclude that current evidence of efficacy is weak and research designs are poor
Merry et al 2004	Psychological and/or psycho-educational interventions	RCTs	Children & adolescents	13	There is insufficient evidence to warrant the introduction of depression prevention programmes to reduce suicide attempts and completed suicide
Vandersande et al 1997	Psychosocial intervention	RCTs	Suicide attempters	15	Currently there is evidence only to support CBT approaches in preventing repeated suicide attempts

Table E.3 Summary of Systematic Reviews Retrieved: Educational Interventions

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Educational/Training					
Ploeg et al 1996	Curriculum-based prevention programmes	Prospective studies with a control group or before/after evaluation	Adolescents	11	There is currently insufficient evidence to support curriculum-based prevention programmes. The evidence suggest there may be both beneficial and harmful effects on attitudes related to suicide

Table E.4 Summary of Systematic Reviews Retrieved: 'Any' or 'Other' Interventions

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Other/'Any initiative'					
Comtois 2002	Any intervention for parasuicide	Experimental and quasi-experimental designs	Parasuicidal individuals	Not stated	Empirically supported treatments are rarely used as part of usual care; standard treatments including hospitalization of expensive
Dew et al 1987	Suicide Prevention Centres	Any available design	Unspecified	7	There is no evidence for the efficacy of suicide Prevention Centres in reducing the suicide rate
Gould et al 2003	Any intervention	Any design	Young people	Unclear	Whilst several interventions are promising, none have proven efficacy
Gunnell et al 2005b	Interventions to reduce suicide by hanging	All available designs	Any reported population	unclear	Strategies to reduce suicide by hanging should focus on controlled environments , the emergency management of 'near hanging' and on the primary prevention of suicide in general
Hawton et al 1998	Psychological and pharmacological treatments	RCTs	Patients who had deliberately harmed themselves	20	There remains considerable uncertainty about which forms of psychosocial and physical treatments of patients who harm themselves are most effective.
Kelly & Knudson 2000	'no suicide' contracts	All available designs	Any reported population	0	No evidence exists to evaluate the efficacy of no-suicide contracts
Links & Hoffman 2005 *(this updates an earlier review by Gunnell & Frankel 1994)*	Prevention programmes in psychiatric wards or units within general hospitals	All available designs	Psychiatric patients	34	A number of programme and policy recommendations are made but these are based on the potential of current treatments to reduce suicide risk, firm evidence for efficacy is not presented.
Mann et al 2005	Any prevention initiative	Systematic reviews & meta-analyses, RCTs, cohort studies, ecological or population based studies	Any reported population	Systematic reviews & meta-analyses (10), RCTs (18), cohort studies (24) ,ecological or population based studies 41)	Physician education in depression recognition and treatment and restricting access to lethal methods reduce suicide other interventions require more evidence of efficacy
O'Leary et al 2001	ECT and anti-depressant availability	Follow-up studies	Affective disorder	75	The availability of ECT and anti-depressants may have contributed to decline in suicide during follow-up

Table E.4 ***Continued***

StudyID	Intervention	Design	Population	N of Studies Included	Main Conclusion(s)
Other/'Any initiative'					
Pirkis & Burgess 1998	Contacts with health care	All available designs	People known to have committed suicide (Retrospective analysis)	24	Contact with clinicians may help prevent suicide but more evidence is needed, in particular to identify which risk groups this applies to
Repper 1999	Interventions in A&E	Unclear, authors refer to RCTs only in tabulated data but imply a wider retrieval of study design in the text	Persons presenting to A&E	Unclear, authors refer only to 7 RCTs in tabulated data, to 8 studies in the abstract and to 'all UK studies' in the text	There is inadequate information regarding the targeting of clients at risk of suicide, no specific intervention strategy in A&E has proven efficacy
Ruddy & House 2005	Liaison psychiatry	Systematic reviews	Any persons in contact with liaison psychiatry	64, including studies not directly addressing suicide or self-harm but recording relevant outcomes	Many areas of liaison psychiatry are not based on high quality evidence, more research is needed
Ryan 2005	Any treatment for depression	Unclear, the authors do not cite any exclusion criteria based on design, but text and tables refer only to controlled trials	Children and adolescents with depression	Unclear	Cognitive behavioural therapy and interpersonal therapy are better than treatment as usual ; several anti-depressants are more efficacious than placebo, there is a correlation between treatment with SSRIs and a decrease in completed suicide, however comparing all anti-depressants as a single group the association is with an increase in suicide

ANNEX F OVERVIEW OF PRIMARY STUDIES RETRIEVED

Profile of Primary Studies Included

F.1 All but two of the 200 primary studies included in this review were identified by the review team through electronic searching. The exceptions (Thrive Initiative 2006; Gerber 2003) were unpublished evaluation reports provided by NIST. The majority of included material (54%) is of recent date (dated 2000-2006), with 37% of the material dating from the 1990s and only 8% of included material produced in the 1980s or earlier. This is in part due to the nature of electronic searching (although the majority of databases searched include material at least from the 1980s if not earlier) but it also reflects a trend for a rapid expansion in the literature addressing suicidal behaviour and suicidal ideation. In terms of the type of intervention focussed on in the literature, publication dates suggest a slight but significant shift over time (χ^2=12.9 $p<0.04$) with an increase in the proportion of research focused on psychotherapeutic interventions and service delivery and a decrease in the proportion of studies focussed on pharmaceutical and other interventions.

F.2 The intervention literature is extremely diverse in respect of the approach taken to preventing suicidal behaviour and ideation. Within the 200 studies included, we identified over 150 different specific interventions which had been evaluated. This level of diversity, accompanied by the more restricted but nevertheless diverse range of settings, populations and age groups in which the interventions have been evaluated precludes any meaningful meta-analysis in the context of the current report. With the benefit of additional information or, preferably, individual level data from study authors, limited meta-analysis to address specific issues may be a possibility in the future. The broad categories of intervention addressed and their contribution to the total number of studies included are set out in Table F1 below.

Table F.1 Approaches to Intervention identified in the Literature

Intervention	Pharmaceutical	Psycho-therapeutic	Multi-Modal	Behaviour Therapy	Service Delivery initiative	Education / Training Of health staff or key others	Public health / education directed at specific groups	Other
N	61	33	6	4	21	12	16	47
%	30	16	3	2	10	6	8	23

F.3 Although there has recently been a slight decrease in the proportion of research focussed on pharmaceutical intervention, this area clearly remains the driving force behind research in the prevention of suicidal behaviour and ideation. As a contributor to the overall body of knowledge it comes close to being rivalled only by the very eclectic collection of 'other' interventions which have been evaluated and these are too diverse to be regarded as directing the literature in any meaningful way. Note here that given our very broad inclusion criteria, there is little reason to assume that the studies we have included present a particularly biased view of the empirical intervention literature, with the possible exception of the foreign-language literature, which for pragmatic reasons, we specifically excluded.

F.4 Although foreign language literature was excluded, the range of countries from which the included studies originated is broad. Excluding multi-national studies, populations from 21 countries provided studies for the review. Note here, that where study authors reported on a population *other* than their native population, we coded study origin in respect of the population for which an intervention was evaluated, *not* the country of origin of the author of the research. Table F.2 below provides an overview of the origin of included studies compressed into categories.

Table F.2 Country of Origin of Included Studies

	US / Canada	UK	Other European	Other Non-European	Multi-National
N	94	38	35	23	9
%	47	19	18	11	4

F.5 As with the majority of public health research and, indeed, research more generally, the population to which the majority of evidence applies is the United States (only seven of the studies included within this combined category derived from Canada). In comparison with other public health literatures, including comparable literature on other-directed violence, the proportion of the intervention research carried out within the UK is quite high, slightly exceeding that of research carried out in other European countries. This is likely to be due, in part at least, to the longstanding work of specialist research centres such as the University of Oxford Centre for Suicide Research. Of the 38 studies carried out in the UK, 8 related directly to the Scottish population. However, of these, four studies (Davidson et al 2004, Evans et al 1999, Tyrer et al 2003 and Tyrer et al 2004) reported on different aspects of the same multicentre trial (the POPMACT study). Only one of the five centres taking part in the study was sited in Scotland. Further details of outcomes from these linked studies and from the four additional and independent Scottish studies (Cunningham-Owens et al 2001, Eagles et al 2003, Gerber 2003 and Thrive Initaitive2006) are provided in the main text of the report.

F.6 In terms of the specific populations addressed by the included studies, the majority of studies, as with the majority of prior systematic reviews, focussed on psychiatric populations (46% of all included studies). This distribution is likely to be out of kilter with the true distribution of suicidal behaviour and self-harm, although evidence addressing the incidence of suicidal behaviour (other than completed suicide) in the general population, particularly in the UK, is vanishingly small and an accurate estimate of prevalence remains to be established. Within the group of studies addressing suicidal behaviour and ideation in people with a psychiatric disorder, the literature showed a clear bias towards specific types of disorder. The proportion of studies on psychiatric patients falling into each category was as follows:

Major depression/Depression	38%
Personality Disorder/Borderline Personality Disorder	24%
Schizophrenia/schizo-affective disorder	12%
Other affective disorder	12%
Manic depression/Bipolar disorder	4%
Mixed or unspecified psychiatric populations	9%

F.7 The strong bias towards an evaluation of interventions for suicidal behaviour and suicidal ideation in the context of **depression** is unsurprising. Both this focus and the focus on **schizophrenia** are broadly in line with lifetime risk of suicide in these disorders in comparison to estimates for the general population[22], although the emphasis on depression in particular remains exaggerated in purely numerical terms. The focus on **personality disorder** may reflect a confounding of definitions. Whilst a number of studies (e.g. Bronisch 1996, Duberstein 1997) have cited the apparently close association between personality disorder and likelihood of suicide, estimates of lifetime prevalence of suicide in this disorder commonly fail to take into account that suicidal behaviour remains one of the defining criteria for a diagnosis of personality disorder. Without controlling for this definitional circularity it is difficult to establish the true association between this disorder and suicidal behaviour and hence to establish what the appropriate balance of research effort should be.

F.8 Outside of the psychiatric population, the main population focus of research (30% of included studies) is, again unsurprisingly, **people presenting with suicidal behaviour** and, to a lesser extent, ideation, or people otherwise seen as at high risk of suicide or suicidal behaviour. Amongst those studies specifying a particular group within the general population as the focus of intervention, the single dominant population group (12 of 14 such studies, 86%) of interest is **adolescents**. This is largely justified by population rates of suicide, which consistently indicate the relatively high risk of suicide in adolescent populations. In contrast, the impact of suicide on children and older people is *not* reflected in the amount of available research on interventions for these populations. Other specific populations on which a small number of studies have focussed in evaluating interventions (7% of included studies) are military personnel, the prison population, people with physical disorders and people who misuse substances.

F.9 Taken as a whole, the age range of participants in all included studies (where such information was provided) was between 6 and 94. In terms of the age ranges specified by the Research Advisory Group, the distribution of those studies providing age details and focussing on participants from particular age groups is as follows:

Children (0-15 years)	5%
Young Adults (16-25 years)	8%
Adults (26-65 years)	40%
Older Adults (66+ years)	1%

[22] The World Health Organization cites the lifetime prevalence of suicide as between 4-10% in schzipophrenia, 6-15% in depression and around 1% in the general population

F.10 A substantial proportion of studies (29%) failed to provide any details of the age of their participants, the remainder recruited participants from across one or more or the age ranges specified above. The failure of primary studies to provide key demographic information is not an uncommon finding of systematic reviews. In the current context, reporting of the **gender** of participants was comparatively good ('only' 13% of the studies failed to provide such information), but information relating specifically to either women or men remains scarce, as the majority (73%) of studies providing information on the gender of their participants included mixed groups, with no separate sub-analyses of outcomes for males and females.

F.11 In line with the emphasis on borderline personality disorder, studies focussing solely on interventions with women (11%) were more common than studies focussed solely on men (5%). As we found also in our previous review of other-directed violence, participant **ethnicity** was particularly poorly reported by the included studies. In total, 68% of the 200 studies failed to provide information regarding the ethnicity of their participants. Of those studies which did provide this information, 84% included mixed ethnicities, with no separate sub-analysis by ethnic group. Out of the remaining 10 studies, six addressed interventions with participants drawn from minority ethnic groups only, the remaining studies focussing purely on white participants.

F.12 With regard to other key characteristics, nearly half (46%) of the studies failed to identify whether prior suicidal behaviour or ideation had been identified in their participants (that is, whether the behaviour used as an outcome measure represented a first time incident or a repetition of behaviour previously engaged in). Of the remaining studies, only two reported that the behaviour represented a first-time incident. For an additional seven studies the only behaviour known to have occurred previously was suicidal ideation. This means that 49% of the 200 included studies provide evidence for interventions evaluated in the context of repeated rather than first time suicidal behaviour.

F.13 Notwithstanding the high proportion of studies focussed on participants with a history of suicidal behaviour, the failure of nearly half of the available studies to consider and/or report the previous history of their participants precludes accurate analysis of differences between **'repeaters'** and non-repeaters'. As a proxy, we will compare outcomes for studies which specifically state that their participants had engaged in actual acts of suicidal or self-harming behaviour and studies which did not record this or which failed to specify whether or not participants had engaged in such behaviour prior to entry into the study. Despite the poor reporting of this key characteristic, it seems there is a clear and, given their known risk status, an appropriate focus in the literature on people identified as having engaged in prior suicidal behaviour.

F.14 The Research Advisory Group expressed a specific interest also in studies addressing intervention for people known to misuse substances. Although only one study (Ahrens et al 1993) explicitly set out to address intervention for people identified as 'substance abusers', 16% of studies noted that one or more participants were 'substance abusers' and 12% of studies identified participants as having a diagnosis of substance abuse. A number of points can be made here. Firstly, as with other participant details, the key feature likely to interact with outcomes for suicidal behaviour has been left out of the equation by the majority of studies. In total, 73% of the included studies failed to identify whether or not participants were known to be abusing (or even using) alcohol or illicit substances during the course of their study and 79% of studies failed to identify whether or not one or more participants had a recorded diagnosis of substance abuse. Again, this is not an uncommon finding in systematic reviews; however, it is particularly unfortunate in the current context, where there is a known association between the outcome of interest and the use of alcohol and other substances.

F.15 In terms of **study design**, the review, as intended, identified a broad range of quantitative, quasi-experimental and qualitative studies. Dividing these often highly individualistic designs into broad categories, the literature, as represented by the studies meeting our inclusion criteria, again demonstrates a clear bias in approach. The proportion of studies falling into each broad category is outlined below:

RCTs	36%
Non-randomised controlled trials and group comparisons	14%
Cross-sectional comparisons	7%
Single group follow-ups (prospective and retrospective)	14%
Before/after or Repeated measures designs	8%
Other quantitative designs	6%
Qualitative designs	13%

F.16 Surprisingly, the high proportion of randomised controlled trials in the literature is driven not by the preponderance of pharmaceutical trials, but by the significantly higher proportion of psychotherapeutic/psychosocial studies following an RCT design (χ^2=24.7 p<0.001). Whilst 44% of pharmaceutical trials adopted an RCT methodology, the majority of psychotherapeutic/psychosocial interventions did so (64%). Since around 23% of both service delivery and 'other' intervention studies also followed this methodology, it can reasonably be said that this literature displays a comparatively sophisticated methodological approach. Whilst the universal applicability of the RCT approach to evaluating all forms of intervention has been challenged (e.g. Weightman et al 2005) it currently remains the 'gold standard' approach in evidence-based health care. The widespread use of this methodology in evaluating interventions for suicide and self-harm is in notable contrast to other relevant public health literatures (cf. Leitner et al 2006).

F.17 Whilst qualitative designs are not wholly lacking, the number of detailed and well-conducted in-depth studies of the 'lived experience' of intervention for suicidal behaviour and ideation is disappointing. The design and implementation of the qualitative studies available is also generally of a rather lower standard than that of the quantitative research. The majority of the qualitative studies included (63%) are case studies and the vast majority of these are brief narrative accounts of a case intervention, with little structure and few attempts to validate the conclusions reached using any accepted principles of qualitative investigation. Of the remainder, only three studies follow an approach which could be considered to follow pre-defined principles of qualitative methodology (content analysis, non-participant observation and psychological autopsy). All other studies falling within the qualitative category simply report outcomes based on interview or survey data, largely in the absence of any structured approach to the investigation of stated hypotheses.

F.18 A particular strength of study design in this literature is the relatively large sample sizes achieved. The median sample size for all included studies is 140, with 55% of studies reporting an initial sample size of 100+. In addition, the majority (65%) of studies used prospective follow-up, reported statistical analyses where appropriate (70%), followed an intention-to-treat analysis (56%), used a small number of pertinent outcome measures (59% used three or fewer outcome measures) and, again where appropriate, reported baselines for all main outcome measures (56%). These are all characteristics which provide some confidence in the likely reliability and validity of the outcomes reported by the intervention studies.

F.19 Some differences in 'quality markers' were noted between studies with a focus on different types of intervention. Intention-to-treat analyses were more likely to be carried out in pharmaceutical studies than in studies focussed on all other modes of intervention (χ^2=37.4 $p<0.001$) and psychotherapeutic/psychosocial studies were likely to have a higher number of outcome measures than pharmaceutical studies (a mean of 5.56 versus 2.61 in pharmaceutical studies $t= -3.05$ $p<0.004$). These differences, although worth noting, are not of sufficient weight to warrant blanket conclusions regarding the relative quality of studies addressing different modes of intervention. Overall, the quality of studies evaluating distinct modes of intervention is broadly comparable. This again differentiates the current research literature from other public health literatures, where the quality of study design varies more markedly with the interventions evaluated (cf. Leitner et al 2006).

F.20 In addition to the intrinsic features of study design set out above, the value of the research literature to clinical decision-making depends also on the **settings** in which interventions have been evaluated. In contrast to details given regarding participant characteristics, the majority of studies provided a clear description of the setting in which interventions took place. Only 8% of studies failed to provide any details regarding setting, with a further 2% providing details of the setting at the start of the study but failing to clarify whether or not all participants remained in the same setting during follow-up. Twenty-two studies (11%) involved participants drawn from a mixed range of settings. Taken together, this leaves 78% of the studies providing clear information regarding the settings in which interventions have been evaluated. Of these studies the vast majority (88%) evaluated outcomes with baseline and follow-up in a single setting. The distribution of settings for these single-site studies is as follows:

Community	67%
Schools	6%
In-patient Psychiatric care	10%
Outpatient Psychiatric unit	11%
A&E	1%
Other	4%

F.21 Of the 15 studies with distinct start and end settings, 12 began in an in-patient psychiatric setting with follow-up into the community, two began in A&E with follow-up into the community and one began in a community setting with follow-up into in-patient psychiatric care. In line with the focus on specific population groups outlined earlier, 'other' settings included prison, military bases and outpatient units involved with physical rather than mental health care. Whilst the balance of the above distribution is not wholly disproportionate to the balance of settings in which clients find themselves, some aspects of the above profile are a matter for concern. In particular, the lack of studies taking place in A&E, which provides a very significant point of first contact for a substantial number of people with suicidal behaviour and ideation. Similarly, given the comparatively high rates of suicidal behaviours in prisons, it is of considerable importance that further intervention studies focussed specifically on this setting are carried out.

