



Public Health
England

Commissioning Cost-Effective Services for Promotion of Mental Health and Wellbeing and Prevention of Mental Ill-Health

About Public Health England

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Plain English summary

There is no health without mental health. Promoting and protecting the mental health of everyone is vital to improve the quality of people's lives.

It is important to promote good mental health because it has been associated with better physical health. This includes better heart health, an improvement in the ability of our immune systems to fight problems and slower progression of some problems. Having good mental health and wellbeing makes it easier to deal better with the different stresses (physical and mental) and problems in life. It also supports our ability to fulfill our ambitions and dreams, to be more confident, have good relationships with other people and cope with life's ups and downs. It can help us to do well at school, in the workplace and in adjusting to retirement. Better mental health and wellbeing may also improve community spirit, bringing people together and reducing levels of violence, intolerance and crime.

It is also important to protect our mental health. Lack of appropriate care may lead to other adverse outcomes such as people ending up in prisons, institutions, becoming homeless, and dying early, all associated with significant financial and human costs. People with mental health problems report experiencing stigma, disadvantage and discrimination when accessing services. For instance some people may be reluctant to talk with their GP about their mental health because of a fear of being identified as having mental health problems, and then being socially stigmatised. Many people who have poor mental health also have other physical health problems. As a result, they may die earlier than the general population. Treating avoidable physical health problems and their complications can also cost the National Health Services (NHS) enormous amounts each year. Poor mental health also reduces someone's chances of being in employment or finishing school, college or university, as well as increasing costs in places such as schools and workplaces. People can also be marginalised and excluded from participation in opportunities to be physically active (including gyms, sports) social events, education, health improvement interventions (eg smoking cessation support) and many other aspects of community life.

There is clear evidence proving that a range of prevention activities promote good mental health and reduce some of the impacts of poor mental health. These actions have also been shown to be cost-effective as a good way of spending money on activities that improve health outcomes.

This report is designed to enhance what is already known about the economic case for action in the mental health area. Building on the 2011 report *Mental Health Promotion and Mental Illness Prevention: the Economic Case* (Knapp, McDaid and Parsonage, 2011), this report summarises the findings of modelling work to estimate the cost of investing in a number of different interventions for which there is evidence that they can help reduce the risk and/or incidence of mental health problems in individuals of different ages and/or promote good

mental health and wellbeing. The intention is that local areas will use this additional information alongside the interventions highlighted in the 2011 report.

To do this work, a detailed search was made to find previous studies of actions to promote good mental health and to prevent mental health problems from occurring. This included evidence on suicide prevention. Evidence that has emerged since 2011 on the economic case for investing in actions that work was used to inform modelling. Economic models were then built for eight different interventions.

The interventions examined are:

- school based programmes to prevent bullying and initiatives to prevent depression in children and young people
- workplace programmes to promote mental health and initiatives to help adults at risk of stress, anxiety and depression
- mental health support integrated into the pathways and interventions for people with long term physical health problems eg diabetes and heart disease
- group based social activities, including volunteering, to address loneliness as a way of promoting mental health
- financial advice services for people with debt problems located in primary care
- initiatives to identify and support people who have self-harmed and are potentially suicidal

The intention is to help local economies (places and organisations) to make informed choices about how resources can be targeted to improve the public's mental health. In particular the models look at potential resources and money that public sector organisations could avoid spending due to poor mental health through investing in these eight promotion and prevention activities.

The economic models highlight the typical investment source (eg health, education, employers) alongside the range of beneficiaries. Each calculates return on investment (ROI). This shows total costs that can be avoided for every pound invested in an intervention, eg a ROI of £5 would mean £5 in costs averted could be realised for every £1 invested in an intervention. The evidence from these models was then used to create a Microsoft Excel-based ROI tool which compares the level of investment in any one of these actions with the level of costs that can be avoided in different local authority areas and NHS Clinical Commissioning Groups in England.

The report finds that there is a strong case for investing in these different actions. Each provides good value for money when compared with the current ways that money to improve our quality of life is spent. The prevention activities represented in this report provide a ROI that vary between £1.26 and £39.11 per £1 spent on these activities. Where it is possible to estimate impacts on quality of life, all of the interventions appear to be cost-effective, with a cost per quality adjusted life year (QALY) gained below £20,000. This is the same threshold as used by NICE.

Finally, it should be stressed that the presentation of these economic models is designed to encourage partnership and collaborative approaches to investment. This report does not advise or direct against investment in proven evidence based interventions that cannot show cash-releasing benefits or are cost neutral. Instead, and in the context of constantly increasing pressures on resources, local economies are encouraged to use this report to inform what blend of investments will deliver local ambitions for better mental health in a sustainable way.

Introduction

The health, social and economic consequences of poor mental health are substantial. One in four adults experience at least one diagnosable mental health problem in any given year (Mental Health Taskforce, 2016). 10% of children aged 5 to 16 have significant mental health difficulties (Public Health England, 2016b). The most recent psychiatric morbidity survey in England in 2014 estimated that one adult in six had a common mental health disorder (CMD)¹: about one woman in five and one man in eight. It noted that since 2000, overall rates of CMD in England have steadily increased in women and remained largely stable in men (McManus et al., 2016). Data are also available on the contribution of poor mental health to the total burden of disease in England. In 2015 in England, mental health problems (schizophrenia, alcohol use problems, depressive problems, eating disorders and autistic spectrum disorders) accounted for 4.87% of the total Disability Adjusted Life Year (DALY) disease burden. They also accounted for 9.7% of all Years Lived with a Disability (YLD) in 2015² (Institute for Health Metrics and Evaluation, 2017). 50% of long-term mental health problems emerge by the age of 14; 75% by the age of 18 (Jones, 2013, Silva and Stanton, 1996).