F.22 Given the focus of the review on studies which addressed **suicidal behaviour** or **suicidal ideation** as an explicit outcome measure, it is not surprising that in the majority of the included studies (79%) the main focus was on suicidal behaviour or ideation. The main focus in the remainder of the studies was on interventions targeted at depression (16%), all-cause mortality (1%) or on outcome measures of no direct relevance to suicidal behaviour but with specific reference to the benefits or otherwise of the intervention for also reducing suicidal behaviour or ideation (3%). Note that only two of the studies falling into the latter category evaluated pharmaceutical interventions.

F.23 With regard to the particular form of suicidal behaviour addressed by the studies, nearly half (47%) focussed either solely on suicidal ideation or used this as a subsidiary outcome measure. Completed suicide was used as an outcome measure by 34% of studies, with 37% focussing on attempted suicide (variously defined) and 22% focussing on self-harm. Around 40% of studies included more than one of the above methods, primarily combining suicidal ideation as a subsidiary outcome with a main focus on suicidal acts, in particular attempted suicide or self-harm. Despite the fact that the majority of studies addressed suicidal behaviour or ideation as their main focus, comparatively few studies focussed *solely* on these issues, with 62% including also other outcomes in particular general mental health and social functioning.

F.24 Studies used a variety of methods to establish outcomes for suicidal behaviour and ideation. Official statistics were the most common source of information in respect of completed suicide (61% of studies evaluating outcomes for suicide used official statistics for suicide as the specific outcome measure). A more diverse range of sources was used to establish outcomes for self-harm, the most prominent approaches being via hospital or other formal records (24%) or narrative and scale-based self-report by participants (20% in each case). 'Attempted suicide' was the outcome measure least clearly defined by study authors and in line with this, a fifth of studies (20%) also failed to state how the outcome had been identified. This is a particular problem in the literature, since behaviour defined by a study author as 'attempted suicide' ranges across the full spectrum from minor self-harm to an act with near-fatal consequences. Parity of definitions for this and other aspects of suicidal behaviour and ideation or, at least, clear descriptions of the specific behaviour addressed by a research study would have the potential to significantly improve the value of future research for intervention practice.

F.25 A high proportion of studies evaluating outcomes for self-harm (54%) addressed only attempted self-harm. A further third (27%) addressed both actual and attempted self-harm, with the remaining 18% addressing actual self-harm only. As with attempted suicide, more precise descriptions of the behaviour referred to were scarce, with 41% of studies failing to provide any further definition and 34% using the eclectic term 'any method' of self-harm as their identified outcome measure, without further sub-analysis by means. The only methods of self-harm for which further detail was generally provided were self-mutilation (18% of studies using self-harm as an outcome) and self-poisoning (7% of studies evaluating outcomes on the basis of incidents self-harm).

F.26 Contrasting what is known about the incidence of different forms of suicidal behaviour with patterns observed in the intervention studies included here, the proportion of research addressing rarer forms of suicidal behaviour (suicide, attempted suicide) is out of balance with the incidence of observed behaviour. Whilst it is clearly the case that completed suicide, in particular, is a more severe outcome, it seems to be the case that self-harm, as a common, or possibly very common behaviour, in the general population and in particular in young populations (c.f. Fox & Hawton 2004) is under-researched by comparison. From the limited description of behaviours provided in the included studies addressing self-harm it seems also that self-cutting is under-represented as a specific focus of attention. The use of multiple methods of self-harm, together or sequentially over time is a form of self-harm barely referred to in the context of intervention studies. It may be possible to explore this issue further by contacting study authors for further more detailed information regarding the forms of self-harm carried out by participants.

ANNEX G OUTCOMES OF THE SCOPING REVIEW

G.1 The aim of the **scoping review** was to provide a broad overview of study findings, irrespective of judgements regarding study quality. In taking this approach, the scoping review is able to provide an account of the literature in this field as a whole. It provides, for example, insight into which modes of intervention have been pursued in the literature to date, which population groups have been focussed on and which methodologies researchers have chosen to adopt in evaluating interventions for suicide and self-harm. It also provides an indication of which interventions show some promise of efficacy, albeit in the absence of the high quality trials which may still need to be carried to confirm possible benefits.

G.2 Finally, evaluating outcomes 'across the board' allows us to carry out multivariate analyses to explore which of a potential range of variables impacts to the greatest extent on the outcomes identified for an intervention. Is it, for example, the quality of the research methodology alone which determines whether an intervention is identified as being effective, or is it the population in which the intervention is evaluated, or the mode of intervention or the type of behaviour being addressed, or do all of these distinct aspects have an impact? Taking into account only the outcomes of the small number of highest quality studies would not allow these sorts of questions to be addressed and in a comparatively sparse empirical literature such as this, these are questions which are of considerable importance in driving forward the search for effective interventions.

Outcomes for suicide

G.3 Defining outcomes very broadly on the basis of an increase or decrease in the rate or absolute number of suicide(s) based on whichever method of accounting the study authors used, outcomes for the 67 studies addressing completed suicide were as follows:

No change in completed suicide	36%
Suicide reduced (narrative report of authors only)	24%
Suicide reduced (statistically significant differences)	33%
Suicide increased (statistically significant differences)	<1%
Suicide not adequately differentiated from all-cause mortality	3%
Unable to evaluate – no, or too few suicides	3%

G.4 The one study demonstrating an *increase* in suicide following intervention (Oerlinghausen et al 1994) was a retrospective follow-up study of psychiatric patients treated with lithium. Within those studies providing only a narrative report of positive outcomes (that is, presenting no quantitative data to back up the textual report of positive outcomes), only one followed a qualitative methodology (Landers 1981). Outcomes for this study are tenuous, since they rely on generalising from a single case study of carbon monoxide poisoning to conclude that changes in carbon monoxide legislation may have an impact on suicide. Epidemiological studies provide support for this view, but the study as it stands is best seen as an exploration of the mechanisms by which this is achieved (providing practitioners with a lengthier period of time in which to intervene).

G.5 Two other qualitative evaluations (Etzersdorfer 1993, Owens et al 2004) report, respectively, a case study of treatment for depression and a psychological autopsy evaluating detection and treatment of depression. Neither study reports successful outcomes. Two other studies, also providing purely narrative accounts of successful intervention were RCTs. The remainder followed other quantitative methodologies. An evident difficulty with outcomes based purely on qualitative methods is the problem of establishing objective parameters within which to confirm outcomes. When quantitative studies also fail to provide adequate statistical analysis there are additional grounds for scepticism regarding the reliability of assumed outcomes.

G.6 The comparative rarity of suicide accounts for the lack of statistical analysis in fewer than half of the studies following a quantitative methodology but failing to present supportive analyses. One study, (Oyama et al 2004), which evaluated a community-based intervention programme for older people living in rural areas, did provide some statistical analysis supporting the author's conclusions in respect of outcomes for particular subgroups at particular stages in the study. However, the overall statistics presented did not appear to support the broader conclusions given by the author in the study text. Taking these issues into consideration, we have reasonable grounds to believe that around one third of the studies report potentially meaningful reductions in suicide. Tables G1 and G2 overleaf provide a summary of study outcomes for all specific interventions evaluated for the prevention of suicide.

Table G.1 Outcomes for Interventions to Reduce Suicide: Pharmaceutical

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Lithium				8
no comparator	4	1	1	
vs. divalproex	1			
vs. carbamazepine	1			
Clozapine				4
mathematical modelling study based on prescribing practice		1		
no comparator		1		
vs. olanzapine	1		1	
Fluoxetine				1
no comparator			1	
Risperidone				1
vs olanzapine		1		
Olanzapine				2
vs clozapine			(1 vs clozapine)	
vs risperidone		(1 vs risperidone)		
Escitalopram				1
vs placebo			1	
'SSRIs'				
no comparator	1			
vs tricyclic anti-depressants and other anti-depressants			1	
'Anti-depressants'				6
no comparator	2	1		
vs placebo			2 (+ 1 vs SSRI)	

Table G.2 Outcomes for Interventions to Reduce Suicide: Non-Pharmaceutical & Multi-Modal Interventions

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Suicide prevention centres	2		1	3
Restriction of access to means	4	1		5
Ongoing contact *(by letter, telephone, GP or support services)*	3	2		5
School-based prevention programmes		2	1	3
Prison-based prevention programmes		1		1
Programmes for military personnel		1		1
Programmes for the elderly		2	1	3
Other public health/educational programmes			3	3
Training health professionals		1	3	4
Treating for depression (any treatment)		1		1
Psychiatric in-patient treatment (any)			1	1
Integrated vs standard treatment			1	1
ECT			2	2
Neurosurgery			1	1
Palliative care for cancer patients		1		1
Multi-modal	3			3

G.7 The overview of interventions and outcomes provided in the above tables demonstrates that research effort evaluating interventions for the prevention of suicide has been spread too thinly over broadly distinct areas. Whilst around a third of *studies* report positive outcomes, support for individual *interventions* is diminished by the small number of studies addressing each distinct intervention and the equivocal nature of outcomes across the board. Only two approaches to prevention stand out as having a small but not negligible number of studies available, with largely unequivocal outcomes. These approaches are the restriction of access to means and maintaining ongoing contact with the suicidal person. Multi-modal approaches also seem promising, although on the basis of a slightly smaller number of studies and with the rider that the specific interventions combined within each study differ.

G.8 Approaches which have been evaluated in a number of studies with little evidence of efficacy include the training of health professionals (e.g. to recognise and treat depression) and a variety of institution-based and public-health oriented programmes. In the latter case however, the studies are again evaluating programmes which rarely contain the same components, so comparison across the full range of programmes may be misleading. The use of lithium, clozapine and 'anti-depressants' (taken as a composite of any anti-depressant drug given to participants) have all also been evaluated by a non-negligible number of studies. On balance, lithium appears the most promising of these pharmaceutical approaches. However, concerns must be raised in respect of one study (Oerlinghausen et al 1994) which reported an increase in suicide during lithium treatment. Notably given the fact that in one additional high quality study (Tondo et al 1998) increases in the risk of 'suicidal acts' compared to baseline were reported in the first year following discontinuation of lithium. The potential impact of clozapine and 'anti-depressants' evaluated as a composite is at best equivocal. Given the limited number of studies addressing each of the interventions listed and the diverse contexts in which interventions have been evaluated, positive outcomes must be treated with considerable caution, even as suggestions for promising avenues to pursue in further research into the prevention of suicide.

G.9 To explore further the pattern of outcomes, we compared the characteristics of studies reporting significant reductions in suicide with those reporting either neutral outcomes or increases in suicide. Studies with positive outcomes were marginally more likely to have used national statistics to establish suicide than other means (77% of studies with positive outcomes versus 51% with neutral or negative outcomes, $\chi^2=4.4$ one-sided $p<0.03$). This is not a function of sample size (there was no significant association between methods of establishing outcomes and sample size within this group of studies), but is in line with expectations based on the nature of official statistics (cf. Douglas 1967; Maxwell Atkinson 1978). There were no significant differences depending on whether studies were retrospective or prospective or whether outcomes were measured at discrete time points or were evaluated on a continuous basis across a period of time. Nor were there any significant differences in outcome when RCT designs were compared with other quantitative approaches. Since only three qualitative studies were identified it was not possible to compare across broader methodological categories.

G.10 Little can be established regarding the impact of participant demographics on study outcomes, for reasons given earlier. Neither ethnicity nor gender is sufficiently well differentiated within this group of studies to evaluate outcomes along even these broad demographic divides. Since the bulk of studies fell within the 'adult' (26-65) age group specified by the Research Advisory Group, little can be gauged regarding the impact of age on outcomes based on the priority age groupings as defined earlier. However, there *was* a significant correlation between the mean age of participants included in studies and the likelihood of positive outcomes ($r=0.49$ $p<0.01$), with outcomes more likely to be positive in studies with an older mean age of participant. It is of note that very few studies evaluating interventions to prevent completed suicide focus on the youngest age groups.

G.11 Given the fairly small number of studies addressing suicide and the wide spread of origins and approaches, other characteristics of the studies had to be compressed into very broad categories to allow meaningful comparisons. On this basis, there were no differences in outcomes between studies published recently and in earlier decades (2000s vs 1990s and pre-1990s combined); studies from different countries (US and Canada vs all other populations), studies addressing different modes of intervention (pharmaceutical vs non-pharmaceutical) or studies addressing different populations (general population vs psychiatric populations vs other populations). Considering *only* those studies which both started and ended in the same setting, there was a marginal difference between studies where intervention took place in the community and where it took place in more controlled settings, with outcomes for more controlled settings showing a greater likelihood of success ($\chi^2=3.63$ one-sided $p<0.05$), as would be anticipated on the basis of research addressing the control of other-directed aggressive behaviour (cf. Leitner et al 2006). Finally, whilst quantitative studies demonstrating positive outcomes were likely to be of higher methodological quality[23] than studies which failed to cite positive outcomes, this difference failed to reach significance.

[23] Our methods and rationale for judging the quality of included studies is outlined in some detail in Annex H ('Evidence from the Highest Quality studies'). Essentially, the comparison drawn here is between studies meeting median or higher values for overall quality, taking into account study design and the focus on suicide as an outcome.

Outcomes for attempted suicide

G.12 A total of 74 studies addressed attempted suicide as an outcome. Four of these studies failed to give sufficient details of this particular outcome to judge whether the intervention evaluated had been successful or not. Outcomes for the remainder of the studies are given below:

No change in attempted suicide	40%
Attempted Suicide reduced (narrative report of authors only)	14%
Attempted Suicide reduced (statistically significant differences)	44%
Attempted Suicide increased (statistically significant differences)	1%

G.13 The one study identifying an *increase* in attempted suicide (Leon et al 1999) was a prospective follow-up of fluoxetine treatment in patients with affective disorder. As with the earlier profile of studies addressing completed suicide, it is worth noting that only three of the ten studies which report a decrease in attempted suicide *without* reference to confirmatory statistical analysis are qualitative studies. These qualitative studies evaluated the use of naltrexone (Krupitsky et al 2001), DBT (Perseius et al 2003) and training for school personnel (Ross 1980) using single and multiple case studies and survey designs respectively. One additional qualitative study (Kuipers & Lancaster 2000) reported a reduction in the likelihood of attempted suicide following the provision of informal support to brain injured patients. Of the quantitative studies which, as was the case for completed suicide, form of the bulk of evidence available for interventions in attempted suicide, 41% are RCTs.

G.14 Tables G.3 and G.4 overleaf give a summary of outcomes for all specific interventions evaluated for the prevention of attempted suicide. The available research is spread over an even more diverse range of interventions than was the case for completed suicide and with the possible exception of treatment with clozapine, which is compared only against other active comparators, no interventions stand out as having a reasonable number of studies reporting unequivocally positive outcomes. Treatment with lithium again offers some promise on the basis of outcomes from three of five studies, but concerns regarding possible increases in suicidal behaviour for at least some sub-groups again argue for caution in the use of this treatment.

G.15 The number of studies addressing school-based intervention programmes (11) is substantially higher than for competed suicide, and five of these studies report decreases in attempted suicide as a consequence of the intervention, but set against this are six studies with no evidence of any reduction in repetition and which on the whole also use stronger measures of outcome (actual behaviour rather than scale-based report). Again it should be noted that the programmes themselves are not directly comparable. Amongst the psychotherapeutically oriented therapies, DBT appears most promising on the basis of the available evidence. As with completed suicide, ‘anti-depressants’ evaluated as a group find little support in the intervention literature, with all five trials (including two trials comparing anti-depressants with placebo) reporting no reduction in suicide attempts.

Table G.3 Outcomes for Interventions to Reduce Attempted Suicide: Pharmaceutical

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Clozapine				4
vs olanzapine	3			
vs 'traditional anti-psychotics'	1			
Olanzapine				4
vs clozapine			3	
vs risperidone			1	
Lithium				5
no comparator	1	1	1	
vs divalproex	1			
vs carbamazepine	1			
Divalproex				1
vs lithium			1	
Carbamazepine				1
vs lithium			1	
Paroxetine				2
vs placebo	1			
vs amitriptyline	1			
				1
Amitriptyline				
vs paroxetine			1	
Naltrexone				1
no comparator		1		
Fluoxetine				2
no comparator			1	
vs CBT / with CBT vs placebo			1	
'SSRIs'				1
no comparator	1			
'Anti-depressants '				5
no comparator			3	
vs placebo			2	

Table G.4Outcomes for Interventions to Reduce Attempted Suicide: Non-Pharmaceutical & Multi-Modal Interventions

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Suicide prevention centres	1			1
Restriction of access to means			1	1
Ongoing contact *(by telephone/by telephone vs rapid referral)*			2	2
School-based prevention programmes	4	1	6	11
Programmes for military personnel	1			1
Other public health programmes	1			1
Drug misuse programmes			1	1
Training health professionals or other key professions		1	1	2
Residential versus community treatment	2			2
Intermediate care management programme	1			1
Change in hospital protocol	1	1		2
Integrated treatment vs standard treatment			1	1
Provision of trained mental health services in rural areas			1	1
Psychoanalytically orientated partial hospitalization	1			1
Treatment for depression (any)		1		1
CBT	1		2	3
DBT (alone/versus client-cantered therapy)	2	1	1	4
Interpersonal psychotherapy			1	1
Interpersonal & social rhythm therapy (vs intensive clinical management)			1	1
Intensive inpatient psychotherapeutic approach			1	1
Bibliotherapy	1			1
Motivating visit to noncompliant patients	1			1
Neurosurgery	1			1
Token for re-admission			1	1
Multi-modal	2			2

G.16 Outcomes for attempted suicide, using the broad categories which were available for analysis, seem even less sensitive to characteristics of study design, intervention, setting and population than is the case for completed suicide. We found no association between the use of RCTs and other quantitative designs and positive outcomes (again the number of qualitative studies was too small to include in the analysis). Similarly outcomes were insensitive to whether study designs were prospective or retrospective and whether outcomes were measured using discrete or continuous follow-up. The recency of studies also had no impact, with studies published in the 2000s no more or less likely to record positive outcomes than studies published one or more decades ago.

G.17 There were also no differences between the modes of intervention we were able to compare (pharmaceutical vs other interventions); how outcomes had been established (formal hospital or other records vs self-report vs other means) or between the different populations and settings considered. As previously, the only meaningful demographic comparison which could be drawn was based on the mean age of participants in the sample and in this case there was no association between age and the likelihood of a positive study outcome. The sole study characteristic showing even marginal association with the likelihood of positive outcomes for attempted suicide was country of origin, with US and Canadian studies less likely to report a reduction in suicide attempts as a consequence of intervention in comparison to all other countries (42% versus 64% χ^2=3.7 $p<0.04$). However, in contrast to outcomes for completed suicide, study outcomes *were* associated with study quality. Positive outcomes were significantly more likely to be reported by studies meeting at least the median quality score for their design group (77 % of studies with positive outcomes fell into this category versus 53% falling below the 'cut-off' score assigned for quality, χ^2=4.54 $p<0.04$). This suggests that future improvements in design quality could potentially help in the identification of additional interventions with positive ouctomes.