The health, social and economic consequences of poor mental health are substantial. In England, it has been estimated that the government spends around £19 billion every year within and beyond the health system on dedicated services for people with mental health needs³ (Mental Health Taskforce, 2016). The NHS alone spent almost £9.2 billion in 2015/16 on mental health problems⁴. The mental health planned spend at Clinical Commissioning Group (CCG) level was 12.5% of their overall budgetary allocation in 2015/16 (NHS England, 2016a).

These budgetary costs under-estimate the full impact of poor mental health as it also increases the risks of poor physical health and poor management of pre-existing physical health problems. Studies in the UK and elsewhere indicate that people living with severe mental health problems may die up to 20 years younger than the general population (Chang et al., 2011, Nordentoft et al., 2013). These impacts are also felt well beyond the health care system, mainly due to lost economic productivity as a result of reduced participation in work, education and community activities. There is also the increased risk of premature mortality mainly due to poorer physical health but also linked with self-harm and suicide. Perhaps most significant of

¹ CMDs are characterised by a variety of symptoms such as fatigue and sleep problems, forgetfulness and concentration difficulties, irritability, worry, panic, hopelessness, and obsessions and compulsions, which present to such a degree that they cause problems with daily activities and distress McManus, S., Bebbington, P., Jenkins, R. & Brugha, T. (eds.) 2016. *Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014*, Leeds: NHS Digital.

² These figures have been accessed via <http://ghdx.healthdata.org/gbd-results-tool> Global Burden of Disease Tool. January 2017.

³ Estimate excludes dementia, learning disability and substance abuse.

⁴ Includes spending on dementia, learning disability and substance abuse.

all, it remains the case that many people who have experienced poor mental health have been subjected to prejudice, stigmatisation and social exclusion. These substantial impacts mean that potentially there is a strong economic case - as well as a health and moral case - for investing in actions to promote better mental health and reduce the risk of developing mental health problems.

There is now a growing body of literature that looks not only at the effectiveness of actions to promote mental health and prevent mental health problems (Goldie et al., 2016), but also looking at their cost-effectiveness (Vos et al., 2010, Smit F et al., 2015). This evidence base has highlighted a number of promising actions that can be taken across the life-course. This included work undertaken by the LSE in 2011 which looked at the economic case for investing in 15 different promotion and early intervention actions (Knapp, McDaid and Parsonage, 2011).

The purpose of this report is to undertake further modelling work to build on this earlier evidence. It identifies eight interventions delivered in a number of different sectors for which there is evidence that they can help reduce the risk and/or incidence of mental health problems in individuals of different ages and/or promote good mental health and wellbeing.

This new evidence base largely complements and augments the existing evidence in the 2011 report and a brief summary of the relationship between the two reports is provided on page 55. The report recognises that a holistic and collaborative approach working across sectors may be needed to improve health outcomes. The approach taken here identifies which sectors, such as CCGs, Local Authorities or schools are likely to pay for each of the eight interventions that we have modelled; it also looks at the potential resource use and costs that can be avoided over different time periods, depending on the nature of the evidence available. It also notes the potential for achieving cashable savings and/or a freeing up resources for alternative uses. These cashable savings can be thought of being a sustainable reduction in planned budgetary expenditure that at worst has a neutral impact on service delivery (Shared Intelligence and LLP, 2014).

The evidence from these models has subsequently been used to inform a Microsoft Excel-based ROI tool which compares the level of investment in any one of these actions with the level of costs that can be avoided in different local authority areas and CCGs in England.

Our primary focus is the health and social care perspective, including benefits relating to reduced impacts of co-morbidities if these can be identified, but it is also important to be aware of wider public purse and societal perspectives. Each summary chapter documents which sectors incur costs and where potential savings fall, eg impacts on the education sector related to a school-delivered mental health promoting intervention, or major impacts on patterns of employment or participation in work. In some cases these savings may release resources that can be used for other health-related purposes, but in others there may be cash-releasing opportunities. Costs and pay-offs beyond one year have been discounted at a rate of 3.5% per

annum; health benefits have been discounted at a rate of 1.5%⁵. We have also explored a discount rate of 0% in sensitivity analysis. All values are reported in 2015 prices.

⁵ Health benefits are discounted at 1.5% per annum in line with DH Impact Assessment Guidance and the HM Treasury Green Book (reference: http://www.hm-treasury.gov.uk/data_greenbook_index.htm).

Addressing bullying targeted at children and young people

Background

Bullying can be defined as behaviour that is intended to hurt someone either physically or emotionally (Gov.UK, 2016). It can include both direct aggressive behaviour (eg, physical assault and intimidation, teasing and verbal threats) and indirect aggressive behaviour (eg, exclusion, rejection) (Evans, Fraser and Cotter, 2014). It is very common among young people. The recent Health Behaviour of School Children (HBSC) survey in England asked the question 'how often have you been bullied at school in the past couple of months?' 36% of 11 year old girls and 33% of boys reported that they had been bullied at least once in the last two months (Brooks et al., 2015). Other sources of information on prevalence include the annual bullying survey of young people aged 12-20 conducted by Ditch the Label (Ditch the Label, 2016), as well as the annual extension to the Crime Survey for England and Wales for 10 to 15 year olds (Office for National Statistics, 2015).

A recent phenomenon has been the emergence of cyberbullying. Cyberbullying refers to bullying through electronic means, typically through mobile phones, the internet and e-mail. It has been defined as 'an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself' (Smith et al., 2008). It affects between 20% and 40% of all young people (Tokunaga, 2010). Young women are more likely to report being the victims of cyberbullying than young men. The recent HBSC survey for England estimated that at least 24% of girls and 12% of boys had been cyberbullied in the previous 3 months (Brooks et al., 2015). The risk of cyberbullying increases with age, unlike traditional bullying.

There are immediate impacts of bullying on mental health and emotional wellbeing, including the risk of self-harm, and suicide (van Geel, Vedder and Tanilon, 2014). Children and young people who were frequently bullied were more likely to use mental health services, both in childhood and adolescence (OR 2.53) and in midlife (OR 1.30) (Evans-Lacko et al., 2016). There are increased risks in adulthood of depression, (Ttofi et al., 2011) a lack of social relationships, economic hardship and poor perceived quality of life up to age 50 (Takizawa, Maughan and Arseneault, 2014). Children and young people who have been bullied are significantly more likely to have poor academic results and lower levels of earnings than those who have not experienced bullying (Brown and Taylor, 2008, Takizawa, Maughan and Arseneault, 2014).

Actions against bullying in schools

In England, by law, all state schools must have a behaviour policy in place that includes measures to prevent all forms of bullying among pupils. This policy is decided by the school and all teachers, pupils and parents must be told what it is. The Department of Education also recommends that all forms of bullying (including cyberbullying) should be handled as a community issue for the whole school, emphasising the importance of schools taking measures to prevent and tackle bullying among pupils. The Independent School Standards Regulations 2010 also state that the proprietor of an Academy or other independent school is required to ensure that an effective anti-bullying strategy is drawn up and implemented. These requirements apply equally to mainstream and special needs school settings.

Schools are free to take their own approaches to addressing bullying. This could include actions to influence school culture as well as working with young people as an element of PSHE (Personal, Social, Health and Economic) education that most state schools provide in some form. Again the form that PSHE takes, is up to individual schools to decide, and could include the provision of education on bullying.

Intervention modelled

The economic model looks at the potential ROI of implementing one promising example of a school-based programme (KiVa) to support young people within and outside the school environment to counter the impacts of all bullying, including cyberbullying and other forms of online abuse. The comparator is assumed to be usual provision only, their current PSHE curriculum (Clarkson et al., 2016). The KiVa programme, developed in Finland, focuses on enhancing the empathy, self-efficacy, and anti-bullying attitudes of classroom peers; positive changes in the behaviour of pupils who are neither bullies nor victims can reduce the rewards that bullies perceive that they receive and thus reduce the incentives for bullying. It has two elements: “universal actions include classroom-based lessons that (a) raise awareness of the role that the group plays in maintaining bullying, (b) increase empathy toward victims, and (c) promote young people’s strategies for supporting the victim and thus their self-efficacy to do so. Indicated actions target specific incidents of bullying, including cyberbullying, through adult intervention and peer support for the victimised student” (Williford et al., 2013). The programmes are delivered by teaching staff within the school day. It includes specific teaching on cyberbullying.

KiVa has been implemented in more than 90% of all schools in Finland for children between the ages of 7 and 16 and in a non-randomised trial involving more than 150,000 students, participants in the control group were 22% more likely to be victims and 18% more likely to be perpetrators of bullying during the first 9 months of the study (Karna et al., 2011). Other analysis indicates a small but significant reduction, specifically in cyberbullying, among KIVA participants (Williford et al., 2013). KiVa has been implemented in a number of countries, including evaluation in three schools in England and 14 schools in Wales that has

demonstrated the feasibility of implementation (Hutchings and Clarkson, 2015). In England the KiVa curriculum covers half of the KS2 PSHE curriculum components, meaning that it could fit well within existing PSHE commitments in schools.

Modelling assumptions

The economic model follows a hypothetical primary school cohort of 200 pupils, initially in year 3 of school (aged 7). The model then runs for 4 years until the end of primary school. The appendix provides more detail on model assumptions, with evidence on effects and costs taken from previous evaluations in Finland and in Wales. It looks at impacts on the use of Child and Adolescent Mental Health services (CAMHS), contact with GPs, periods of absence from school and the costs to the NHS of accident and emergency hospital costs and psychosocial assessments for self-harm. The model assumes that costs of funding the KiVa programme are assumed to be borne by either the school itself (the majority of schools) or the local education authority.

Results

As Table 1 shows, for a cohort of 200 children, investment overall in KiVa is associated with net increased costs of £4,658 or £23.29 per child over a four year period, but it is also associated with an additional 15 bullying free years. This means that there is a overall ROI of £1.58 for each pound spent over four years. At first glance this may not appear that attractive to schools as most of the costs of implementing the intervention rest with them, but this is a very conservative estimate of the short term ROI. There are additional benefits of great importance to the education sector including educational achievements, school atmosphere and reputation that we have not been able to place a monetary value on these impacts. Higher educational attainment will increase potential earnings in adulthood. Using the 1958 UK Birth Cohort economic analysis, has for instance, indicated an average wage return of 18% for obtaining O-Levels⁶ (principal exams at age 16 until 1988) and a further 6% return from A-Levels⁷ at age 18 compared to achieving no qualifications at age 16 (Blundell, Dearden and Sianesi, 2004).