Outcomes for self-harm

G.18 The number of studies evaluating outcomes for self-harm were substantially fewer than for either completed suicide or attempted suicide (N=44, 22% of all studies). The distribution of outcomes across studies was as follows:

No change in Self-Harm	32%
Self-Harm reduced (narrative report of authors only)	29%
Self-Harm reduced (statistically significant differences)	34%
Self-Harm increased (statistically significant differences)	4%

G.19 The two studies reporting statistically significant *increases* in self-harm following an intervention (Hopko et al 2003, Martinez et al 2005) both report on pharmaceutical interventions. The first study is an RCT comparing treatment with mianserin to treatment with either placebo or nomifeserine for people with borderline personality disorder, the significant increase in self harm was noted in those treated with mianserin. The second study reported on a case-control evaluation of SSRIs versus either tricyclic or other anti-depressants for people receiving their first prescription of anti-depressants. The significant increase in self-harm was noted in those treated with SSRIs.

G.20 As with both completed suicide and attempted suicide, narrative reports of outcomes were not wholly restricted to qualitative studies. Two quantitative studies of self-harm (one an RCT) also reported positive outcomes without supporting evidence from statistical analysis. The number of qualitative studies available for analysis was marginally higher in the case of self-harm (N=6) than in completed suicide or attempted suicide but again provided little opportunity for in-depth analysis of promising interventions, since only one of these studies (Perseius et al 2003ps) reported positive outcomes. This study, which is also referred to above in the context of attempted suicide, reported ten case histories of DBT for borderline personality disorder, with outcomes limited to self-report by the patients that therapy had reduced their self-harm. Of the quantitative studies, 67% (12 studies) followed an RCT design. Tables G.5 and G.6 overleaf summarise outcomes for all included studies evaluating outcomes for self-harm.

Table G.5 Outcomes for Interventions to Reduce Self-Harm: Pharmaceutical

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Clozapine				2
no comparator	1	1		
Venlafaxine				1
no comparator		1		
Mianserin				1
vs nomifeserine & placebo			1	
'SSRIs'				1
vs tricyclic anti-depressants and vs other anti-depressants			1	
Escitalopram				1
vs placebo			1	

Table G.6 Outcomes for Interventions to Reduce Self-Harm: Non-Pharmaceutical & Multi-Modal Interventions

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Ongoing Contact (postcard contact/ letter from GP inviting to consultation,)	1		1	2
Residential versus community treatment	2			2
Hospital management programme	2			2
Case management			1	1
General hospital admission versus discharge			1	1
Home based family intervention plus routine care (vs routine care alone)			1	1
Treatment before and after self-harm			1	1
Psycho-analytically-oriented partial hospitalization	1			1
Psychodynamic Interpersonal therapy	1			1
Dialectical Behaviour Therapy (alone/vs client-centred therapy	6			6
Brief manual-assisted cognitive therapy (MACT) vs TAU	1		2	3
CBT		1		1
DBT		1		1
Interpersonal psychotherapy			1	1
Hypnobehavioural treatment		1		1
Stress inoculation training		1		1
Developmental group psychotherapy		1		
Behavioural activation treatment for depression (BATD)			1	1
Bibliotherapy		1		1
Other Psychosocial/psychoeducational intervention		1		1
Differential reinforcement		1		1
Token economy/time-out		1		1
Nurse training		1		1
Empowerment-based parent education groups			1	1
Maintenance ECT		1		1

G.21 A number of points can be made regarding the above tables. The most striking is the evident focus on psychotherapeutic rather than pharmaceutical intervention. This is in sharp contrast with the distribution of studies for completed suicide and attempted suicide. Since there are far fewer studies in total addressing self-harm and yet the range of interventions evaluated remains equally wide, the available evidence for any given intervention in this context is even more severely limited than in the context of completed or attempted suicide. The single most promising intervention taking the studies overall, without regard to quality or other considerations is DBT. All other interventions identified in the included studies have been evaluated by one, or at most two, studies. Other distinctions between the profile of studies for self-harm and the profile for suicide and attempted suicide are the lack of broad-based public health or educational interventions evaluated. Finally, although this is evidenced by only two studies, it is worth noting that behaviour therapy has been evaluated (with successful outcomes) in the context of self-harm in the studies we have identified, but has not been evaluated in the context of other forms of suicidal behaviour or of suicidal ideation.

G.22 In comparing across study characteristics, the profile for self-harm broadly matched that of completed suicide and attempted suicide, with positive outcomes significantly associated with very few study or participant characteristics. Study design did impact to some extent (again there were too few qualitative studies to include these in the equation) in that studies reporting positive outcomes were more likely to follow an RCT design than any other quantitative method (53% versus 45% χ^2=6.38 p<0.04). Other design characteristics, such as prospective versus retrospective follow-up or continuous versus discrete assessment of outcomes, had no significant impact. Date of publication, country of origin, population, setting and mode of intervention also had no impact on outcomes.

G.23 Demographic variables were again too poorly reported to draw comparisons between 'successful' and 'unsuccessful' interventions. However, studies with positive outcomes were marginally more likely to include participants recruited from the 25-65 age group than participants recruited from either the youngest or oldest age categories (73% versus 41% χ^2=4.05 one-sided p<0.04). This is a characteristic of evaluations commonly reported in intervention research (cf. Hahn et al 2005). The greater likelihood that RCTs would report positive outcomes was also in this instance reflected in the marginally greater likelihood that studies reporting positive outcomes reached at least median quality criteria for their design category (73% of studies with positive outcomes versus 41% of studies not reporting positive outcomes, χ^2=4.05 one-sided p<0.04). Again this suggests that improvements in study quality may help in identifying additional interventions with some promise of efficacy.

Outcomes for suicidal ideation

G.24 Nearly half of the studies we identified for inclusion in the review (N=94, 47%) evaluated outcomes for suicidal ideation. Three studies failed to clarify whether outcomes were positive or not. For the remainder, the distribution of outcomes was as follows:

No change in suicidal ideation	35%
Suicidal ideation reduced (narrative report of authors only)	21%
Suicidal ideation reduced (statistically significant differences)	43%
Suicidal ideation increased (statistically significant differences)	1%

G.25 The one study identifying a significant *increase* in suicidal ideation following an intervention (Cunningham-Owens et al 2001) was an RCT focussed on a community-based educational intervention for people with schizophrenia. The majority of the studies using quantitative designs (57%) also followed an RCT methodology. Studies using suicidal ideation as an outcome measure accounted for half of the qualitative designs (N=13, 50%) included in the review. In contrast to outcomes for the suicidal behaviours outlined above, this provides a reasonable number of qualitative studies (N=11) with positive outcomes to analyse.

G.26 As with the qualitative studies referred to earlier (two of which also report outcomes in this context), the quality and depth of the material available is, however, disappointing. Six of the studies were case studies, one (Perseius et al 2003) presented what could be regarded as a brief content analysis, the remainder followed no specific qualitative methodology, instead providing a narrative overview of survey or interview responses, relying on small numbers of participants, or on available audit and other data only peripherally linked to suicidal ideation. The interventions and populations addressed were also too diverse to allow for any comparative analysis across the qualitative studies.

G.27 In summary, the nature of many of the studies available does not provide firm support for the interventions evaluated. Taken at face value, positive outcomes were reported for the following interventions: occupational therapy, naltrexone; intervention by psychiatrists *o*r by friends and family members *in preference to* intervention by GPs for high risk groups; anti-depressant treatment for people with major depression; short-term hospitalization for 'non-compliant' patients, DBT for people with borderline personality disorder, psychoanalytic psychotherapy and community or school-based programmes for adolescents and young adults and Magnetic Field Therapy for depressed patients with Multiple Sclerosis. These and other study outcomes for all interventions evaluated in the context of suicidal ideation are set out in Tables G.7 and G.8 overleaf. It is important to note that the positive outcomes reported by study authors in the context of these studies can be regarded as *preliminary* outcomes at best. Before they can be regarded as in any way definitive, further evaluation using more robust methodologies is required.

Table G.7 Outcomes for Interventions to Reduce Suicidal Ideation: Pharmaceutical

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Olanzapine				1
with adjunctive valproate vs with adjunctive lithium	1 (under both conditions)			
Fluoxetine				4
no comparator	1			
vs CBT/with CBT vs placebo	1			
vs imipramine			1	
vs venlafaxine			1	
Imipramine				2
vs fluoxetine	1			
vs fluvoxamine			1	
Moclobemide				1
no comparator	1			
Fluvoxamine				
no comparator	1			3
vs imipramine	1	1		
Duloxteine				1
no comparator	1			
Ketamine				1
no comparator	1			
Sertraline				3
no comparator	2	1		
Paroxetine				2
vs placebo	1			
vs amitriptyline	1			
Nortriptyline				1
no comparator	1			
Mianserin				1
vs amitriptyline			1	
Amitriptyline				2
vs paroxetine			1	
vs mianserin			1	
Viloxazine				
no comparator		1		1
'Anti-depressants'				
no comparator		1		2
vs placebo			1	
Naltrexone				1
no comparator		1		
Lithium *no comparator*			1	1

Table G.8 Outcomes for Interventions to Reduce Suicidal Ideation: Non-Pharmaceutical & Multi-Modal Interventions

Intervention	Positive Outcomes Supported by Statistical Analysis (N of studies)	Positive Outcomes Supported by Narrative Report only (N of studies)	No evidence of Positive Outcomes (N of studies)	*Total N of Studies*
Suicide Prevention Centres	1			1
Restriction of Access to Means	1	1		2
Ongoing contact (telephone)/telephone vs rapid referral	1		2	3
Telephone intervention style (Non-directive Rogerian vs directive)		1		1
School-based prevention programmes	5	2	6	13
Community-based programmes		2		2
Drug misuse treatment programme			1	1
Programmes for military personnel		1		1
Public health/educational interventions	1		1	2
Training of health professionals	1	1	2	3
A&E intervention	2			2
Change in hospital protocol		1		1
Integrated treatment versus standard treatment			1	1
General hospital admission versus discharge			1	1
Intervention by psychiatrists and/or family & friends vs GPs	1			1
Routine care plus family intervention vs routine care	1			1
Meeting treatment preferences of suicidal patients		1		1
Short term hospitalization in a crisis centre		1		1
Treatment matched or mismatched to cognitive distortion			1	1
Proactively involving patient in therapy			1	1
CBT	1		3	4
Psychodynamic interpersonal therapy	1		1	
Problem solving therapy	1		1	2
DBT (alone/versus client-centred therapy)	2	1		3
Psychotherapy	1			1
Psychoanalytic psychotherapy		1		1
Problem-solving and adaptive coping			1	1
Developmental group psychotherapy			1	1
Writing therapy (Writing with cognitive change or exposure)			1	1
Electromagnetic field therapy		1		1
Occupational therapy		1		1
Empowerment based parent education groups			1	1
Multi-modal therapies	2		1	3
Doing nothing			1	1

G.28 The high proportion of studies addressing suicidal ideation is matched by the diverse range of interventions evaluated. Although around half of the studies (N=45) focussed on suicidal ideation alone, without reference to suicidal behaviours, the nature of the interventions evaluated broadly matched the profile for suicidal behaviours as outlined above. The range of individual pharmaceutical interventions evaluated was more diverse than that noted in connection with suicidal behaviours, but again focussed, predictably, primarily on various forms of anti-depressant. None of the pharmaceutical interventions evaluated have a sufficient number of studies, in particular high quality studies, demonstrating unambiguously positive outcomes to make any confident assertion regarding their likely efficacy. The most promising outcomes, with all available studies reporting reductions in suicidal ideation following the intervention, are for fluvoxamine (two studies) and sertraline (three studies).

G.29 The one form of non-pharmaceutical intervention evaluated by a substantive number of studies (N=13, school based intervention programmes) shows considerable ambiguity in outcomes. Again, this may be due to the diversity of distinct programme components addressed, but nevertheless this fails to provide evidence-based grounds on which to recommend strongly such programmes. Aside from the restriction of access to means, which again is supported by both studies evaluating its efficacy, all of the non-pharmaceutical interventions evaluated by more than a single trial show the same degree of ambiguity.

G.30 The age categories specified by the Research Advisory Group were better represented in the context of studies for suicidal ideation than for suicidal behaviour. However, no significant association between either these age categories or the mean age of study participants and reported outcomes was apparent. Other demographic characteristics were again too poorly reported to allow any analysis of possible associations between participant characteristics and study outcomes. Background characteristics of the study, specifically date of publication, country of origin of participants and how suicidal ideation had been established (narrative self-report vs scale-based self-report vs other means) also failed to show any significant association with the likelihood of positive outcomes. Study design did impact to some extent, with, as previously, positive outcomes more likely to be reported by RCTs than by other quantitative designs (56% versus 41% χ^2=7.89 p<0.02). Qualitative studies were, as previously, excluded from the design based analysis due to small numbers. No association was shown between outcomes and whether follow-up was continuous or discrete, prospective or retrospective.

G.31 In contrast to suicidal behaviour, the mode of intervention *did* have a significant impact on outcomes for suicidal ideation. Studies evaluating pharmaceutical interventions were significantly less likely to report positive outcomes than studies evaluating non-pharmaceutical interventions (36% versus 64.1% χ^2=4.08 p<0.04). Also in contrast to suicidal behaviour, outcomes were population-dependent. Studies focussed on psychiatric populations were more likely to report positive outcomes than studies focussed on other populations (61% versus 38% χ^2=7.49 p<0.01). Study quality also had a significant impact on outcomes for quantitative studies, independently of whether designs were RCT or non-RCT. Positive outcomes were far more likely to be reported by studies achieving at least the median quality score for their design category (82% versus 18% χ^2=4.69 p<0.05). The consistency of this finding across different modes of behaviour is promising, in that it supports the view that improvements in study design may have the potential to allow identification of additional interventions with positive outcomes.

Comparing across the types of suicidal behaviour

G.32 Outcomes for completed suicide and, to a lesser extent, for suicidal ideation were evaluated in isolation from outcomes for other suicidal behaviours by a substantial proportion of studies (N=40 and 45 respectively). In contrast, outcomes for self-harm and attempted suicide tended to be addressed in tandem either with each other or with completed suicide or suicidal ideation. Only 11 and 13 studies respectively focussed solely on outcomes for either self-harm or attempted suicide and presented these separately rather than as a composite measure such as 'suicidal acts' or 'suicidal behaviour'. The failure of studies to differentiate between different aspects of suicidal behaviour in reporting the outcome of interventions makes direct comparison between the impact of interventions on these diverse behaviours difficult. Looking only at those studies which focussed on a single outcome, reliably established ***positive*** outcomes were as follows:

Suicidal ideation	47% (21 studies)
Self-Harm	18% (2 studies)
Attempted Suicide	38% (5 studies)
Completed Suicide	37% (15 studies)

G.33 The relatively low likelihood of success reported for studies evaluating outcomes specifically for self-harm is mirrored in the outcome of a regression analysis we carried out using all 200 studies. This analysis evaluated the relative contribution of key features of the studies to the overall outcome of whether or not a study reported a reduction in the behaviour evaluated following the intervention. Outcomes, for the purposes of this analysis, were judged to be positive if reductions in the behaviour were confirmed *either* by reference to statistical analysis *or* purely on the basis of the narrative report of study authors. This allowed us to include both quantitative and qualitative studies in the regression analysis. The characteristics of the studies entered into the initial regression equation were chosen to reflect issues of importance both to research and to clinical practice. Specifically, we took into account major features of study design (whether a study was quantitative or qualitative and whether it followed an RCT or other design, with the latter coded as zero for qualitative studies); the mode of intervention (pharmaceutical; psychotherapeutic/psychosocial; service-delivery); the population (general population vs other, psychiatric population vs non-psychiatric population) and setting (community vs other setting) in which the intervention was evaluated and the specific focus of the study (whether the reported outcomes referred to completed suicide, attempted suicide, self-harm, suicidal ideation or a combination of suicidal behaviours, the latter implied by terms such as 'suicidal acts' or 'suicidal behaviours').

G.34 The regression analysis was a stepwise logistic regression, with all dependent and independent variables coded as zero or one. Table G.9 overleaf sets out the percentages of studies falling into a category included in the regression equation. The Beta coefficients are a measure of the relative importance of each variable, and the significance levels indicate whether their contribution to outcomes was statistically significant or not. One study was excluded from the analysis as data for key variables were missing. To avoid further loss of power, the variable for setting (community versus other setting) was coded as 'community' in studies for which settings varied across time, provided the study either started or ended in the community.

Table G.9 Regression analysis to predict overall outcomes

Study characteristic	N of studies	% of studies	Beta	Significance
Quantitative design	173	86.5	3.18	P<0.0001
RCT	73	36.5	0.78	NS
Pharmaceutical intervention	61	30.5	-0.47	NS
Psychotherapeutic/psychosocial intervention	33	16.5	0.65	NS
Service delivery intervention	21	10.5	1.23	NS
Focus on general population	32	16.0	0.61	NS
Focus on psychiatric population	93	46.5	1.50	P<0.05
Focus on people presenting with self-harm/suicidal behaviour	61	30.5	1.26	NS
Focus on community setting	108	54	0.49	NS
Focus on Completed suicide	67	34	-1.14	NS
Focus on attempted suicide	74	37	-0.37	NS
Focus on suicidal ideation	94	47.5	-0.68	NS
Focus on self-harm	44	22.0	-1.53	P<0.02

G.35 In total just under one third of studies (26%) reported positive outcomes for at least one measure of suicidal behaviour or suicidal ideation. The outcomes in Table G9 provide a clear message regarding the characteristics of study design and focus which contribute independently to the likelihood of positive outcomes. Quantitative study designs (the majority of which were of substantially better quality than the available qualitative material) were more likely to result in positive outcomes for the evaluation of an intervention. Evaluations of interventions targeted at psychiatric populations were also significantly more likely to result in positive outcomes and studies focussed on self-harm, as opposed to other aspects of suicidal behaviour, were significantly *less* likely to result in positive outcomes.

G.36 Other associated factors not entered into the equation (for example the fact that quantitative study designs were more likely to use scale-based outcome measures than qualitative study designs) may have an impact here. Nevertheless, the regression analysis is informative. One key point to note is that, controlling for other factors, neither the broad mode of intervention nor the settings in which interventions were evaluated contributed to the final equation. The important issues were the population in which the intervention was evaluated, the form of behaviour which the intervention was intended to address and the use of a quantitative rather than a qualitative study design (in this context a quantitative design is likely to be a proxy for the overall quality of study design). The outcome of the regression equation therefore supports recommendations that the quality of future research is improved and that research urgently addresses the need to find effective interventions for people who self-harm and for people who are experiencing suicidal behaviour or suicidal ideation but do not have mental health problems.

The economic costs of intervention for suicidal behaviour and suicidal ideation

G.37 One of the objectives of the current review was to assess the available information on the cost and/or cost effectiveness of interventions. Unfortunately, only three of the studies included in the review addressed or refer to this issue (Vandersande et al 1997, Tyrer et al 2004, Duggan et al 2003). Since the efficacy of any given intervention clearly remains to be confirmed, the lack of focus on cost effectiveness is not surprising. The cost effectiveness of an intervention is inherently tied to the extent to which it produces positive outcomes. Since the literature is still at the stage of attempting to establish which interventions can be regarded as effective in any unambiguous way, it may be regarded as premature to begin evaluating cost effectiveness.