Again using the 1958 Cohort, it has also been estimated that each young person who had not been frequently bullied at age 11 would have a higher monthly wage of between £39 per month and £116 per month (price year not stated) between the ages of 18 and 42 compared to those who had experienced frequent bullying (Brown and Taylor, 2008). The increase in comparable earnings today associated with better academic performance at age 16 and 18 needs to be determined and incorporated into a future version of the model. This in turn will also increase the likelihood of a young person going into higher education (university), which has been associated with substantial lifetime net economic benefits to society and individuals amounting

⁶ Principal exams taken at school usually at age 16 in England until 1988.

⁷ Higher level exams currently taken at school or college usually at age 18 in England.

to hundreds of thousands of pounds per individual compared to not going into higher education (Department for Business, 2013).

Sensitivity analysis involved considering the potential impact of on wages earned at age 50 drawing on data from the UK 1958 birth cohort. Men who had been frequently bullied at age 11 compared with those that had not had mean average salaries that were £52 less per week (£2,704 per year) than for the non-bullied. For women the bullied group had a difference in mean wages was £31.10 (£1,617) (Takizawa, Maughan and Arseneault, 2014). We do not know the impact on wages at age 18 today, but including earnings impacts dramatically increases the case for investment. If an annual differences in wages between £1,617 and £2,704 per year were to be seen, then adding lost earnings for individuals aged 18 alone who had been subject to intense bullying at age 11 would increase the ROI to between £3.97 and £5.58. Extending this impact of lost earnings to age 21 would increase the ROI to between £10.67 and £16.79 for women and men respectively.

Another study using longitudinal data following children born in Denmark between 1990 and 1992 looked at the association between being bullied by age 10 – 12 on education, health and crime outcomes by age 18 (Eriksen, Nielsen and Simonsen, 2014). It indicated higher educational outcomes, lower rates of teenage pregnancy, lower body weight and lower use of psychopharmacological medications for children who had not been bullied. It also identified a higher probability of criminal convictions in children who had been bullied and then become perpetrators of bullying themselves.

There are reductions in costs in the model to CCGs through a potential reduction in the use of CAMH services and fewer attendances at hospital A&E departments for self-harm. But there will also be additional avoidable costs to schools not shown. For each child who goes on to develop mental health problems at school then there will be substantial costs to schools and local authorities, for both frontline (parental meetings with teachers, extra help provided in school by teaching staff and support assistants, special educational needs services) and special education services (attendance at specialised provision and contact with educational social workers and educational psychologists), which we have not included in this model of just over £1,500 per pupil with mental health problems per annum (Snell et al., 2013). This would further increase the case for investment.

In addition to short term outcomes considered in the model, data from the Avon Longitudinal Study of Parents and Children (ALSPAC) have been used in sensitivity analysis to look at the potential association between being the victim of bullying in childhood and levels of depression, anxiety and psychosis at age 18. Young people who were the victims of bullying at age 13 were at significantly higher risk of mental health problems at age 18. They were 2.5 times more likely to have psychotic experiences at 18 compared to young people who had not been bullied by the age of 13 (Lereya et al., 2015). The same study also suggested they were 1.91 times more likely to have depression and 1.92 times more likely to have anxiety problems. Another analysis of ALSPAC which distinguished between children who had been frequently or sometimes

bullied at 13 reported rates of depression at age 18 that were 1.87 and 1.13 times greater than for young people who had not been bullied (Bowes et al., 2016).

In sensitivity analysis when the potential longer term reductions in the use of health care services to treat depression and anxiety disorders are considered then the economic case for investment becomes stronger still. This long-term ROI perspective in this model is still conservative as only costs incurred for an initial episode of depression at age 18 were included. there will be additional ongoing depression and psychosis treatment costs for some of these young people over many years. Mental health problems in adulthood will also have further impacts, for instance on contact with the criminal justice system and poor physical health. Finally, the model is also conservative as future cohorts of children and young people would also benefit from the teachers trained to deliver KiVa. Factoring in all these extra favourable impacts would suggest that there is in fact a strong case to be made for these actions having a positive long term ROI.

Table 1: Total net costs/payoffs for cohort of 200 pupils receiving KIVA bullying intervention (2015 prices)

	Year 1	Year 2	Year 3	Year 4	Total Cost / Saving
Incremental cost of KIVA intervention	£320	£116	£112	£108	£656
CAMH cost	£0	-£83	-£112	-£126	-£321
GP cost	-£1	-£1	-£1	-£1	-£3
Pupil Absenteeism	-£129	-£143	-£158	-£162	-£592
Self-Harm	£0	-£31	-£42	-£48	-£121
					£0
Total cost (saving if negative value)	-£129	-£258	-£313	-£337	-£1,037
Overall Return per Pound Invested	£0.40	£0.89	£1.28	£1.58	£1.58
Intense Bullying Victimization Free Years Gained	3	3	4	4	14

Table 2: Total costs and bullying victimisation free years gained for cohort of 200 pupils receiving bullying intervention (2015 prices)

	Year 1	Year 2	Year 3	Year 4	Total
Intervention cost	£320	£116	£112	£108	£656
CAMH cost	£5,115	£5,112	£5,010	£4,880	£20,116
GP cost	£24	£23	£23	£22	£92
Absenteeism	£586	£603	£629	£629	£2,447
Self Harm	£0	£64	£89	£101	£254
Total cost	£6,044	£5,918	£5,863	£5,740	£23,565
Intense Bullying Victimisation Free Years	187	183	179	176	726