G.38 Further cost effectiveness studies are likely to follow as researchers begin to feel more confident regarding the clinical benefits of particular interventions. To draw on the limited cost-effectiveness evaluations currently available, a mathematical modelling study (Duggan et al 2003) funded by Novartis Pharmaceuticals reaches the conclusion that if we assume clozapine to be cost-neutral, the potential saving per life saved of prescribing clozapine for treatment resistant schizophrenia would be £5108. Assuming that clozapine achieves a 10% reduction in annual support costs, the net saving would be £8.7 million per year, with additional savings potentially deriving from an estimated reduction in the number of acute hospital beds used each year of 167. The authors conclude on this basis that clozapine is cost effective. Both the assumption of a cost-neutral scenario and the assumptions of percentage efficacy are, however, rather optimistic, notably the latter assumption, given the somewhat equivocal outcomes for clozapine demonstrated by the studies included in the current review.

G.39 A further study, relying on actual outcomes rather than mathematical modelling (Tyrer et al 2004, POPMACT study) presents data regarding the cost-effectiveness of Manual Assisted Cognitive Behaviour Therapy (MACT) in the treatment of recurrent self-harm. It is worth noting that the study showed no significant difference between those repeating self-harm in the MACT group than in the treatment-as-usual (TAU) group, so the practical value of estimates of cost-effectiveness for this approach is debateable. However, the authors conclude that the treatment was 10% cheaper than TAU. The implications for clinical decision-making are, however, more complex than this simple message suggests. The study distinguished between patients with and without borderline personality disorder. Whilst the authors report that the mean cost of MACT vs TAU over 1 year did not differ between BPD and non-BPD patients (BPD cost of MACT £14,524 per person, cost of TAU £15,665/non-BPD MACT £12,618, TAU £13,331), the mean cost of treating BPD with either (£15,081) was significantly greater than treating non-BPD patients (£12,985, $p<0.004$). No differences in cost between the treatment of BPD and other personality disorders were noted. The separation of the available cost data by disorder in the only pertinent tables in the report also means that the cost differences cited are not available to the reader as absolute figures for further consideration.

G.40 The final study referring to issues of cost effectiveness (Vandersande 1997ps) provides only very limited speculation on the likely cost effectiveness of an intervention. The study itself relates to an intensive in-patient and community intervention following attempted suicide, drawing comparisons with routine care. In respect of clinical efficacy, the authors conclude that despite intensive intervention suicide attempts were not reduced in comparison with routine care and the number of days in in-patient psychiatric care was also not reduced. The issue of cost is only raised in respect of the increased contact with services identified for the experimental group The authors simply note that the cost implications of this would be slight, but provide no data to support this assumption. No specific evaluation of cost is carried out and since the intervention was not effective it is unclear that any further exploration of costs would be justified at this stage.

ANNEX H DETAILS OF THE 'HIGHEST QUALITY' EVIDENCE

Methodological and 'Quality Control' issues

H.1 Randomised controlled trials are regarded as the 'gold standard' method for the evaluation of interventions for the simple reason that aspects of their design help to control for the effects of error variation and bias. Many current systematic reviews, including the bulk of Cochrane reviews, use this fact to rationalise a decision not to include studies *other* than RCTs in their evaluation. The majority of systematic reviews, Cochrane or otherwise, even where they include other quantitative designs exclude any qualitative primary study following the reasoning that whilst methods of quality control for quantitative studies are comparatively well established, we have few guidelines with which to evaluate the methodological quality of a qualitative study. This is in fact overstating the case, since many of the principles adhered to by well-conducted qualitative studies have been explored in some detail and are well understood within the research communities employing these methodologies. A case in point is the extensive methodological work which has been undertaken in respect of Grounded Theory (Glaser & Strauss 1967).

H.2 The above notwithstanding, the quality of quantitative and qualitative studies cannot be directly compared in any very straightforward fashion, since quantitative research inherently relies on the 'objectivity' provided by, for example, statistical analysis, whilst qualitative research remains inherently subjective. The ideal use of the methodologies would be in tandem, since they are best suited to addressing quite distinct concerns. In the current context, it is clear that the methodologies have been used interchangeably and this represents something of a lost opportunity. The majority of the qualitative studies included in this review have sought to establish conclusively that changes in the behaviour of individual or groups have occurred. Since the methods used are inherently subjective it can never be conclusively determined from these studies that this is actually the case.

H.3 Sadly, very few qualitative studies to date have taken advantage of the main benefits of a qualitative approach to provide an account of the 'lived experience' of interventions from the viewpoint of either clients or practitioners , or to explore the issues raised by intervention, for example, adverse drug-related events, the impact on friends and relatives and so on, at a deeper level. The ideal for future research would be to attach in-depth qualitative research following a well-established methodology to large scale quantitative studies which have the statistical power to establish outcomes objectively but struggle to elucidate either the perceptions of the client or the perceived or actual causes behind the success or failure of an intervention.

H.4 Returning to the issue of measuring 'quality', many of the basic principles which apply to randomised controlled trials in fact apply also to the bulk of quantitative methodologies. This is a point which seems to have been missed by reviewers who choose to *exclude* quantitative studies other than RCTs on the grounds that their quality cannot readily be evaluated. Whilst, in the specific context of evaluating an intervention, a well conducted single-group follow-up is not on a level playing field with a well-conducted RCT, certain core principles apply equally to both methodologies. Including all designs but controlling for overall quality with reference to the 'core principles' avoids the problem of, in effect, favouring even a very poorly conducted RCT over a well designed study following an alternative quantitative methodology.

H.5 A final point of relevance to the quality control decisions taken in this review relates to the issue of 'quality scores'. It has become increasingly common in systematic review methodology to rate studies on the basis of a 'total quality score', generally derived from existing scales such as the Jadad scale (cf. Moher et al 1996). Despite the 'rule of thumb' purposes for which these scales were developed, they are now commonly treated as if they are equivalent to psychometric scales, in short that a score of '2' is in some real sense twice the quality value of a score of '1'. This entirely misses the point of the nature of the items contained in the scales. The individual items measure qualitatively different aspects of study design. The value of 'blinding' for example (where either the participant or investigator or both are unaware of which intervention a participant is receiving) is that it has the potential to reduce the risk of bias introduced by the preferences or observations/speculations of those conducting or taking part in the trial. In contrast, the benefits of randomisation are that it reduces error variance which may be introduced by, for example, the traits shown by participants which correlate with outcomes but which are *not* directly connected to the intervention. Summative scores adding points for blinding and points for randomisation are therefore meaningless *except* as a rough guide to how many potential sources of bias have been controlled for in a study and they should be approached in this way.

H.6 It remains a debateable issue which of the various possible design flaws carries the greatest weight. Where there is a need to inform intervention practice, as in the case of the current review, it is also true that quality judgements are of greatest practical value when they are seen as relative rather than absolute. Reaching the conclusion that no studies meet the ideal design and therefore there is no evidence for any intervention is not helpful, although it may be true in the strictest sense. A more useful approach in pragmatic terms is to identify the messages which can be taken from the best quality studies we currently have available, however poorly designed these may be – with the caveat that their limitations should be recognised.

H.7 Taking the above points into account, we have used the following strategy for evaluating the relative quality of the available material:

Qualitative studies are judged separately from quantitative studies and on the basis of their own individual merit (including whether they follow a well-established methodology) with outcomes presented separately

Quantitative studies are evaluated on the basis of whether the following key aspects of study design are adhered to:

- Adequate sample size to evaluate outcomes
- Low drop-out rates
- Randomisation (of selection and/or allocation of participants)
- Blinding (of participant, investigator or both)
- Control for fidelity of implementation of the intervention
- Baseline evaluation of outcome measures
- Intention-To-Treat analysis
- Number of outcome measures used
- Placebo control (direct or by comparison with equivalent non-participating groups)
- Washout (participants beginning a study having previously been without medication or other treatment for a period preceding the study start point)

For studies involving the direct comparison of two or more groups the following additional quality markers are used:

- Equal group size at baseline
- Equality of groups at baseline on relevant outcome and demographic measures

H.8 To draw comparisons between studies we use a 'total quality score' for pragmatic reasons, since individual in-depth evaluation of every study would not be feasible in a review taking into consideration 200 studies, *but* we would argue for caution in the over-interpretation of these scores, as they provide a rough guide to the number of potential sources of error in the design of a study only. Taking the scores as a means of identifying which studies are of the 'best' quality relative to the other studies available in each context (evaluation of interventions for suicide versus for self-harm etc.) we compare each study's score to the median total score for that group of studies, and use as a cut-off for 'highest quality' whether or not studies match or exceed the median total score for their group. Hence, the 'highest quality' studies evaluating interventions for self-harm will be those quantitative *and* qualitative studies matching or exceeding the median 'total quality score' for all studies evaluating outcomes for self-harm and adopting the same broad methodological stance. This having been said, in presenting outcomes for the 'highest quality' quantitative and qualitative studies identified we give greater credence to those studies which provide well conducted statistical analyses supporting the conclusions reached by their authors.

Quality profile of the studies as a whole

H.9 To inform future research in this field, we will briefly consider the profile of individual 'quality markers' for the studies taken as a whole. For this overview, we combine together qualitative and quantitative studies, since although the fundamental rationale behind the two methodologies is distinct, in respect of their ability to answer the question of whether or not an intervention works, the same principles apply:

H.10 **Sample size:** This impacts on the ability to detect changes where these occur. Clearly, the sample size required to detect a difference in the rate of completed suicide is rather different to that required to detect a change in self-harm since the former behaviour is relatively rare. This aside, the general profile of the included studies suggests that sample size is an issue which the literature has taken on board. The majority (55%) of studies reported initial sample sizes of above 100 and one fifth (20%) reported initial sample sizes of 500+. This again contrasts favourably with equivalent research in the area of other–directed violence (which is subject to the same problem of detecting comparatively 'rare' behaviours). The sample size of included studies also tracks the incidence of the behaviours studied appropriately, with studies using suicide as an outcome measure significantly more likely to report sample sizes of 500+ than studies with alternative outcome measures (χ^2=18.3 p<0.001).

H.11 **Drop-out:** This impacts on the representativeness of final outcomes, in particular where an intention-to-treat (ITT) analysis is not presented. Retention of participants showed a rather split distribution, with a comparatively high proportion of studies reporting 100% retention (38%) but a rather higher proportion losing a third or more of their participants to follow-up (46%). This profile was not a function of either the mode of intervention focussed on or of the participant population or setting. However, drop-out tended to be higher in studies focussed on interventions for suicide (51% of studies lost one third or more of participants to follow-up compared to 43% in other studies, χ2=7.03 p<0.03, this is not a function of loss due to mortality).

H.12 **Randomisation:** As noted earlier, randomisation controls for error variance relating to participant characteristics. Again, in comparison to the literature on other-directed violence the literature on suicidal behaviour and ideation seems to have taken on board the need for randomisation, with just under half (43%) of studies reporting random selection and/or allocation of participants. Again, there was no significant association between randomisation and the mode of intervention, population or setting addressed by the studies, but there was an association with a focus on completed suicide, with 72% of studies evaluating interventions for suicide failing to randomise either selection or allocation of participants, compared to 49% of studies addressing other objectives (χ^2=9.05 p<0.004).Conversely, studies addressing suicidal ideation appeared more willing to randomise (54% of studies on suicidal ideation versus 34% of studies focussed on other behaviour χ2=7.69 p<0.001)

H.13 **Blinding:** Blinding acts to reduce bias introduced by either the participant or the investigator and is an aspect of study design which future studies in this field could improve on. The majority of studies (79%) failed to carry out even single-blind procedures (or to report on these if they had done so). Whilst in part this is a function of the difficulty of 'blinding' for

complex interventions in open settings (programme-based interventions in community settings were for obvious reasons the least likely to blind to outcome χ^2 10.5 $p<0.005$) it can be argued that even in such conditions it is still possible to blind investigators to allocation in order to reduce bias at the data analysis stage. Furthermore, although pharmaceutical studies, in which blinding is a comparatively straightforward procedure, were significantly more likely than other studies to blind ($\chi 2=15.9$ $p<0.001$), the majority of these studies (62%) also failed to blind either participants or investigators. No distinctions on the basis of population or setting were noticed, but, as with randomisation, studies focussed on suicidal ideation were more likely to use blinding (29% versus 13%, $\chi^2=7.0$ $p<0.009$).

H.14 **Fidelity of implementation:** This ensures that outcomes are due to the impact or otherwise of the intervention as it is intended to operate, rather than due to implementation failure. Few studies in this field appear to address this issue (83% of studies failed to provide any evaluation of the fidelity of implementation). Again, there were no differences between studies evaluating different modes of intervention, or different populations or settings in this respect. However, studies evaluating interventions for suicide were significantly less likely to explore the fidelity of implementation of their interventions than studies addressing other outcomes (6% versus 23%, $\chi 2=9.06$ $p<0.001$).

H.15 **Baseline Evaluation:** This provides a check on the base rate of the outcome measure in the participant group(s). As such, it provides both a control for initial differences between groups where more than one group is included in a study and a means of assessing the true clinical impact of the intervention on the outcome measure (a high percentage reduction in an already very rare behaviour gives only a spurious indication of efficacy). The majority of studies (57%) did provide baseline figures for the incidence of the behaviour they addressed. Evaluation of baseline figures was not associated with mode of intervention, population or setting, or the form of suicidal behaviour evaluated.

H.16 **Intention-To-Treat (ITT) Analysis:** This provides a control for the 'real world' value of the outcomes, as well as reducing certain biases, by ensuring that people who drop out of the study, for whatever reason, are counted as 'treatment failures'. The majority of studies did provide an ITT analysis (53%). No associations were noted between the likelihood of doing so and either the population of interest, the setting or the mode of intervention. However, in respect of the behaviours focussed on, studies addressing attempted suicide were significantly less likely to provide an ITT analysis. 57% failed to provide such an analysis compared to 40% of studies with a focus on the other behaviours considered ($\chi^2=5.03$ $p<0.03$).

H.17 **Number of outcome measures:** This is evaluated in an attempt to control for 'fishing trip' approaches to outcome evaluation, in which a diverse range of distinct measures are applied in the hope that at least one measure will provide a positive outcome. Statistical controls can be put in place if it is necessary to use a broad range of measures, but since virtually none of the studies included made any attempt to address this issue, a large number of measures can be taken as a simple estimate of the likelihood of a bias towards positive outcomes. The mean number of measures used in the studies was 4, with a median of 3. The range, however, was quite extensive, stretching from 1 to 39.

H.18 Nearly half of the studies (44%) used at least four separate outcome measures, suggesting that there is some room for bias towards positive outcomes to creep in here, notably given that, for outcomes other than suicide, it was common for studies to use standardised self-report scales. A not insignificant number of studies used three or more different standardised or 'in-house' scales to measure the same behaviour. The biggest 'offenders' in this context were studies focussed on psychotherapeutic or psychosocial interventions. Evaluations of pharmaceutical interventions on the other hand were significantly more likely to use only one or a small number of outcome measures (69% compared to 50% of other studies χ^2=5.88 p<0.002).

H.19 Population focus also impacted on this measure of bias, with studies carried out on the general population far more likely to restrict the number of outcome measures used to no more than 3 (75% versus 52% in other populations, χ^2=5.87 p<0.05). Studies focussed on completed suicide also tended, for obvious reasons, to use far fewer outcome measures, 75% using three or fewer measures (χ^2=13.1 p<0.001 in direct comparison with 'any other focus') in comparison to 48% of studies focussed on attempted suicide, 40% focussed on suicidal ideation and 36% on self-harm. Whilst this assessment is based on the number of *all* main outcome measures (including, for example depression), even studies focussed exclusively on suicide quite commonly found a number of alternative ways of measuring outcome, for example via different interpretations of the time to completed suicide (from start-point, from leaving hospital, from re-admission etc.).

H.20 **Placebo comparators:** The true measure of any intervention is whether it achieves more than doing nothing at all. For ethical reasons it is understandable that researchers in this field are reluctant to assign participants to a placebo condition (90% of studies used active comparators only). However, an alternative ethical issue is raised if placebos are *not* used, notably where interventions may have adverse outcomes. Evaluations based on an active comparator alone preclude researchers from establishing that in fact, as may be the case, clients are better off without *either* active intervention. This is an issue which urgently needs to be addressed, notably in the context of pharmaceutical trials, where it is well established that the compounds most commonly evaluated (drugs acting on the serotonin or dopamine pathways) can have a broad range of adverse outcomes. Whilst pharmaceutical studies were significantly more likely to use a placebo comparator, fewer than one third did so (28% versus 1% in other studies χ^2 34.5 p<0.001). Providing a convincing placebo comparator for multi-modal or complex interventions is difficult to say the least and in the case of single group studies complex designs are required to compare placebo with active intervention. Nevertheless, where placebo comparison *is* possible it should more commonly be used.

H.21 **Washout:** An adequate period without alternative intervention prior to the start of a study avoids the complication that prior (or in the case of many studies in this context *ongoing*) treatment may be confounding outcomes related purely to the intervention of interest. It is worth noting that a 'washout' period can apply to psychological and other therapies as well as to pharmaceutical interventions. Again, it is understandable that for ethical reasons researchers are unwilling to remove a participant from therapy they are already receiving (95% of studies failed to include a washout period or failed to report on such a period if it was instituted). However, this is a significant problem as without controlling for the impact of other recent or ongoing interventions, outcomes cannot be directly attributed to the intervention being evaluated. Pharmaceutical studies were the only studies included in the current review which addressed this issue and reported including a washout period, yet even in the case of these studies only 15% referred to washout and, of these studies, the washout period was followed, during the course of the study, by a resumption of prior treatment for the participants! The number of studies using washout is too small to allow for any further analysis by study focus, population or setting.

H.22 **Equality of group size at baseline (Group comparison studies only):** This and, to an even greater extent, the control for key differences between groups at baseline addressed below, are key elements in a strong study design for group comparisons. They ensure that any difference in outcomes is due to the intervention and not to group differences which are unrelated to the intervention. To control for sample size, we evaluated group size differences at baseline as a percentage of total sample size. The majority of studies reported differences in the size of groups at baseline (42% reported differences equivalent to or greater than 10% of total sample size, primarily due to pragmatic constraints on sample recruitment). Pharmaceutical studies were more likely to report comparatively large (greater than 10%, commonly greater than 30%) differences in group size at baseline (52% versus 38% in other studies $\chi^2=6.05$ $p<0.05$). Similarly, studies addressing completed suicide were more likely than other group comparison studies to report relatively large differences in group size at baseline (64% versus 34% in others studies $\chi^2=12.3$ $p<0.003$). Studies focussed on suicidal ideation were less likely to do so (33% versus 53% $\chi^2=6.47$ $p<0.04$). No other differences in terms of population focus or setting were noted.

H.23 **Equality in outcome measures and demographic characteristics at baseline (Group comparison studies only):** This issue is of particular concern and should be addressed in future research studies. The majority of studies (66%) either failed to evaluate or to report baseline values for the outcome measure used, or evaluated these and found groups to be significantly different on either the main outcome of interest or on demographic variables which may have impacted on outcomes. Few studies went on to control for such differences in their analyses. Removing studies for which the sole outcome measure was suicide (which, except for comparisons between distinct populations, cannot be expected to have a baseline value), 55% of studies for which baseline figures were pertinent still failed to control for baseline outcomes or demographic values. Aside from the association with suicide as an outcome, no other key aspects of study focus were associated with the likelihood of reporting or controlling for baseline values.

Quantitative versus Qualitative studies

H.24 As noted earlier, summative quality scores need to be used with caution, but do provide a 'rule of thumb' for evaluating study quality across large numbers of studies such as the pool of studies considered in the current review. On the basis of the above 'quality control' measures, the total summative score achievable for quantitative studies using group comparisons is 15, the total score achievable for single group studies is 12. Throughout the report, where median quality scores have been compared, like has been compared with like, with medians derived from within each of these study categories separately. Taken across all single group quantitative studies, the achieved median (and mean) quality score was 4. The median for studies using group comparisons was slightly higher at a score of 5 (mean 5.59) but not impressively so. The major failings in study design are as outlined above. Table H.1 below provides comparative figures for studies focussing on the four main outcome measures. The absolute differences between these are not substantial, with the single greatest disparity relating to single versus group comparator studies focussed on self-harm.

Table H.1 Median quality scores by type of behaviour addressed

Focus	Median for Single Group Studies	Median for Comparator Group studies
Completed Suicide	4	5
Attempted Suicide	4	5
Self-Harm	3	6
Suicidal Ideation	3	5

H.25 The above median scores clearly indicate some room for improvement in the design and implementation of quantitative studies, with scores for individual studies ranging between 1-8 for single group studies and 1-11 for group comparator studies. However, a number of studies in each category showed a substantially more robust design than the majority. Fourteen quantitative studies stood out on this basis and these are identified as the 'highest quality' quantitative studies for the purposes of evaluating what the *best* evidence currently available for intervention is. Summary outcomes from these studies are set out in Table H.2 below and are discussed in the main text of the report in relation to the relevant outcome measures.

H.26 It should be noted that although comparatively few quantitative studies meet stringent criteria for study design, studies within this literature are on the whole better designed and implemented than those in the most readily comparable literature relating to other-directed violence. Study quality is also comparable to the bulk of other public health intervention research. Two key issues have a particular impact on the quality of research in this area. Firstly, actual or perceived pragmatic and ethical constraints on the type of study which can be carried out. Secondly, a lack of funding. In comparison to the emphasis on funding the implementation of interventions, the resources allocated to evaluating these same interventions is small. Improvements in the quality of future research could be made by resolving these issues. In the

short term, both issues could to some extent be addressed by improvements in the collection and use of routine data.

H.27 The poorest quality studies in this literature as a whole, both with regard to design and to implementation, are the qualitative studies. Of the 27 qualitative studies included in the review, only three make any attempt to follow a specific qualitative methodology (non-participant observation and content analysis/grounded theory), a fourth follows a methodology which is not, strictly speaking, a qualitative methodology as such, but is an approach which has risen to prominence in this particular field and therefore has comparatively well established principles (psychological autopsy). The remainder of the studies are in effect simply narrative reports of the study author's subjective conclusions and, strictly speaking, could be described as 'failed' quantitative methods rather than studies explicitly adopting a qualitative approach. The poor quality of this aspect of the intervention literature leaves a significant gap in respect of our understanding of intervention for suicidal behaviour and suicidal ideation. There are currently very few reliable, in-depth, exploratory accounts of intervention. Well conducted qualitative studies are urgently needed to inform our understanding of how and why intervention does or does not work.

H.28 Fifteen of the 27 studies adopting a purely discursive approach to evaluation present information taken from case reports, or direct clinical experience. In the main, evidence is taken from only one or a small number of participants. However, some studies followed a survey or audit format, with sample sizes ranging from 14 to 35,077. The four studies which followed a more explicit methodological protocol are by default the 'highest quality' qualitative studies available for analysis. To this rather limited total, we add two studies which follow an experimental case study protocol. Whilst, technically, these are quantitative studies, the authors present them as qualitative accounts and provide considerable additional in-depth detail regarding both the intervention and outcomes. Summary outcomes from these six higher quality qualitative studies are presented in Table H.3 below and discussed in relation to the relevant outcome measures in the main text of the report. Well conducted qualitative studies are of substantial value in exploring and evaluating the lived experience of interventions, in particular in respect of interventions which are anticipated to impact on behavioural outcomes. The commissioning of such studies, ideally designed to run alongside quantitative studies which have the statistical power the methodological focus to quantify outcomes, must be seen as a priority.

Table H.2 Summary outcomes for the 'highest quality' quantitative studies

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Bennewith et al 2002	RCT	GP based intervention consisting of management guidelines for GPs outlining good practice in treating patients who self-harm. Participant GPs then pro-actively offered patients the opportunity of a consultation, with the consultation intended to follow the recommendations of the new guidelines.	Patients registered with GP s who had attended A&E for DSH	Community	1932 (males and females, mean age 32)	Any form of self-harm (identified via medical records)	No significant difference between intervention and non-intervention groups was noted for any of the three outcome measures of a repeat episode of self-harm, the number of repeats, or the time to repetition.
Brown et al 2005	RCT	Cognitive Behaviour Therapy (CBT)	People attending A&E for DSH	Start setting, Community, mixed end settings	120 (males and females aged 18 to 66)	Attempted suicide (established via medical records) Suicidal ideation (Beck Scale for Suicidal Ideation (Beck et al, 1979) completed by researcher)	At least one repeat suicide attempt from baseline to 18 month follow up was noted in 13 (24.1%) of the cognitive therapy group versus in 23 (41.6%) of the TAU group (z=1.97, p=.049). Suicidal ideation showed no significant differences between groups at any assessment point
Carter et al 2005	RCT	'Postcards from the Edge', postcards were sent from the Emergency Department which a person had attended for self-harm to the discharged person at 1,2,3,4,6,8,10 & 12 months after admission for self-poisoning. The postcards contained a short message asking how the person was and suggesting they get in touch if they felt they needed further help.	People discharged from hospital after suicide attempt/self-harm	Community	772 (males and females mean age 33)	Self-poisoning, established via medical records	No significant differences in the absolute likelihood of further admission for self-poisoning were found. However, the postcard group showed a significantly lower number of repeat episodes. Total N of episodes =192 in control, 101 in experimental group (incidence risk ratio 0.55, 95% CI 0.35-0.87, Z-2.56 p=0.01). A subgroup analysis showed that the postcard intervention significantly improved outcomes for women (IRR 0.54 95%CI 0.30-0.96 Z-2.09 p0.037), but not for men

Table H.2 ***Continued***

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Gagiano et al 1995	RCT	Treatment with moclobemide (an anti-depressant): comparison of most effective dosage - 150mg twice daily, 100mg three times daily or 150mg three times daily	People with major depression	Community	270 (males and females)	Suicidal ideation (HAM-D: Hamilton Rating Scale for Depression (Hamilton, 1960) interviewer administered)	There was a significant reduction in suicidal ideation in all groups (efficacy ratios of 1.2 and 1.3 respectively).In the absence of a placebo or active comparator other than moclobemide it is not possible to gauge whether these outcomes are better than would be expected on the basis of *not* treating with moclobemide.
Gonella et al 1990	RCT	To assess the clinical effectiveness & tolerability of fluvoxamine compared with imipramine in depressed patients	People with depression	Not stated	20 (males and females mean age 47)	Suicidal ideation Hamilton Rating Scale for Depression (Hamilton, 1976) completed by researcher	Fluvoxamine was reported to show more marked improvement than imipramine but the statistics reported as supporting this outcome are not presented in either text or tables.
Kapur et al 2004	Retrospective Cohort study	Emergency Department management after self-poisoning (Psychosocial assessment or referral for specialist follow-up versus no follow-up)	People attending A&E for DSH	Community	658 (males and females, mean age 30)	Repetition of self-poisoning (established via medical records)	Following adjustment for baseline differences, receiving a psychosocial assessment was *not* associated with reduced repetition, but being referred for specialist follow-up *did* improve outcomes. (adjusted hazard ratio for repetition,: 0.49, 95% CI 0.25-0.84, p=0.01)
Kasper et al 1995	RCT	Comparison of fluvoxamine vs imipramine in depressed patients	Depressed patients	Mixed start settings, end setting community	338 (males and females mean age 43)	Suicidal ideation (HAM-D: Hamilton Rating Scale for Depression (Hamilton, 1960) interviewer administered)	At week 1 there were significant improvements in the fluvoxamine group compared with placebo in respect of suicidal ideation, with no significant improvements in the imipramine group vs placebo (details of the statistical analysis supporting these outcomes are given but are unclear)
King et al 2003	Pre-test/post-test	Telephone counselling	People who had made at least one suicide attempt	Community	1010 (males and females)	Suicidal ideation (scale developed for the study drawing on items from existing scales, primarily the MINI International Neuropsychiatric Interview (Sheehan et al 1998)	Suicidal ideation decreased significantly from the beginning to end of call ($t=12.66$ $p<0.005$) as did suicidal urgency ($t=8.37$ $p<0.0005$). Considering only items reflecting ideation for 'imminent' suicide, this difference remained significant ($t=3.13$ $p<0.005$). Comparable differences were also observed in the raters' views of how suicidal people were ($Z=-8.05$ $p<0.001$)

Table H.2 ***Continued***

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Lapierre 1991a	RCT	Sertraline vs placebo	Major depression (adults)	Not stated	369	Suicidal Ideation (HAMD, CGI & POMs scales)	Statistical outcomes for suicidal ideation are not presented separately from reductions in HAMD total scores, which decreased in sertraline group, ($p<0.001$) reportedly to an extent greater than that achieved by the placebo group. This study is included as, by implication in the text, it presents outcomes for younger adults which are similar to the outcomes more explicitly set out in its 'sister' study below.
Lapierre 1991b	RCT	Sertraline vs amitriptyline	Major depression (elderly adults aged 65+)	Not stated	448	Suicidal ideation HAMD, CGI & POMs scales	Suicidal ideation was reported to decrease significantly in both groups, statistical analyses are referred to but only presented in graph form.
Meltzer et al 2003	RCT	Clozapine vs olanzapine	Schizophrenia	Community	1065 (males and females mean age 37)	Completed suicide and attempted suicide (not clear how established)	There were no statistically significant differences in completed suicides between the two groups over a two year period. There were significantly fewer suicide attempts "as determined by the study monitoring board" in the clozapine than in the olanzapine group (6.9% vs 11.2% $p<0.03$ 95% CI 0.01-0.08) Similar outcomes were noted for hospitalizations to prevent suicide (16.7% in cloz vs 21.8 in OLA $p<0.05$ CI 0.00-0.10). A further unspecified measure of outcome, which may refer to patient self-reports of adverse events in respect of attempted suicide also showed better outcomes for clozapine, with 7.7% reporting an attempt versus 13.8% in the olanzapine group ($p<0.002$ CI 0.02-0.10)
Milstein et al 1986	Retrospective group comparison	Electroconvulsive therapy (ECT)	Adult psychiatric patients	Start setting inpatient open ward, end setting not stated	1570 (males and females mean age 37)	Completed suicide (established via triangulation across more than one source)	This study tracked the total population of one adult psychiatry hospital across 7 years. Over this time, 76 people died by suicide (established via families; physicians and death certificates). The study compared this group to a sex and diagnosis matched control group and looked for differences in ECT treatment between groups. No significant differences were found. 44% of those who had committed suicide had been treated with ECT, compared to 32% of the matched group (who had died from other causes).

Table H.2 ***Continued***

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Tondo et al 1998	Prospective follow-up	Lithium	People with bipolar disorder	Community	310 (males and females , mean age 39)	Completed suicide (established via medical records) and attempted suicide (established via narrative report by person other than participant)	Suicide outcomes were not separated from the broader range of behaviours included as 'suicidal acts'. Poisson modelling of risk ratios showed that the incidence of suicidal acts was 5.62 -fold greater before lithium treatment than during lithium treated. 95% CI 2.15-14.5 z=3.96 p<0.001). A subgroup analysis of 185 people who discontinued lithium, gave a risk ratio after vs during of 9.10 z=4.57 95% CI 3.47-23.4 p<0.001 , with the rate of suicidal acts in the first year after discontinuing lithium significantly higher than before starting (ratio 3.09). The rate in the first year off lithium was higher than that for the next five years (4.79 $\chi^2$54.6 p<0.0001 CI 1.83-12.3). A Kaplan-Meier survival analysis of time to the first act in 310 patients also showed significant differences before and during lithium (χ^2=19.7 p<0.0001) and also during and after lithium for the subgroup of 185 patients who discontinued lithium (χ^2=16.4 p<0.0001), for this group however, there were no differences between pre and post lithium periods.
Zenere & Lazarus 1997	Retrospective follow-up	Suicide prevention and school crisis management programme focussed on school based crisis teams	School students	School	330,000 (males and females)	Completed suicide; attempted suicide and suicidal ideation (established via national and/or local statistics)	The programme was introduced in 1989. there were 7 reported suicides in this year. Comparable figures for subsequent years were: 1990=5, 1991=6, 1992=4 1993=3 1994=5. The authors conclude that outcomes favour the programme, however the numbers are so small that patterns could be the result of random variation. In respect of suicide attempts, the comparative figures given were as follows: 1989/90= 243 attempts; 1990/91=157, 1991/92=120, 1992/3=95, 1993/4=95. In respect of suicidal ideation: 1989/90= 641 reports of ideation, 1990/91=511, 1991/92=443, 1992/3=464. 1993/4=640. No statistical analysis is presented, but taken at face value there is evidence as the authors suggest for an initial decrease in both outcomes with a subsequent rise back to a level higher than initial figures in the case of suicidal ideation. These patterns provide at best very weak evidence for the reported efficacy of the programme.

Table H.3 Summary outcomes for the 'highest quality' qualitative studies

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Bloxham et al 1993	Case study	Behaviour therapy based on token economy and time-out	Borderline personality disorder (adult)	Secure inpatient unit	1 (35 year old female with previous history of self-harm)	Any form of self-harm identified via hospital records	Extinction of self-injury achieved by week 26 of admission, scores on EDI subscales (Eating Disorders Inventory Garner et al 1983) also improved, although self-starvation target was not reached, fluid intake also showed upward trend again without reaching target.
Cowdery et al 1990	Case study	Differential reinforcement of other behaviour (DRO)	General population (child)	Outpatient unit	1 (9 year old boy with previous history of self-harm)	Self mutilation (observed through one-way mirror or recorded in hospital notes)	Self-mutilatory behaviour suppressed by DRO under a number of different environmental conditions - objective measures used i.e. counting of occasions through one way mirror, length of time without Self-Injurious Behaviour (SIB) on each occasion also % of observed session with SIB decreased from 80% at baseline to virtually zero at endpoint (NB endpoint was 50 sessions over an unspecified time period). Time spent in each session without SIB increased, but absolute values are unclear.
Kuipers & Lancaster 2000	Grounded theory/content analysis	Supportive relationships and informal social support	Brain injured patients	Outpatient rehabilitation unit	14 (males and females, mean age 32)	Attempted suicide; suicidal ideation (both as evaluated by clinician)	Themes drawn from structured interviews identified that past suicide attempts and current suicidal ideation were resolved by restriction of access to means for some participants, but the most common mechanism helping to reduce attempts was informal social support by family, friends and clinicians.
Mishara & Daigle 1997	Non-participant observation	Different telephone intervention styles used by helpline staff (directive vs nondirective or 'Rogerian' styles)	Callers to a general population suicide prevention helpline	Community	263 (males and females, mean age 35)	Suicidal ideation (evaluated by scale based report by person other than participant, Suicide Urgency scale Morisette 1984)	Overall, there were no significant differences in ideation from start to end of call based on style of intervention. However, when outcomes were analysed on the basis of whether callers were 'chronic' or 'non-chronic, use of Rogerian techniques improved outcomes in non-chronic callers $F=3.69$ $p<0.05$ although not in chronic callers

Table H.3 ***Continued***

Study Identifier	Design	Intervention	Population	Setting	Sample size	Outcome measures	Outcomes
Owens et al 2004	Psychological autopsy	Recognition and treatment of mental illness by GPs	People known/thought to have committed suicide	Community	100 (males and females aged between 18 and 87)	Completed suicide (established via (local) coroner's reports or death certificates	This study assessed whether there had been adequate detection and treatment of mental illness by GPs in people who had committed suicide. The authors concluded that rates of detection and treatment were high and not therefore responsible for subsequent suicide. Note that detection and treatment rates referred only to those who had consulted with their GP, 30 of 68 with an identified mental illness failed to consult. Detection & treatment rates were 76% in those who consulted, so lack of consultation remains a problem and lack of presentation (lack of outreach approaches) may therefore have resulted in the adverse outcomes observed.
Perseius et al 2003	Content analysis	Dialectical behaviour therapy (DBT)	Borderline personality disorder	Setting not specified	10 (females mean age 27, with previous history of self-harm)	Attempted suicide, self-harm and suicidal ideation (all established via narrative self-report by participant)	Themes derived from all patients suggested that they regarded therapy as 'life-saving' in respect of having reduced their suicide attempts; reduced self-harm and reduced suicidal ideation. No further details are given.

ANNEX I OVERVIEW OF EVIDENCE FOR PRIORITY POPULATIONS AND INTERVENTIONS

The following table gives further details of all studies addressing the populations and interventions identified as priorities for *Choose Life* by the Research Advisory Group. Discussion of the outcomes of the studies can be found in Chapter Five of the main text of this report.

Table I.1 Details of studies cited in Chapter Five

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Ahrens et al 1993	BRITISH JOURNAL OF PSYCHIATRY	Retrospective group comparison	International	Community	Affective disorder	Length of lithium treatment needed to eliminate high mortality in affective disorders	Recent studies show long-term lithium treatment reduces expected suicidal activity and overall mortality of patients with affective disorders. Based on the data from the lithium clinics in Berlin and Hamilton (n = 512), a minimum length of two years of continued lithium treatment is needed to reduce the high mortality resulting from affective disorders.	
Ahrens et al 1995a	JOURNAL OF AFFECTIVE DISORDERS	Observational	International	Community	Affective disorder	Comparison of suicide & cardiovascular deaths in patients on lithium with general population rates	In a sample of 827 patients on long-term lithium treatment, 7 suicides were observed and 1.3 expected. This is significant excess, but markedly lower than that found in patients with affective disorders not given lithium. Cardiovascular mortality was not found to be higher in these patients than in the general population.	These findings cannot prove definitively that long-term lithium treatment counteracts factors responsible for the excess suicide and cardiovascular mortality of affective disorders but they are compatible with this assumption.