Table 3: Total costs and bullying victimisation free years gained for cohort of 200 pupils receiving usual action (2015 prices)

	Year 1	Year 2	Year 3	Year 4	Total
Usual care	£0	£0	£0	£0	£0
CAMH cost	£5,115	£5,195	£5,122	£5,006	£20,437
GP cost	£24	£24	£24	£23	£95
Absenteeism	£714	£745	£787	£792	£3,039
Self-Harm	£0	£96	£131	£149	£376
Total cost usual care	£5,853	£6,060	£6,064	£5,969	23,947
Intense Bullying Victimisation Free Years	184	180	176	172	712

School-based social and emotional learning programmes

Background

Adverse experience and poor psychological wellbeing in childhood may have long-lasting and profound consequences, which not only last into adulthood but affect future generations. There is already an evidence base that a range of interventions can be delivered in school for the benefit of mental health, as well as social, emotional and educational outcomes (Weare and Nind, 2011). Many of these interventions focus on developing social, emotional and mental health literacy skills and instilling good behaviours in children and young people, with increasingly strong evidence on the economic case for action. They may also have an impact on educational attainment: a meta-analysis of 213 universal school-based programmes delivered to promote pupils' social and emotional development found that programmes were associated with a significant 11% improvement in academic performance (Durlak et al., 2011). Significant effects were maintained in the 15% of studies that reported at least a 6-month follow-up.

A recent meta-analysis and economic model developed in Australia also showed that universal interventions, including resilience programmes to prevent depression, can be cost-saving (Lee et al., 2016). Here we also consider whether there are social and emotional learning programmes which may also help reduce the immediate risk of depression in young people at crucial time in their lives that will impact on their futures.

Intervention modelled

The model compares the impact of a version of the Penn Resilience Programme that has been adapted for implementation in England, with usual school practice in the prevention of depression in children and young people. The intervention aims to increase resilience and prevent depression through teaching pupils cognitive-behavioural and social problem-solving skills. It aims to improve children and young people's psychological well-being by building resilience and promoting accurate thinking (Challen et al., 2011, Challen, Machin and Gillham, 2014). It has been shown to have a modest impact (relative risk reduction 0.55) in reducing the incidence of depression in the short term (6 months) in a number of non-UK settings (Lee et al., 2016, Stockings et al., 2016). Similar small impacts on depression have also been seen in a non-randomised trial of the intervention in 16 schools in England, but the effect was not sustained at one-year follow-up (Challen et al., 2011, Challen, Machin and Gillham, 2014). The programme was also found to have positive short-term (less than one year) impacts on child emotional, behavioural, social, and school wellbeing. There were also impacts on school performance and level of school absenteeism. On average, children and young people whose

psychological wellbeing improved had higher levels of academic achievement and were more engaged in school than children who did not experience those levels of emotional wellbeing

In England the programme has been delivered by trained school staff. The model follows 150 hypothetical pupils in one school year (aged 11 to 12) for a 7-year period (ie until school leaving age). It is assumed that the intervention is offered to all pupils as part of their PHSE curriculum and that each course consists of 18 one-hour sessions during the school year. All pupils are assumed to be depression-free at baseline. The model then looks at the potential ROI associated with a reduction in new cases of depression at 6-month follow-up. Beyond six months the model assumes there is no further impact on the relative risk of developing or remaining in a state of depression. Further details on assumptions on costs and effects are provided in the Appendix to this report. Treatment as usual is assumed to be no more effective than a 'do-nothing' option.

Results

Table 4 shows a positive ROI from the programme, if costs of absenteeism to parents are included in the analysis, with an overall ROI of £5.05 for each £1 invested. Tables 5 and 6 provide cost and outcome data for the resilience and usual PSHE groups over the seven years of the model. There are further small gains in Year 2 due to the initial lower rate of depression, but beyond Year 2 there is very little difference in costs between the resilience programme and PSHE as usual, due to the lack of any long term impact on rates of depression. From the narrow health system perspective, there is a cost per QALY that is less than £2,000 – a value that would be considered highly cost-effective; however, the costs of intervention will likely be borne by the education rather than health sector. The intervention is not cost-saving from an education perspective if it were to be delivered solely to prevent depression but there are additional benefits of importance to schools that cannot easily be reported in money terms, such as a better school atmosphere and better academic outcomes. The evaluation in England reported an improvement in the number of pupils attaining Key Stage 2 targets for English. It was also associated with small reductions in the use of school health services and a reduction in school absenteeism. This analysis is also much more conservative than some previously reported which took account of wider impacts of better emotional health, suggesting a ROI of 7:1 (Social Research Unit, 2013) and to be cost-saving in Australia (Lee et al., 2016).

There appears to be an economic case for investing in effective resilience programmes, even if these benefits, such as reduced depression, are not long-lasting. There may also be additional reinforcement of benefits from further participation in the programme as it is also offered to pupils aged 12 to 13 in some English schools. The economic case will be strengthened given that once teachers are trained they are, subject to school leadership priorities and remaining in post, potentially able to deliver the programme to future cohorts of children at substantially lower cost since they do not need to repeat a full course of training.