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Ahrens et al 1995b	CANADIAN JOURNAL OF PSYCHIATRY	Observational	International	Community	Affective disorder	Comparison of suicide & cardiovascular deaths in patients on lithium with general population rates	In-patients given lithium for two years or longer (n = 641), both suicide and cardiovascular mortality were the same as, or only slightly higher, than in the general population; in patients given lithium for less than two years (n = 186), both mortalities remained high. The authors conclude that in addition to its ability to prevent recurrences, prophylactic lithium treatment appears capable of reducing both the excess suicide risk and excess cardiovascular mortality of affective illness.	
Alexopoulos et al 2005	AMERICAN JOURNAL OF PSYCHIATRY	RCT	USA	Community	Depressed elderly	Comparison of TAU or care management given to elderly depressed patients (randomised via their general practice)	Patients receiving the intervention fared better then those receiving usual care	
Aoun & Johnson 2001	AUSTRALIAN & NEW ZEALAND JOURNAL OF MENTAL HEALTH NURSING	Retrospective group comparison	Australia	Mixed	People at high risk of suicide or self-harm	Consumer survey of the introduction of intensive outreach from a suicide intervention counsellor for people in the community at-risk of suicidal behaviour	The overall outcome of this study is that, from the consumer's perspective, a high intensity approach to suicide intervention resolved or improved the presenting problem and their ability to deal with it.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Aoun 1999	AUSTRALIAN & NEW ZEALAND JOURNAL OF MENTAL HEALTH NURSING	Retrospective group comparison	Australia	Mixed	People at high risk of suicide or self-harm	Introduction of intensive outreach from a suicide intervention counsellor for people in the community at-risk of suicidal behaviour	The programme was effective in producing a systems change within the hospital by implementing a protocol of best practice and in improving the inter-sectoral liaison between community-based referrals and treatment agencies through professional and community education. The early indications suggest a reduction in the rate of hospital admissions for repeated suicide attempts for cases that were managed by the suicide intervention counsellor through a high-intervention approach.	
Appleby et al 1999	LANCET	Case control	UK	Community	People discharged from psychiatric hospital	Assessed the relationship of suicide in severe mental illness to aspects of aftercare	Those who took their own lives were more likely to have had their care reduced at the final appointment in the community before death. Suicide was also associated with a history of self-harm, suicidal thoughts during aftercare and the most recent admission as the first illness. Only 34% of suicides had an identifiable key worker, the essence of the Care Programme Approach. This frequency was no higher than that for controls, reflecting the difficulty of identifying those likely to commit suicide. The authors conclude that reductions in care are strongly associated with suicide by people with mental illness, and may be contributory. The implication is that maintaining care beyond the point of clinical recovery is important in protecting high-risk individuals. Several clinical variables indicate high risk, but greater risk is not an issue generally addressed in health service provisions.	

Notes to Table
The study by Appleby et al is not one of the studies included as evidence in this review. It is a study of risk rather than intervention. However, the study is referred to in Chapter Five and included here for the sake of completeness and to give the reader an overview of the study's focus and outcomes.

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Apter et al 1994	JOURNAL OF THE AMERICAN ACADEMY OF CHILD & ADOLESCENT PSYCHIATRY	Before/after (self as control)	Israel	In-patient open ward	Adolescent in-patients with OCD or depression	Fluvoxamine treatment	Fluvoxamine proved relatively safe and was especially effective in the patients with OCD. Although fluvoxamine also appeared effective in decreasing depression and bulimic symptoms, its impact on impulsive, suicidal, and anorectic symptoms was less clear. The authors conclude that preliminary evidence suggests that short-term treatment of adolescents with fluvoxamine is relatively safe and may be effective for OCD and some affective spectrum symptoms.	
Aseltine & DeMartino 2004	AMERICAN JOURNAL OF PUBLIC HEALTH	Pseudo-randomised controlled trial	USA	School or high school	General population adolescents	'SoS' programme in school (youths taught to recognise signs of suicide in themselves and others)	Significantly lower rates of suicide attempts and greater knowledge and more adaptive attitudes about depression and suicide were observed among students in the intervention group. The modest changes in knowledge and attitudes partially explained the beneficial effects of the programme.	
Baker et al 2004ps	BRITISH JOURNAL OF PSYCHIATRY	RCT	USA	In-patient open ward	Manic depression (bipolar affective disorder)	Olanzapine or placebo with each of lithium or valproate	Addition of olanzapine to ongoing lithium or valproate monotherapy significantly improved depressive symptom, mania and suicidality ratings in in patients with acute dysphoric mania.	
Barak et al 2006	NEUROPSYCHO-PHARMACOLOGY	Case control	Israel	In-patient open ward	Older people with major depression	SSRIs	Older depressed patients treated with anti-depressants may be at reduced risk of attempting suicide.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Bateman & Fonagy 1999	AMERICAN JOURNAL OF PSYCHIATRY	RCT	UK	Out-patient unit	Personality disorder/borderline personality disorder	Partial hospitalization vs TAU	Patients who were partially hospitalized showed a statistically significant decrease on all measures in contrast to the control group, which showed limited change or deterioration over the same period. An improvement in depressive symptoms, a decrease in suicidal and self-mutilatory acts, reduced in-patient days, and better social and interpersonal function began at 6 months and continued until the end of treatment at 18 months. The authors conclude that psychoanalytically oriented partial hospitalization is superior to standard psychiatric care for patients with borderline personality disorder.	Replication is needed with larger groups, but these results suggest that partial hospitalization may offer an alternative to in-patient treatment.
Bohus et al 2004	BEHAVIOUR RESEARCH AND THERAPY	Group comparison (nuclear whether prospective or retrospective)	Germany	Mixed	Personality disorder/borderline personality disorder	In-patient dialectical behaviour therapy vs community based waitlist control with 'treatment as usual'	The DBT group improved significantly more than participants on the waiting list on 7 of the 9 variables analyzed, including depression, anxiety, interpersonal functioning, social adjustment, global psychopathology and self-mutilation. The data suggest that 3 months of in-patient DBT treatment is significantly superior to non-specific out-patient treatment. Within a relatively short time frame, improvement was found across a broad range of psychopathological features.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Brent et al 1993	AMERICAN JOURNAL OF DISEASES OF CHILDREN	Case control	USA	Community	Adolescent suicide victims	Restriction of access to firearms	Hand guns and loaded guns in the home were particularly significant risk factors for suicide in those with no apparent psychiatric disorder.	
Brent et al 1997	ARCH. GEN. PSYCHIATRY	Group comparison	USA	Community	Depressed adolescents	Comparison of CBT, systemic behaviour family therapy (SBFT) & nondirective supportive therapy (NST) in treatment of depressed adolescents	All 3 treatments showed significant and similar reductions in suicidality and functional impairment. Parents' views of the credibility of cognitive behaviour therapy improved compared with parents' views of both SBFT and NST. The authors conclude that Cognitive behaviour therapy is more efficacious than SBFT or NST for adolescent MDD in clinical settings, resulting in more rapid and complete treatment response.	
Brown et al 2004	JOURNAL OF PERSONALITY DISORDERS	Cohort study	USA	Community	Personality disorder/ borderline personality disorder	Whether cognitive therapy (CT) has an impact on risk factors for suicide (suicide ideation, hopelessness, depression & other symptoms) for people with borderline personality disorder.	The results revealed significant and clinically important decreases on measures of suicide ideation, hopelessness, depression, number of borderline symptoms and dysfunctional beliefs at termination and 18-month assessment interviews.	Uncontrolled clinical trial

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Brown et al 2005	JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	RCT	USA	Community	People attending an emergency department following 'attempted suicide'	Whether cognitive therapy reduced rate of repetition for suicide attempts over 18 months	Participants in the cognitive therapy group had a significantly lower suicide re-attempt rate and were 50% less likely to re-attempt suicide than participants in the usual care group. The severity of self-reported depression was significantly lower for the cognitive therapy group than for the usual care group at 6 months, 12 months and 18 months. The cognitive therapy group reported significantly less hopelessness than the usual care group at 6 months. There were no significant differences between groups based on rates of suicide ideation at any assessment point. The authors conclude that Cognitive therapy was effective in preventing suicide attempts for adults who recently attempted suicide.	
Bruce et al 2004	JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	RCT	USA	Community	Depressed older people	Treatment guidelines for older people with care management vs TAU at primary care (i.e. GP practice) level	Rates of suicidal ideation declined faster in intervention patients compared with usual care patients.	
Carter et al 2005	BRITISH MEDICAL JOURNAL	RCT	Australia	Community	People discharged from hospital after suicide attempt/self-harm	Postcard sent from ED to discharged person at 1,2,3,4,6,8,10 & 12 months post admission for self-poisoning	A postcard intervention reduced repetitions of deliberate self poisoning, although it did not significantly reduce the proportion of individual repeaters.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Cedereke et al 2002a	EUROPEAN PSYCHIATRY	RCT	Sweden	Community	People who had made at least one 'suicide attempt'	Repeated telephone contact (twice at 4 month intervals) plus TAU compared to TAU	The randomised groups did not differ in repetition of suicide attempts during follow-up or in improvement in other areas. In individuals with no initial treatment the intervention group improved more in certain psychological symptom dimensions.	The main impact of telephone interventions seems to have been on patients who, at their suicide attempt, had treatment other than psychiatric treatment or who had no treatment.
Chengappa et al 1999	JOURNAL OF CLINICAL PSYCHIATRY	Mirror image design	USA	Open psychiatric wards	Psychiatric in-patients with psychosis & with borderline personality disorder	Impact of clozapine on self-mutilation & related aggression in psychotic patients with borderline personality disorder	After clozapine treatment, there were statistically significant reductions in incidents of self-mutilation, seclusion, the use of prn. anti-anxiety medications, and injuries to staff and peers.	
Chiesa & Fonagy 2003	BRITISH JOURNAL OF PSYCHIATRY	Pseudo-randomised controlled trial	UK	Mixed	Personality disorder/ borderline personality disorder	Medium stay in-patient plus subsequent 'step-down' planned care as out-patient vs in-patient only (step down is basically gradual reduction in care with no abrupt stop)	Improvements were significantly greater in the step-down programme for social adjustment and global assessment of mental health. Patients in the programme were found to self-mutilate, attempt suicide and be readmitted significantly less at 24- and 36-month follow-up than patients in the in-patient group.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Chiesa et al 2004	AMERICAN JOURNAL OF PSYCHIATRY	Pseudo-randomised controlled trial	UK	Mixed	personality disorder/ borderline personality disorder	Long-term psychoanalytically oriented residential programme vs a phased 'step-down'; psychosocial programme with brief in-patient stay vs a general community psychiatric model	The results of this study suggest that for personality disorders, a specialist step-down programme is more effective than both long-term residential treatment and general psychiatric treatment in the community.	
Clarkin et al 2001	JOURNAL OF PERSONALITY DISORDERS	Pre-test post-test	USA	Mixed	Females with borderline personality disorder	Effectiveness of Transference Focused Psychotherapy in reducing suicidal behaviour , use of services etc	Compared to the year prior to treatment, the number of patients who made suicide attempts significantly decreased, as did the medical risk and severity of medical condition following self-injurious behaviour. Compared to the year prior, study patients during the treatment year had significantly fewer hospitalizations as well as number and days of psychiatric hospitalization.	Uncontrolled study so need for caution in interpreting results
Condelli et al 1997	BEHAVIOURAL SCIENCES & THE LAW	Pre-test post-test	USA	Prison	prison inmates	Effect of an Intermediate Care Programme (not quite psychiatric hospitalisation but nearly) for inmates in prison, in terms of decreased suicide attempts & other outcomes	The highest reductions occurred in mental health observations (65%), suicide attempts (63%), and emergency medications (43%). Lower reductions occurred in correctional infractions and restrictions (26% to 31%). The authors conlude that Intermediate Care Programmes are effective in managing risk.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Coryell et al 2001	ACTA PSYCHIATRICA SCANDINAVICA	Case control	USA	Mixed	Affective disorder	Naturalistic follow-up of people receiving a range of anti-depressant treatments	Results do not support previous suggestions that lithium has uniquely anti-suicidal properties.	
Cotgrove et al 1995	JOURNAL OF ADOLESCENCE	RCT	UK	Community	Adolescents discharged from hospital following 'attempted suicide'	Token(green card) allowing readmission to hospital on demand vs TAU	Of the 47 adolescents who were allocated tokens, only three (6%) made further suicide attempts in the following year, and five (11%) made use of their tokens to gain admission into hospital. In the control group of 58 adolescents, seven (12%) made further suicide attempts.	Although the differences between the groups did not reach the level of statistical significance, the results do suggest lower rates of repeat suicide attempts in the group which received the token, even if it was not used.
Cunningham -Owens et al 2001	ACTA PSYCHIATRICA SCANDINAVICA	RCT.	UK	Community	Schizophrenic out-patients	Educational	The intervention failed to improve outcome. While insight and treatment attitudes improved, suicidal ideation increased. The authors conclude that here are limits to which psycho-educational interventions can be simplified without loss of effectiveness in terms of relapse prevention in schizophrenia. Enhanced insight may be associated with increased suicidal ideation.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Davidson et al 2004	PSYCHOLOGICAL MEDICINE	RCT	UK	Community	Repeaters	Prevention of parasuicide by manual assisted CBT	When treated by therapists rated as more competent than other therapists who received equivalent brief training, patients with recurrent self-harm show significant clinical improvements. However, this benefit is not identified across all outcome measures and is not fully apparent until 12-month follow-up.	
De et al 1995	AMERICAN JOURNAL OF PSYCHIATRY	Cross-sectional comparison	Italy	Community	General population elderly	Telephone service designed to provide older people with home assistance (telehelp = alarm system ; telecheck is where person is contacted twice a week for assessment of needs and social support - both combined here)	Only one death by suicide was found in the older people connected to Tele-Help/Tele-Check, compared with the expected number of 7.44 for the general population. Since many of the traditional risk factors for suicide were concentrated in the older people studied, the authors conclude Tele-Help/Tele-Check service appears to provide support of great interest for the prevention of suicide in older people.	
Deykin et al 1986	JOURNAL OF ADOLESCENT HEALTH CARE	Prospective follow-up	USA	Community	Youths at risk for suicide	Youth programme (community education)	The intervention programme was effective in increasing subjects' concordance with medical regimen. To a lesser degree, the intervention also facilitated early help-seeking among adolescents with suicidal thoughts and appeared to diminish slightly the overall occurrence of Emergency Room admissions for suicidal behaviours. However, the intervention programme had no demonstrable effect on the occurrence of repeat suicidal episodes.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Duggan et al 2003	BRITISH JOURNAL OF PSYCHIATRY	Mathematical modelling (hypothetical time series)	UK	Community	Treatment resistant schizophrenia	Mathematical modelling of likely suicide and economic impact of model with all 'suitable' patients prescribed clozapine compared with current levels of prescribing	It was estimated that an average of 53 lives could be saved in the UK each year. If clozapine is cost-neutral, the cost per life-year saved is £5108. If clozapine achieves a 10% reduction in annual support costs, the net saving is £8.7 million per annum. An average of 167 acute beds would be freed each year.	Assumptions made in this study are open to question, in particular the assumption that Clozapine is cost-neutral.
Eagles et al 2003	BRITISH JOURNAL OF PSYCHIATRY	Qualitative (non-specific)	UK	Community	Severe mental illness and suicidal ideation	Social networks vs standard psychiatry	Three-quarters of patients were in contact with psychiatric services when feeling at their lowest, and this contact was generally deemed to be helpful. Social networks were considered just as helpful as psychiatric services by the half of patients who discussed their feelings with friends or relatives. Religious beliefs and affiliations were helpful. Negative influences included the media and the stigma of psychiatric illness. Efforts at suicide prevention might usefully focus on enhancing patients' social networks, increasing the likelihood of early contact with psychiatric services and decreasing the stigma attached to psychiatric illness.	Larger studies of patients exposed to different service models would be informative.