A major limitation remains a lack of evidence of long-term impacts of many programmes, including impacts on education. One current long term evaluation looking at the impact on GCSE scores of a school-based cognitive behavioural therapy approach to influence motivation and resilience is however due to report in 2019 (Education Endowment Fund, 2016). Future analyses may wish to look at whether resilience programmes might be more effective if targeted at higher-risk groups of children and young people rather than a universal approach, or whether follow-up 'booster' sessions can improve the long-term effectiveness of programmes. At the same time, acceptability issues, particularly to intervention providers, including schools and mental health professionals, need to be considered before any large-scale implementation, especially when transferring programmes from very different socio-economic and academic contexts to English settings.

Table 4: Total net costs, quality adjusted life gained and ROI from school based resilience programme for 11-12 year olds (150 pupils in school year)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total Cost / Saving
Cost of Resilience Programme Training	£1,298	£0	£0	£0	£0	£0	£0	£1,298
A&E, inpatient and outpatient hospital contacts	-£344	-£24	-£2	£0	£0	£0	£0	-£370
General Practice (GP) services	-£78	-£5	£0	£0	£0	£0	£0	-£84
School Nurse or Counsellor	-£9	-£1	£0	£0	£0	£0	£0	-£9
CAMHS and child psychologists	-£2	£0	£0	£0	£0	£0	£0	-£2
Social workers	-£1	£0	£0	£0	£0	£0	£0	-£1
Other professionals	-£12	-£1	£0	£0	£0	£0	£0	-£13
Absenteeism cost to families	-£6,107	£0	£0	£0	£0	£0	£0	-£6,107
Total cost consequences (saving if negative value)	-£6,553	-£31	-£2	£0	£0	£0	£0	-£6,586
Total costs (saving if negative value)	-£5,255	-£31	-£2	£0	£0	£0	£0	-£5,289
Cumulative Return per Pound Invested	£5.05	£5.07	£5.08	£5.08	£5.08	£5.08	£5.08	£5.08
QALYs	0.44	0.03	0.00	0.00	0.00	0.00	0.00	0.47

Table 5: Total net costs and quality adjusted life gained, school based resilience programme for 11-12 year olds (150 pupils in school year)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
Cost of Resilience Programme Training	£1,298	£0	£0	£0	£0	£0	£0	£1,298
A&E, inpatient and outpatient hospital contacts	£2,142	£2,840	£2,798	£2,706	£2,614	£2,525	£2,439	£18,065
GP services	£483	£641	£631	£611	£590	£570	£550	£4,077
School Nurse or Counsellor	£53	£71	£70	£67	£65	£63	£61	£450
CAMHS and child psychologists	£10	£13	£13	£13	£12	£12	£11	£84
Social workers	£7	£9	£9	£8	£8	£8	£8	£56
Other professionals	£75	£100	£99	£95	£92	£89	£86	£636
Absenteeism cost to families	-£6,107	£0	£0	£0	£0	£0	£0	-£6,107
Total cost	-£2,039	£3,674	£3,619	£3,501	£3,382	£3,266	£3,155	£18,558
QALYs	124.42	121.57	119.69	117.91	116.16	114.44	112.74	826.94

Table 6: Total net costs and quality adjusted life gained PSHE group 11-12 year olds (150 pupils in school year)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total
A&E, inpatient and outpatient hospital contacts	£2,486	£2,865	£2,800	£2,706	£2,614	£2,525	£2,439	£18,435
GP services	£561	£647	£632	£611	£590	£570	£550	£4,161
School Nurse or Counsellor	£62	£71	£70	£67	£65	£63	£61	£460
CAMHS and child psychologists	£12	£13	£13	£13	£12	£12	£11	£86
Social workers	£8	£9	£9	£8	£8	£8	£8	£57
Other professionals	£88	£101	£99	£95	£92	£89	£86	£649
Absenteeism cost to families	£0	£0	£0	£0	£0	£0	£0	£0
Total cost usual care	£3,216	£3,706	£3,621	£3,501	£3,382	£3,266	£3,155	£23,847
QALYs	123.98	121.54	119.69	117.91	116.16	114.44	112.74	826.46

Promoting mental health and wellbeing in the workplace

Background

We spend much of our lives at work, and as such the workplace is a key setting in which to promote and protect mental health. Effective implementation of preventive strategies at work can not only promote better mental health but also help avoid some of the immediate substantial costs of absenteeism and presenteeism (being at work but being less productive, sometimes despite working longer hours than other employees,) that are associated with poor mental health (McDaid and Park, 2014). Presenteeism is likely to account for most of the costs to business; one recent review of experience in ten countries suggested that it was between five and ten times greater than the costs of absenteeism (Evans-Lacko and Knapp, 2016) . Presenteeism may be high within a workplace, even if absenteeism rates are low; this may be particularly the case if an employee worries that their job might be under threat if they take time off work. There are also increased future risks. Presenteeism is a risk factor for future sickness absence and poor physical and mental health (Skagen and Collins, 2016). This may result in early retirement from the labour force due to disabling levels of poor mental health. Sickness absence due to depression and anxiety also increases both the risk of early retirement from the labour force and premature death, particularly in men (Wedegaertner et al., 2013).

Actions to promote mental health in workplaces can be separated into actions at an organisational level and those targeted at specific individuals (Corbiere et al., 2009, Wagner et al., 2016, Naghieh et al., 2015). Organisational measures include promoting awareness of the importance of mental health and wellbeing at work for managers, as well as risk-assessment and management for stress and poor mental health. The latter may include actions to modify the physical working environment or terms of employment, as well as social relations at work and opportunities for career progression. Measures targeted at individuals might include modifying workloads and flexible working hours, provision of physical activity and general wellbeing programmes, providing cognitive behavioural therapy, relaxation, mindfulness and time-management training, exercise programmes and goal-setting.

A number of evaluations have focused on interventions targeted at people who already exhibit signs of undue stress and mental problem in the workplace, and these are discussed in a later section of this report. Here, we focus on universal workplace health promotion; an area where the literature covers complex, multi-layered actions that are typically not assessed within the context of a controlled trial. Much of this literature, is from contexts outside of the UK, particularly countries where employers are either responsible for sickness payments for a long period of time (eg the Netherlands) or are responsible for the health care costs of their employees (eg the United States).

What do we know about what works?

Effective universal workplace health promotion programmes, not only can improve mental and physical health outcomes, but also can have productivity benefits to business. These actions are in addition to protections that may be embedded within health and safety legislation that impact on mental health. The evidence base on 'what works' remains limited; in part this is because many organisational-level measures are not easy to formally evaluate in a controlled manner, although one recent systematic review of 39 organisational-level interventions was able to find positive impacts in about half of the studies examined (Montano, Hoven and Siegrist, 2014). Another systematic review found that the common elements of the successful workplace promotion programmes included factors such as a supportive atmosphere and embedding a wellness culture at an organisational level (Cancelliere et al., 2011). In research conducted for the Health and Safety Executive (HSE) in the UK to evaluate their approach to reducing workplace stress (the Management Standards), several benefits were found of organisational-level interventions: improved performance (measured both objectively and subjectively), lower absenteeism, reduced turnover intention, better team performance, and fewer work-withdrawal behaviours (Cancelliere et al., 2011). Psychosocial risk-assessment procedures and better training of line-managers to recognise risk factors for poor wellbeing nonetheless are key recommendations of guidelines on workplace mental health promotion (National Institute for Health and Care Excellence, 2009).

Intervention modelled

Most of the existing economic literature has focused on the case for interventions targeted at individuals rather than at the organisational level (Hamberg-van Reenen, Proper and van den Berg, 2012, McDaid and Park, 2011). Here we update an existing model looking at the provision of a multi-component universal mental health promotion programme delivered in a 'white collar' workplace with 500 employees. The intervention consists of a health risk appraisal questionnaire, unlimited access to a personalised web portal to encourage healthy lifestyle behaviours including interactive behavioural changes via online, fortnightly e-mail communications to provide practical tips for self-care, in addition to paper-based information packs, including a newsletter, stress management, sleep, nutritional advice, and physical activity and four off-line seminars touching on the most common wellness issues over 12-month period.

A deterministic decision tree was built to explore the potential cost-savings that might be achieved through implementation of this health promotion programme, looking predominantly at impacts for the business as a result of employees avoiding poor wellbeing state. Potential impacts on productivity and appropriately avoided GP consultations were included in the model. Programme costs and impacts on productivity gained were derived from an evaluation of a programme delivered in one white collar branch of a multinational company in the UK (Mills et al., 2007)., This works out at a cost of £82.10 per annum per employee (2015 prices). Rates of uptake of multi-component workplace interventions can be difficult to determine, particularly

when these interventions can be used at differing levels of intensity. Rates of uptake of health promotion programmes will vary depending on the size and structure of a business. We have conservatively assumed here that in the baseline case that only 10% of employees make use of the intervention. In this controlled trial evaluation the intervention was found to reduce sickness absence by more than four days per annum and presenteeism by more than six hours every four weeks. Average mean wages estimated for full-time employees in 2015 were used to value these impacts on productivity. The model also conservatively assumes a reduction of four days absence per annum would mean that one visit to a GP can be appropriately avoided.

Results

As Table 7 indicates, with a reach of 10% of employees, better wellbeing at work has an overall ROI of £2.37 for every £1 invested in the programme. Potentially it can help to avoid costs of £974,995 to the business from the avoidance of sickness absence and presenteeism. There is also a modest reduction in GP consultations of £2,250. In sensitivity analyses, if the probability of uptake of the programme was to increase from 10% to 33% then net avoidable costs could increase to almost £280,000. This analysis may be conservative as it does not take account of the substantial costs that are associated with dealing with staff turnover when individuals leave work because of their health. There may also be additional reputational benefits to businesses that are perceived as being healthy places to work.

Table 7: Total net costs and payoffs for a company with 500 employees as a result of reduced productivity losses

	Total Cost / Saving
Incremental cost of wellbeing programme	£41,050
Absenteeism-related productivity losses avoided	-£27,080
Presenteeism-related productivity losses avoided	-£67,915
GP Visits Avoided	-£2,250
Total costs avoided	-£97,245
Net savings	-£56,195
Overall Return per Pound Invested	£2.37

Workplace interventions to prevent stress, depression and anxiety problems

Background

Work-related stress can be caused by heavy burden of workload, time pressures for tight deadlines, imbalance between demand and reward, a lack of organisational support (Statistics, 2011). According to the Labour Force Survey, in 2015-2016, there were 480,000 cases of work-related stress, depression or anxiety. Stress due to work represented more than one-third (37%) of the total work-related health problems and 45% of all work days lost. The mean number of days lost per case of work-related stress, depression or anxiety was 23.9 days, which was equivalent 11.9 million days nationally (Health and Safety Executive, 2016). . Taking action against work-related stress and/or burnout has been regarded as one of the most important public health issues for an economically active population, as emphasised in the recent report published by PHE (Public Health England, 2016a). Many studies have focused on secondary preventive interventions for people who had already been clinically diagnosed with mental health problems. Much less attention has been given to primary preventive strategies for people who are at risk of developing depression/anxiety due to work-related stress.