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Etzsersdorfer 1993	CRISIS	Case study	Austria	In-patient open ward	People who had made at least one suicide attempt	Psychiatric in-patient treatment	This paper presents a case study of a 55-year-old housewife who committed suicide after psychiatric in-patient treatment following a previous severe suicide attempt. The social and psychological situation of the patient is described, with special emphasis on her relationships with her husband, the therapist, and the other staff members on the ward. The steps in her "suicidal career" are described. The paper then discusses the significance of this case, and the conclusions that were drawn by the therapy team about how in-patient treatment after suicide attempts could be better managed.	
Evans et al 1999	PSYCHOLOGICAL MEDICINE	RCT	UK	Out-patient unit	Personality disorder/ borderline personality disorder	Manual-assisted cognitive-behaviour therapy (MACT)	Thirty-two patients (18 MACT; 14 TAU) were seen at follow-up and 10 patients in each group had a suicidal act during the 6 months. The rate of suicidal acts per month was lower with MACT and self-rated depressive symptoms also improved. The treatment involved a mean of 2.7 sessions and the observed average cost of care was 46% less with MACT.	
Gagiano et al 1995	JOURNAL OF CLINICAL PSYCHOPHARMACOLOGY	RCT	South Africa	Community	Major depression	Treatment with moclobemide (anti-depressant): comparison of most effective dosage - 150mg twice daily, 100mg three times daily or 150mg three times daily	No clear differences between the treatment groups could be shown with respect to response on the Hamilton Rating Scale for Depression (HAM-D), the Zung Self Rating Scale, or the Clinical Global Impression of efficacy and severity. There was, however, a slightly higher response rate with respect to the anxiety/agitation subscale of the HAM-D in the 150-mg twice-daily group. In all groups, there was a marked and comparable response with respect to suicidal ideation. Moclobemide, 150 mg twice daily, is the optimal initial daily dosage schedule.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Gerber 2003	UNPUBLISHED STUDY	RCT	UK	Community	General population adolescents	CBT with adolescents in the Scottish school system	Reductions in suicidal ideation as a potential outcome of the CBT.	Authors provide no data to support outcomes
Glick et al 2004	JOURNAL OF CLINICAL PSYCHIATRY	RCT	International	Mixed	Schizophrenia	Effects of the use of concomitant psychotropic medication (CPM) during a large study of clozapine vs olanzapine for prevention of suicidal behaviour	The results support the conclusion that the effects of clozapine in reducing the risk of suicidal behaviour derive from its intrinsic pharmacology and not from the influence of concomitant psychotropic medications.	
Goodwin et al 2003	JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	Cohort study	USA	Mixed	Manic depression (bipolar affective disorder)	To compare risk of suicide attempt & suicide death during treatment with lithium with that during treatment with divalproex	Risk of suicide death was 2.7 times higher during treatment with divalproex than during treatment with lithium. Corresponding hazard ratios for non-fatal attempts were 1.7 for attempts resulting in hospitalization and 1.8 for attempts diagnosed in the emergency department. The authors conclude that among patients treated for bipolar disorder, risk of suicide attempt and suicide death is lower during treatment with lithium than during treatment with divalproex.	
Guthrie et al 2001	BRITISH MEDICAL JOURNAL	RCT	UK	Community	People attending A&E following self-poisoning	Use of brief psychodynamic interpersonal therapy to reduce deliberate self-poisoning	Participants randomised to the intervention had a significantly greater reduction in suicidal ideation at 6 month follow-up compared with those in the control group. They were more satisfied with their treatment and were less likely to report repeated attempts to harm themselves at follow-up.	
Heiligenstein et al 1993	INTERNATIONAL CLINICAL PSYCHO PHARMACOLOGY	RCT	USA	Out-patient unit	Major depression	Fluoxetine	Fluoxetine was statistically significantly more likely to reduce suicidal ideation compared with placebo.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Hirschfeld et al 2005	DEPRESSION AND ANXIETY	RCT	USA	Not known	Major depression	Treatment of depression with duloxetine	Compared to placebo-treated patients, duloxetine-treated patients experienced greater improvement in the HAMD17 total score at Week 2. The individual symptoms showing the most rapid improvements (Week 1) were depressed mood, guilt, suicidal ideation, work/activities, and psychic anxiety as well as VAS back pain and shoulder pain. At subsequent visits, significant improvements were observed in retardation; hypochondriasis; general somatic symptoms; middle and late insomnia; and gastrointestinal symptoms, genital symptoms (level of sexual interest or ease of sexual arousal), insight, and early insomnia. Significant advantages for duloxetine were not achieved at any visit for agitation, somatic anxiety, or weight loss.	
Hopko et al 2003	JOURNAL OF PERSONALITY DISORDERS	Case study	USA	Community	Borderline personality disorder	Mianserin vs nomifensine vs placebo	Presents a behavioural activation treatment for depression (BATD) that has shown promising results in treating clinically depressed patients and a theoretical conceptualization for why BATD may prove particularly useful in reducing the frequency of suicide-related behaviours and other symptoms characteristic of patients with borderline personality disorder. Also presents theoretical consistencies between BATD and the well-established intervention of dialectical behaviour therapy (DBT; Linehan, 1993), which may allow for their practical integration, and conclude with a case study that illustrates the assimilation of these strategies in the treatment of a patient with borderline personality disorder.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Houck et al 2002	THE JOURNAL OF SCHOOL NURSING	Pre-test post-test	USA	Community	Depressed adolescents	Weekly school-based support group to enhance coping skills and provide emotional support	At the conclusion of the group intervention, there was a 55% decrease in suicidal ideation, a 27% decrease in perceived stress, and a 26% decrease in family distress. In addition, most of the students became engaged in formal treatment for the first time.	
Isacsson et al 1997	ACTA PSYCHIATRICA SCANDINAVICA	Retrospective epidemiological	Sweden	Mixed	Affective disorder	Analysis of national Swedish suicide rates & statistics on national use of anti-depressants 1992-1994 to examine the relationship between the two	Most people completing suicide were not taking anti-depressants immediately before their death, even though 40-85% may have been depressed. Under-treatment and therapeutic failure are the main problems with anti-depressants, not the risk of using anti-depressants in overdose. The huge increase in the use of anti-depressants in Sweden since 1990-1991 has been paralleled by a significant decrease in suicide rates.	
Isacsson et al 2000	ACTA PSYCHIATRICA SCANDINAVICA	Retrospective epidemiological	Sweden	Mixed	Affective disorder	Analysis of national Swedish suicide rates & statistics on national use of anti-depressants 1978-1996 to test the hypothesis that there is a close association between the two	The author hypothesized that a 5-fold increase in the use of anti-depressants might reduce Swedish suicide rates by 25%. A subsequent 3.5-fold increase in the use of anti-depressants provided a 'natural experimental situation' for prospectively testing this hypothesis. Suicide rates decreased in accordance with the *a priori* hypothesis. Alcohol consumption and unemployment rates did not correlate well with suicide rates.	This naturalistic study is not conclusive. The increased use of anti-depressants appears, however, to be one of the contributing factors to the decrease in the suicide rate.
Kasper et al 1995	INTERNATIONAL CLINICAL PSYCHOPHARMACOLOGY	RCT	International	Mixed	Major depression	Comparison of fluvoxamine vs imipramine	Overall, compared with placebo, more HAM-D (depression) items were improved by fluvoxamine than imipramine. Fluvoxamine but not imipramine was significantly superior to placebo in severely depressed patients.	

Table I.1 ***Continued***

Study id	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Kessing et al 2005	ARCHIVES OF GENERAL PSYCHIATRY	Cohort study	Denmark	Mixed	Affective disorder	Treatment with lithium in reducing completed suicide	In this nationwide study including all patients treated with lithium, it was found that continued lithium treatment was associated with reduced suicide risk regardless of sex and age.	
King et al 2003	SUICIDE & LIFE-THREATENING BEHAVIOUR	Pre-test post-test	Australia	Community	Depressed adolescents	Telephone counselling	Significant decreases in suicidality and significant improvement in mental state were found to occur during the course of counselling sessions, suggesting positive immediate impact.	
Kleindienst & Greil 2000	NEUROPSYCHOBIOLOGY	RCT	Germany	Out-patient unit	Personality disorder/ borderline personality disorder	Comparison of lithium and carbamazepine	Lithium appears to be superior to carbamazepine in classical bipolar cases and might have additional impact on proneness to suicide. The distinctly larger group of patients with non-classical features might profit more from carbamazepine which seems to be well accepted by the patients. Hence, treatment alternatives to lithium are desirable for the majority of bipolar patients.	
Kudoh et al 2002	ANAESTHESIA AND ANALGESIA	RCT	Japan	In-patient open ward	Major depression	Ketamine to improve post-op state for depressed patients	Small-dose ketamine improved the post-operative depressive state and relieved post-operative pain in depressed patients.	
LaFromboise & Howard 1995	JOURNAL OF COUNSELLING PSYCHOLOGY	Quasi-experimental	USA	School or high school	Native Americans	Culturally tailored intervention programme (introducing Life Skills Development into the curriculum)	Students exposed to the curriculum scored better than the non-intervention group at post-test on suicide probability & hopelessness. They also showed greater ability to perform problem-solving and suicide intervention skills in a behavioural assessment.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Lapierre 1991a	INTERNATIONAL CLINICAL PSYCHOPHARMACOLOGY	RCT	USA	Not known	Major depression	Sertraline	The overall results showed sertraline to be consistently superior to placebo and equivalent in therapeutic effect to amitriptyline on a number of measures including depression, anxiety, insomnia and suicidal ideation. Efficacy was found in both moderately and severely depressed patients whose primary psychiatric diagnoses included single-episode and recurrent major depression, with and without melancholia. Sertraline was also found to be effective in patients with a high baseline anxiety score on the Hamilton Rating Scale for Depression.	
Lapierre 1991b	INTERNATIONAL CLINICAL PSYCHOPHARMACOLOGY	RCT	USA	Out-patient unit	Major depression	Sertraline	Sertraline was of equal efficacy to amitriptyline.	
Leenaars & Lester 2004	CRISIS	Trend analysis	Canada	Community	General population/ unspecified	Suicide prevention centres	A study by Leenaars and Lester (1995) found that suicide prevention centres in the provinces of Canada in 1985 had a preventive, but non-significant, impact on the suicide rates of the provinces. The present study replicated that study for 1994-1998 and found a similar preventive impact, although weak, of suicide prevention centres on the provincial suicide rates.	
Leenaars et al 2003	DEATH STUDIES	Retrospective epidemiological study	Canada	Community	General population/ unspecified	Effects of legislative gun control laws on suicide rates (Canada's Criminal Law Amendment Act of 1977, 'Bill C-51')	It appears that Bill C-51 may have had an impact on suicide rates, even after controlling for social variables.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Linehan et al 1993	ARCHIVES OF GENERAL PSYCHIATRY	RCT	USA	Community	Personality disorder/ borderline personality disorder	DBT vs treatment as usual in the community	In general, the superiority of DBT over treatment-as-usual, found in previous studies at the completion of 1 year of treatment, was retained during a 1-year follow-up.	
Linehan et al 2006	ARCHIVES OF GENERAL PSYCHIATRY	RCT	USA	Mixed	Personality disorder/ borderline personality disorder	DBT vs community treatment by non-behavioural psychotherapy	DBT was associated with better outcomes in the ITT analysis than community treatment in most target areas and appeared to be uniquely effective in reducing suicide attempts.	
Low et al 2001	BEHAVIOURAL AND COGNITIVE PSYCHOTHERAPY	Prospective follow-up	UK	Secure in-patient unit	Self-harming females with borderline personality disorder	DBT	There was a significant reduction in self-harm during therapy which was maintained at 6-month follow-up as well as improvements in other areas, including survival and coping beliefs and suicide ideation.	
March et al 2004	JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	RCT	USA	Out-patient unit	Adolescents with major depression	Fluoxetine vs CBT vs CBT+fluoxetine vs placebo	Compared with placebo, the combination of fluoxetine with CBT was statistically significant. Clinically significant suicidal thinking, which was present in 29% of the sample at baseline, improved significantly in all 4 treatment groups. Fluoxetine with CBT showed the greatest reduction. The authors conclude that the combination of fluoxetine with CBT offered the most favourable trade-off between benefit and risk for adolescents with major depressive disorder.	
May et al 2005	AMERICAN JOURNAL OF PUBLIC HEALTH	Prospective follow-up	USA	Community	Native Americans	Community-wide public health oriented prevention programme	Data from this community-based approach document a downward trend - measured by both magnitude and temporal trends in the specifically targeted age cohorts - in suicidal acts. The sequential decrease in age-specific rates of suicide attempts and gestures is indicative of the programme's success.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Mcdaniel et al 1990	MILITARY MEDICINE	Retrospective group comparison	USA	US Navy bases	US navy personnel	Suicide prevention & stress management training for US navy instructors	Suicide prevention efforts produced a significant reduction in suicide attempts.	
Meltzer et al 2003	ARCHIVES OF GENERAL PSYCHIATRY	RCT	International	Community	Schizophrenia	Clozapine vs olanzapine	Clozapine therapy demonstrated superiority to olanzapine therapy in preventing suicide attempts in patients with schizophrenia and schizoaffective disorder at high risk for suicide.	
Metha et al 1998	SUICIDE & LIFE-THREATENING BEHAVIOUR	Retrospective cross-sectional comparison	USA	Community	General population adolescents	State level initiatives directed at youth suicide prevention (any legislative, educational or other state-based initiative)	The results revealed that while changes in suicide rates over time were statistically significant, there was no relation between these changes and any of the variables studied.	
Miller et al 1984	AMERICAN JOURNAL OF PUBLIC HEALTH	Retrospective epidemiological study	USA	Community	General population/ unspecified	Suicide prevention centres	The authors studied 1968 through 1973, the years of greatest growth of suicide prevention facilities, comparing suicide rates in counties that added these centres with counties that did not do so. An association of centres with the reduction of suicides in young white females emerged. This finding was replicated on a different set of counties for a different timespan.	
Moller & Steinmeyer 1994	EUROPEAN NEUROPSYCHOPHARMACOLOGY	RCT	Germany	In-patient open ward	Major depression	Paroxetine vs amitriptyline	Global antidepressive efficacy was comparable under dosages of 30 mg paroxetine or 150 mg amitriptyline per day. A differentiated analysis failed to confirm the hypothesis of a faster reduction of suicidal cognitions by paroxetine.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Morriss et al 2005	PSYCHOLOGICAL MEDICINE	Cross-sectional comparison	UK	Community	General population adolescents	Educational intervention for front-line health professionals (STORM)	The suicide rate in 1994-1996 was 8.8 per 100 000 before this educational intervention and unchanged at 8.6 per 100 000 in 1998-2000 after it. The authors conclude that brief educational interventions to improve the assessment and management of suicide for front-line health professionals in contact with suicidal patients may not be sufficient to reduce the population suicide rate.	
Motto & Bostrom 2001	PSYCHIATRIC SERVICES	RCT	USA	Community	People at high risk of suicide or self-harm	No contact after discharge vs treatment post - discharge vs contact or letter	A systematic programme of contact with persons who are at risk of suicide and who refuse to remain in the health care system appears to exert a significant preventive influence for at least 2 years. Diminution of the frequency of contact and discontinuation of contact appear to reduce and eventually eliminate this preventive influence.	
Motto 1976	SUICIDE & LIFE-THREATENING BEHAVIOUR	RCT	USA	Community	High risk people who declined treatment programmes	No contact & no treatment after discharge vs treatment post - discharge vs no treatment but contact by telephone or letter	Suicidal deaths were found to diverge progressively in the 3 groups, the treatment subjects showing the highest rates, the no-contact group coming next, and the contact subjects showing the lowest. The observed divergence between the contact and no-contact groups provides tentative evidence that a high-risk population for suicide can be identified and that a systematic approach to reducing that risk can be applied.	
Mufson et al 2004	ARCHIVES OF GENERAL PSYCHIATRY	RCT	USA	School or high school	Depressed adolescents	Interpersonal psychotherapy (IPT-A) vs TAU	Adolescents treated with IPT-A compared with TAU showed greater symptom reduction and improvement in overall functioning. The authors conclude that Interpersonal psychotherapy delivered in school-based health clinics is an effective therapy for adolescent depression.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Nordentoft et al 2005	EUROPEAN PSYCHIATRY	Pre-test post-test	Denmark	Community	General population adults	In-patient suicide prevention centre vs none	The intervention group obtained a significantly greater improvement in Beck's Depression Inventory, Hopelessness Scale, Rosenberg's Self-Esteem Scale and CAGE-score and a significantly lower repetition rate.	Although the design cannot exclude selection bias, it seems likely that the improvement in the intervention group was facilitated by the treatment
Nutting et al 2005	ANNALS OF FAMILY MEDICINE	RCT	USA	Community	Depressed people	Brief training of physicians and office GP nurses to provide care management vs guided development of quality improved teams for depression care in GP practices vs TAU	Depressed patients with recent suicidal ideation were detected on 40.7% of index visits in intervention practices, compared with 20.5% in usual care practices, with HMO plan type and male sex associated with detection. The interventions had no effect on referral of patients, starting an anti-depressant, or suicidal ideation reported at a 6-month follow-up.	
Omar 2005	INTERNATIONAL JOURNAL OF ADOLESCENT MEDICINE AND HEALTH	Qualitative (non-specific)	USA	Community	General population adolescents	Stop Youth Suicide campaign, community-based programme	This article describes a grass roots, community-based programme for youth suicide prevention and its impact on the community. The authors claim that over a 4-year period, the programme has responded to many e-mails and phone calls from teens and/or their parents asking for help. During these years, many of these children that were seeking help ended up receiving appropriate help that contributed to changing their lives and helping them stay alive and also utilizing them to help others in that period.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Owens et al 2004	BRITISH JOURNAL OF GENERAL PRACTICE	Psychological autopsy	UK	Community	People known or thought to have completed suicide	Recognition and treatment of mental illness by GPs	Using data from a study of suicide completers who were not in contact with specialist mental health services, the authors found that the rate of detection and treatment of mental health problems in primary care was high. The major barrier to receipt of care for mental health problems prior to suicide was non-consultation. The study also shows that detection and management in primary care does not necessarily result in prevention of suicide.	
Oyama et al 2004	COMMUNITY MENTAL HEALTH JOURNAL	Cross-sectional comparison	Japan	Community	Rural older people aged 65+	Community-based prevention programme for ruralolder people	During the 10-year implementation of the programme based on strategies including screening for depression, follow-up with mental health care or psychiatric treatment and health education on depression, the relative risks estimated by the age-adjusted odds ratios for both males and females were reduced to almost one quarter more than a regional historical trend, with a better response to education for females than for males.	
Oyama et al 2006a	PSYCHIATRY AND CLINICAL NEUROSCIENCES	Cross-sectional comparison	Japan	Community	Rural older people aged 65+	Community based prevention programme for rural older people	During 1999-2004, this programme, including depression screening and group activity was conducted by the public health nurses in the Minami district (population 1685) of Nagawa town, rural Japan. The suicide risk for Minami's elderly females was reduced by 74% more than the historical trend, while there was no change in the risk of Minami's males, nor in the male or female references. This local intervention using public health nursing would be effective against suicide for older females.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Oyama et al 2006b	CRISIS	Quasi-experimental	Japan	Community	General population older people	Community-based programme to prevent suicide	Risk of completing suicide in females was reduced by 70% but not in males.	
Papakostas et al 2003	JOURNAL OF NERVOUS AND MENTAL DISEASE	Prospective follow-up	USA	Out-patient unit	Treatment-resistant major depression (TRD)	Treatment with nortriptyline (NT)	A full 6-week trial of NT, a noradrenergic tricyclic anti-depressant, may be particularly useful in patients who have failed to respond to several anti-depressants and also report significant hopelessness.	
Perseius et al 2003	ARCHIVES OF PSYCHIATRIC NURSING	Qualitative content analysis	Sweden	Not known	Personality disorder/ borderline personality disorder	DBT	Patients unanimously regarded the DBT-therapy as life-saving and something that has given them a bearable life situation. The patients and the therapists are concordant on the effective components of the therapy: the understanding, respect, and confirmation in combination with the cognitive and behavioural skills. The experienced effectiveness of DBT is contrasted by the patient's pronouncedly negative experiences from psychiatric care before entering DBT.	
Potkin et al 2003	BIOLOGICAL PSYCHIATRY	RCT	International	Not known	Schizophrenia	Clozapine versus olanzapine	Clozapine, in general, was more effective than olanzapine in decreasing the risk of suicidality, regardless of risk factors present.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Randell et al 2001	SUICIDE & LIFE-THREATENING BEHAVIOUR	RCT	USA	School or High School	School or high school students	Brief counsellors care (C-CARE) vs C_CARE & 'Coping and Support Training' peer -group intervention (CAST) vs TAU	This study evaluated the immediate post-intervention effects of 2 brief suicide prevention protocols: a brief interview--Counsellors CARE (C-CARE) and C-CARE plus a 12-session Coping and Support Training (CAST) peer-group intervention. Subjects were students "at risk" of high school dropout and suicide potential in Grades 9-12 from 7 high schools (N = 341). Students were assigned randomly to C-CARE plus CAST, C-CARE only, or "intervention as usual". C-CARE and CAST led to increases in personal control, problem-solving coping, and perceived family support. Both C-CARE plus CAST and C-CARE only led to decreases in depression, and to enhanced self-esteem and family goals met. All 3 groups showed equivalent decreases in suicide risk behaviours, anger control problems, and family distress.	
Reid et al 1998	PSYCHIATRIC SERVICES	Retrospective epidemiological study	USA	Community	Schizophrenia	Clozapine	The annual suicide rate for all patients with schizophrenia and schizo-affective disorder was 63.1 per 100,000 patients, approximately 5 times higher than in the general population. In contrast, only one suicide occurred in 6 years among patients treated with clozapine who were of similar diagnosis, age, and sex, for a suicide rate of about 12.7 per 100,000 patients per year. The authors conclude that the study results suggest that clozapine therapy is associated with a reduced risk of suicide among patients with schizophrenia and schizo-affective disorder	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Ross 1980	SUICIDE & LIFE-THREATENING BEHAVIOUR	Qualitative (non-specific)	USA	School or High School	School or high school students	Suicide prevention training for school personnel	Experience in providing consultation and survivor counselling to school personnel following student suicides led to the development of a programme of prevention through training school personnel. The goal of the programme was to increase the ability of resource persons available to adolescents-teachers, counsellors and school nurses-to recognize signs of suicidal depression and to respond effectively to suicidal students. This report describes that programme, the reaction of the participants and the observations of the project staff, and comments on the feasibility of this approach as a means of helping to prevent suicide among adolescents.	
Rost et al 1998	GENERAL HOSPITAL PSYCHIATRY	Prospective telephone follow-up	USA	Mixed	Depression identified by telephone screening	Provision of trained mental health services in rural areas	Primary care patients with undetected major depression report persistently poor outcomes. Comparison of outcomes with detected patients suggests that quality improvement efforts directed at improving detection without improving management of detected patients may not improve outcomes.	
Rotherham-borus et al 1996 (study one)	JOURNAL OF THE AMERICAN ACADEMY OF CHILD & ADOLESCENT PSYCHIATRY	Non-randomised control group comparison	USA	Hospital emergency room	Adolescent suicide attempters presenting at hospital Emergency Room with family members	Emergency Room programme (training workshop for staff & videotape to modify families' treatment expectations & on-call family therapist vs TAU)	Attempters receiving the specialized programme were more likely to attend one treatment session and were somewhat more likely to attend more sessions than those receiving standard Emergency Room care; however, their mothers were less likely to complete treatment. In addition, participants receiving the specialized programme reported reduced psychiatric symptoms, and mothers reported more positive attitudes toward treatment and perceptions of family interactions.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Rotheram-Borus et al 1996 (study two)	JOURNAL OF THE AMERICAN ACADEMY OF CHILD & ADOLESCENT PSYCHIATRY	Quasi-experimental	USA	Emergency room	Youths at risk for suicide	Specialized care programme in hospital Emergency Room (staff training video to modify family expectations)	Adherence to treatment programme by youths and their families was significantly improved by receiving the specialized care programme in the emergency room. Adherence was also associated with decreased suicidal ideation, more cohesive family relations, and higher self-esteem than at baseline.	
Rotherham-Borus et al 2000	JOURNAL OF CONSULTING AND CLINICAL PSYCHOLOGY	Quasi-experimental	USA	Emergency room	Adolescent females at risk for suicide	Specialised ER care intervention to enhance adherence to out-patient therapy (including a soap opera video)	The intervention was deemed to have a positive impact, particularly for the parents of youth with high psychiatric symptomatology.	
Rozanov et al 2002	CRISIS	Cross-sectional comparison	Ukraine	Ukraine military bases	Ukraine military personnel	Training of military officers in suicide prevention, also of representatives of most vulnerable groups plus educational materials for soldiers.	One of the main conclusions is that the prevention activity must be organized as a continuum of actions, seminars, consultations, and materials distribution.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Rutz & Walinder 1992	ACTA PSYCHIATRICA SCANDINAVICA	Cross-sectional comparison	Sweden	Community	General population/ unspecified	Educational programme for GPs on diagnosis and treatment of depression	Following the educational programmes on this Swedish island, the frequency of sick leave in patients of GPs for depressive disorders decreased, the frequency of in-patient care for depressive disorders decreased to 30% of that at the baseline; the prescription of anti-depressants increased, but prescription of major tranquilizers, sedatives and hypnotics decreased. The frequency of suicide on the island decreased significantly. This study describes the long-term effects. In 1988, 3 years after the project ended, the in-patient care for depressive disorders increased, the suicidal rate returned almost to baseline values and the prescription of anti-depressants stabilized. Thus, the effects were strictly related in time to the educational programmes, indicating that the effects were real and not only a coincidence with local trends on Gotland. Furthermore, the results indicate that educational programmes that can have pronounced effects on the health care system have to be repeated approximately every 2 years if long-term effects are to be expected.	
Rutz 2001	JOURNAL OF AFFECTIVE DISORDERS	Cross-sectional comparison	Sweden	Community	General population/ unspecified	Educational programme for GPs on diagnosis and treatment of depression	The programme was successful in reducing suicide rates by 60%. This was accompanied by reduction of different indices measuring depressive morbidity. Prevention was successful for as long as the programme was instituted.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Salkovskis et al 1990	BRITISH JOURNAL OF PSYCHIATRY	RCT	UK	Community	People at high risk of suicide or self-harm	Cognitive behavioural problem solving vs TAU	The group practising problem-solving improved significantly more than controls on ratings of depression, hopelessness, suicidal ideation and target problems at the end of treatment and at follow-up of up to one year, and there was evidence of an effect on the rates of repetition over the 6 months after treatment.	
Smith & Glaudin 1992	JOURNAL OF CLINICAL PSYCHIATRY	RCT	USA	Not specified	Major depression	Paroxetine vs placebo	Paroxetine produced significantly greater improvement than placebo for patients whose illness had lasted more than 1 year, and there was a significant reduction in suicidal ideation. Significantly fewer treatment drop-outs were due to lack of efficacy in those patients treated with paroxetine compared with those in the placebo group.	
Spivak et al 1999	CLIN.NEURO-PHARMACOLOGY	Retrospective group comparison	Israel	Not specified	Schizophrenia	Clozapine vs traditional anti-psychotics	A significant reduction in aggressive and suicidal behaviour was noted in the clozapine-treated group but not in the classical anti-psychotic-treated group.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Suominen et al 1998	AMERICAN JOURNAL OF PSYCHIATRY	Prospective follow-up	Finland	Not specified	Major depression in people who had made at least one 'suicide attempt'	Treatment for depression	Although almost all of the patients complied with the recommended aftercare following the suicide attempt, after 1 month only 7 (17%) were receiving anti-depressants in adequate doses, 9 (22%) were receiving weekly psychotherapy, and none had been given ECT. The authgors conclude that it seems that few suicide attempters with major depression receive adequate treatment for depression before the suicide attempt and that, despite their well-known high risk for suicide, the treatment situation is not necessarily any better after the attempt.	
Thompson et al 2000	SUICIDE & LIFE-THREATENING BEHAVIOUR	Repeated measures design	USA	Community	Youths at risk for suicide	School-based intervention programme emphasising personal growth and personal control with support from teachers. Intervention groups: grp 1 = 1 semester, grp 2 = 2 semester, grp 3 = no programme	For the 2 intervention groups, there were direct and/or indirect effects of teacher and peer group support on personal control, depression, and suicide risk behaviours. The general hypothesis that personal control mediates between support resources and reductions in depression and suicide risk behaviours received partial support across the study groups.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Thompson et al 2001	AMERICAN JOURNAL OF PUBLIC HEALTH	Repeated measures design	USA	Community	Youths at risk for suicide	C-CARE (brief one to one counselling assessment and crisis intervention vs CAST (coping and support training in small groups together with C-CARE) vs TAU	Analyses showed significant rates of decline in attitude toward suicide and suicidal ideation were associated with the experimental interventions. C-CARE and CAST, compared with usual care, also were effective in reducing depression and hopelessness. Among females, reductions in anxiety and anger were greater in response to the experimental programmes. CAST was most effective in enhancing and sustaining personal control and problem-solving coping for males and females.	
Thrive Initiative 2006	SCOTTISH EXECUTIVE	Qualitative (non-specific)	USA	Community	Male survivors of childhood sexual abuse	Counselling & support service focussed on male survivors of childhood sexual abuse	Reduction in the dimensions of propensity for suicide and self-harm reported by some participants.	
Tollefson et al 1994	JOURNAL OF CLINICAL PSYCHOPHARMACOLOGY	RCT	USA	Not specified	Agitated major depression	Imipramine (IMI) vs fluoxetine (FLU)	Both compounds proved to be similarly effective, however, a statistically significant difference in early discontinuations because of intolerable adverse events emerged. In conclusion, among subjects with major depression, subtype agitated, the risk:benefit profile favoured FLU over IMI.	
Tondo et al 1998	JOURNAL OF CLINICAL PSYCHIATRY	Prospective follow-up	Italy	Community	Bipolar affective disorder	Lithium	Lithium maintenance was associated with marked reduction of life-threatening suicidal acts, the number of which sharply increased after discontinuing lithium. Suicidal behaviour was strongly associated with prior suicide attempts, longer time depressed and younger age or recent onset.	
Toumbourou & Gregg 2002	JOURNAL OF ADOLESCENT HEALTH	Non-randomised control group comparison	Australia	School or high school	School or high school students	Empowerment-based parent education groups	This whole-school parent education intervention demonstrated promising impacts on a range of risk behaviours and protective factors relevant to youth self-harm and suicide.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Turner 2000	COGNITIVE & BEHAVIOURAL PRACTICE	RCT	USA	Emergency Room (ER)	Personality disorder/ borderline personality disorder	DBT vs client-centered therapy (CCT)	Outcomes showed the DBT group improved more than the CCT group on most measures. The quality of the therapeutic alliance accounted for significant variance in patients' outcomes across both treatments.	
Tyrer et al 2003	PSYCHOLOGICAL MEDICINE	RCT	UK	Community	Repeated self-harm	Brief manual assisted cognitive behavioural therapy (MACT) vs TAU	The main outcome measure, the proportion of those repeating deliberate self-harm in the 12 months of the study, showed no significant difference between those treated with MACT (39%) and treatment as usual (46%). Although brief cognitive behaviour therapy is of limited efficacy in reducing self-harm repetition, the findings taken in conjunction with the economic evaluation (Byford et al. 2003) indicate superiority of MACT over TAU in terms of cost and effectiveness combined.	
Tyrer et al 2004	JOURNAL OF PERSONALITY DISORDERS	RCT	UK	Community	Repeated self-harm	Brief manual assisted cognitive behavioural therapy (MACT) vs TAU	Results showed no significant difference between those repeating self-harm in the MACT group (39%) compared with the TAU group (46%). However, the treatment was cost effective (10% cheaper than TAU) and the frequency of self-harm episodes was fewer (50%) in the MACT group. It is concluded that MACT has value in preventing self-harm cost effectively but this appears to be confined mainly to those who do not have borderline personality disorder.	
Vanheeringen et al 1995	PSYCHOLOGICAL MEDICINE	RCT	Belgium	Community	People discharged from hospital after suicide attempt/self-harm	Motivational visits by nurses to home of 'non-compliant' patients vs. no visit	Significant beneficial effect of the experimental procedure on compliance with referral and a near-significant effect on the rate of repetition of suicidal behaviour.	

Table I.1 ***Continued***

Study ID	Publication	Type of study	Country of origin	Setting	Target group(s)	Type of intervention	Outcomes (according to the authors of the publication/researchers who conducted the studies)	Limitations
Verheul et al 2003	BRITISH JOURNAL OF PSYCHIATRY	RCT	Holland	Community	Personality disorder/ borderline personality disorder	DBT vs TAU	Dialectical behaviour therapy resulted in better retention rates and greater reductions of self-mutilating and self-damaging impulsive behaviours compared with usual treatment, especially among those with a history of frequent self-mutilation.	
Waterhouse & Platt 1990	BRITISH JOURNAL OF PSYCHIATRY	RCT	UK	Emergency Room (ER)	Patients presenting at ER with overdose	General hospital admission vs discharge home	One week later there were no significant differences between groups on diverse outcome measures, including repetition rate, psychological symptoms and social functioning. A second follow-up using the same measures at 16 weeks also failed to demonstrate any differences between groups, both of which showed considerable overall improvement. A parasuicide management policy consisting of assessment in a casualty department and selective discharge was appropriate for 15% of a hospital-referred population.	
Zenere & Lazarus 1997	SUICIDE & LIFE-THREATENING BEHAVIOUR	Retrospective follow-up	USA	School or high school	School or high school students	Suicide prevention and school crisis management programme focused on school-based crisis teams	Evaluative data indicating the effectiveness of the programme as well as implications for suicide prevention and intervention are discussed.	

ANNEX J GLOSSARY

Glossary of terms used in the review

Attempted suicide

As reviewers we have little choice but to assume that authors of research papers will take the term 'attempted suicide' to refer to any intentional act of self-harm or self-injury where the individual had a strong subjective intent to end their own life. However, in practice the term may have been used in a number of ways by different authors and, except in the rare instances where authors have defined their terminology more closely, we are ultimately reliant on their subjective interpretation of the term as it is used in their writings.

Boolean search

Boolean searching enables the researcher to narrow down a search by using special terms (called logical operators) before keywords. Examples of these terms are OR, AND and NOT. Boolean logic defines a logical relationship among search terms which means that a more specific search can be conducted that is likely to produce more relevant results.

Cognitive Behaviour Therapy (CBT)

Cognitive behaviour therapy (CBT) is a combination of psychotherapy and behavioural therapy. It includes several related approaches which are all aimed at solving life problems. CBT has been applied to a wide variety of problems, from anxiety and depression to relationship difficulties and substance abuse. By focusing on an individual's cognitive processes (such as their thoughts, images, beliefs and attitudes) and the way these relate to behaviour, CBT helps people to change their attitudes and behaviour and so deal more effectively with emotional problems.

Cohort study

This refers to a study in which patients with a specific condition or characteristic or who receive a particular treatment, are followed-up over a period of time and (usually) compared with another group who do not have the condition, characteristic or treatment. A prospective cohort study defines the groups before the study is conducted whereas a retrospective cohort design makes the grouping after data collection.

Cost-neutral

An intervention that costs no more than 'treatment as usual' is taken to be cost neutral.

Dialectical behaviour therapy (DBT)

DBT is a modification of Cognitive Behaviour Therapy (CBT), having both behavioural and cognitive therapy elements. It was developed by Marsha M. Linehan specifically to treat individuals with borderline personality disorder who were prone to self-harm, though it has been used for people with other diagnoses as well. It includes a strong emphasis on acceptance of the person as they are, combined with the expectation that current behaviours need to change. The tension that arises between this need for both acceptance and change is known as a dialectical tension, dialectics referring to finding the middle ground between two opposites.

Effectiveness and efficacy

It is common to distinguish between the efficacy and the effectiveness of an intervention. The debate about efficacy and effectiveness concerns the discrepancy between the results of randomised controlled clinical trials and the more pragmatic evaluation of treatment and practice as they occur in the clinical setting. Efficacy trials are intended to determine whether an intervention produces the expected result under ideal circumstances, whereas effectiveness studies measure the degree of beneficial effect under 'real world' clinical settings. Efficacy is high on internal validity but low on generalisability, whereas effectiveness is high on external validity but low on careful controls. The point at issue in this debate is what constitutes the best evidence for clinical decisions. Although effective health care delivery should be based on the highest level of proof of efficacy for every therapy, we may be denying patients the benefit of potentially valuable and cost-effective treatments if we ignore effectiveness.

Intention to treat analysis

In the analysis of randomised controlled trials intention to treat (ITT) analysis is based on the initial treatment intent, not on the actual treatment administered. So, as in real life, some patients will not receive their full treatment even though that was the initial intention. Nevertheless, all patients who have been randomly assigned to one of the treatment arms will be included in the analysis, regardless of whether or not they completed or received that treatment. Why the patient did not receive the treatment is of no relevance to ITT.

Manual-assisted CBT

Cognitive behaviour therapy is frequently delivered through one-to-one sessions with a therapist. However, use of a self-help treatment manual instead of this person-to-person approach has become more common in recent years and is known as manual-assisted CBT. A development from this is use of interactive CD-Rom programmes and other self-help software packages, which may be preferred by some. These approaches are likely to be more cost-effective than therapist-based CBT though research is yet to demonstrate how effective they are.

Meta-analysis

Meta-analysis is widely used in epidemiology and evidence-based medicine today. It is a form of quantitative systematic review, a statistical technique for combining the findings of several independent studies that address a set of related research hypotheses. The approach is frequently used to assess the clinical effectiveness of healthcare interventions by combining data from two or more randomised controlled trials. It provides an averaged estimate of treatment effect, weighting the role of individual studies in the analysis according to their sample size and other design characteristics.

Non-directive therapy

Client-centred Rogerian therapy is a form of non-directive therapy. The non-directive approach starts from the individual client and the therapist does not structure the session or direct the client. Instead, the therapist waits to see whatever emerges, reflecting back to the client what they say and sometimes restating the client's comments.

Non-interventionist approaches

An approach that involves no proactive intervention can be said to be non-interventionist. It refers to a situation where a purposefully non-directive, solely listening, stance is adopted by the therapist or counsellor.

Randomised controlled trial (RCT)

Randomised controlled trials are generally considered to be the most rigorous method of determining whether a causal relationship exists between a given treatment and a specific outcome. These studies are experimental. The researcher randomly assigns subjects or other units of study, such as hospital wards or clinics, into groups. These groups should be identical except for the fact that they either receive or do not receive the intervention(s) under consideration. Where it is feasible and appropriate the study is designed so that patients and researchers remain unaware of which treatment was given to which individual subject until the study is completed - a procedure known as double blinding. The results are analysed by comparing outcomes in the groups, regardless of whether they experienced the intended intervention (known as intention to treat analysis).

Rogerian therapy

Rogerian therapy is also known as Person-Centred Therapy and Client-centred therapy. It was developed by the humanist psychologist Carl Rogers in the 1940s and 1950s and is founded on empathy, which he viewed as healing in itself. The client is encouraged to express their feelings within an environment of empathy, unconditional positive regard and acceptance. The therapist does not suggest how the person might wish to change, but by listening and then mirroring back what the client reveals to them, helps them to explore and understand their feelings for themselves. They are then able to decide what kind of changes they would like to make and can achieve personal growth.

Self-harm

As with the term 'attempted suicide', as reviewers we have little choice but to assume that authors of research papers will have some shared element of meaning around this term referring to self-poisoning or self-injury, irrespective of the apparent purpose of the act. However, in practice the term may have been used in a number of ways by different authors and, except in the rare instances where authors have defined their terminology more closely, we are ultimately reliant on their subjective interpretation of the term as it is used in their writings.

Sensitivity and specificity

Sensitivity and specificity are the most widely-used statistics to describe a medical diagnostic test. When a test is imperfect, a balance is sought between sensitivity and specificity, where sensitivity refers to the proportion of people with a disease who have a positive test result and specificity refers to the proportion of people without disease who have a negative test result. This idea has been borrowed by systematic reviewers so, in the context of citation searching in a systematic review, a restriction term string is developed to identify material relating specifically to the characteristic of interest which, in the present case, is interventions to prevent suicide. The aim is to increase the sensitivity of the full search term without reducing the specificity of the search in identifying relevant material.

Suicidal behaviour

This term applies to any behaviour that could in principle lead to completed suicide, regardless of whether this is the intention of the individual. This includes behaviours that could be considered to be acts of attempted suicide as well as any behaviour that contains an element of self-harm or self-injury. Suicidal behaviour therefore relates not only to actions where the individual intentionally self-injured with the aim of completing suicide, but also to other self-injurious acts not intended to result in death. The actual death or survival of the person concerned is not the point at issue.

Suicidal ideation

Any thoughts an individual may have of taking their own life are considered to be suicidal ideation. This remains true whether or not the thoughts include a plan to complete suicide.

Treatment-as-usual

Often referred to by the shortened form 'TAU', treatment that would usually be given in an everyday non-research clinical context is known as treatment-as-usual. TAU is commonly compared with treatment or procedures that have been specifically given as part of an experimental research study.

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