Intervention modelled

The intervention modelled here is the universal provision of a workplace cognitive behavioural therapy (CBT) service offered to all employees who are identified by occupational health services as being stressed. A recent Cochrane systematic review found that CBT in the workplace with or without relaxation therapy for periods of follow-up from 1 month to 6 months showed a 13% decrease in relative risk of stress compared to no intervention (Ruotsalainen et al., 2015). The model looks at the impact of an intervention over a 2-year time period. Employees were either offered the CBT option consisting of up to 12 one-hour sessions of CBT and other support or a do-nothing option. The structure of the intervention, resource use and costs averted were based on observed experience of a workplace CBT programme available to employees of a Welsh City Council, employing 11,000 people (Hitt, 2016). CBT was conservatively assumed to lead to a reduced risk of stress of 13% relative to no intervention; observed experience in Cardiff suggested that significant positive impacts on mental health were seen in 46% of those who received CBT.

Results

Table 8 shows the net savings from investment in a workplace stress-reduction programme and the small increase in quality-adjusted life years gained. This calculation is based on a workforce of 1000 employees and taking account of the prevalence of workplace stress and the likelihood of being identified by occupational health services, estimates that around five individuals will be

offered the chance of CBT through the programme in any one year. The programme generates a positive ROI overall by the end of Year 2, from the perspective of the employer, with the ROI greater (£2 for every £1 invested) if impacts on health services are taken into account. The programme has the opportunity to generate even greater returns on investment by supporting future cohorts of workers from Year 2 onwards, but these additional savings are not included in the model.

While the CBT intervention is cost-effective it is important to note that the evidence base on alternative workplace based stress and depression-reduction interventions is growing. In the appendix to this report we have noted some limited evidence on mindfulness, but other interventions that can aid relaxation such as yoga may also merit consideration when the evidence becomes stronger. These potentially might generate a greater ROI if they have lower intervention costs than the provision of CBT. A workplace might also consider a stepped care approach, beginning with some of these more modest interventions before recommending that an individual receive CBT.

Table 8: Total ROI using workplace stress intervention (1,000 employees in workplace)

	Year 1	Year 2	Total Cost / Saving
Total cost of intervention	£3,493	£0	£3,493
Set Up Costs	£88	£0	£88
Running Costs	£3,405	£0	£3,405
GP Visits	-£256	-£253	-£510
Physical Care Costs	-£49	-£49	-£98
Secondary Mental Health Services	-£200	-£198	-£399
Medications	-£29	-£29	-£58
Occupational Health Services	-£46	-£46	-£92
LA wellbeing services	-£311	-£307	-£618
Productivity	-£909	-£899	-£1,809
Presenteeism	-£784	-£775	-£1,559
Retention	-£928	-£917	-£1,845
Total cost consequences (saving if negative value)	- £3,512	- £3,473	-£6,985
Total cost	-£19	£3,473	-£3,492
Cumulative Return per Pound Invested	£1.01	£2.00	£2.00

Protecting the mental health of people with long-term physical health problems

Background

Many people with long-term physical health conditions are at increased risk of developing mental health problems. These mental health problems can impact on the management of physical health, leading to significantly poorer health outcomes and reduced quality of life. This can lead to substantial but avoidable costs to the health care system; one analysis suggests that co-morbid mental health problems raise total health care costs by at least 45% for each person with a long-term condition and co-morbid mental health problem (Naylor et al., 2012).

Between 12% and 18% of all NHS expenditure on long-term conditions is linked to poor mental health and wellbeing, conservatively equating to around £1 in every £8 spent on long-term conditions (Naylor et al., 2012). There may also be direct costs for the provision of services that fall on other sectors such as social care services. Multi-morbidity might also lead to a need for greater levels of family support and informal care; it might also reduce the chances of an individual participating in the labour force.

One area that has been the subject of considerable research is co-morbid depression or anxiety problems and physical health problems. One US study reported that the costs of eleven chronic health problems were significantly greater when an individual has co-morbid depression. Costs related to diabetes, coronary artery disease and congestive heart failure were around double the costs of non-depressed individuals without depression (Welch et al., 2009).

Two reviews, one with 27 (Hutter, Schnurr and Baumeister, 2010) and the other with 41 largely US-set studies (Molosankwe et al., 2012), looked at the impact on health care resource utilisation of having co-morbid diabetes and depression. Both reviews consistently showed increased health care resource use to manage diabetes in people with depression. For instance, in one study of more than 400,000 adults with diabetes in the US, the costs of depression increased mean annual health care costs from \$11,000 to \$19,000 (Le et al., 2011). In an Australian study, health service use by people with co-morbid diabetes and depression was 49% higher compared to those with diabetes alone (Atlantis et al., 2012). In another US study, the health care costs of managing diabetes over a 6-month period were found to be between 50% and 75% higher in people with major depression than in people with diabetes alone (Simon et al., 2005). Furthermore, this study observed a significant difference in the costs of managing one or more complications of diabetes in people with major depression compared to those with sub-clinical thresholds of depression. Other studies also point to higher costs of managing complications. The costs of managing complications of diabetes, such as diabetic

neuropathy, in people with co-morbid depression have also been shown in the US to be significantly greater than in those without depression (Boulanger et al., 2009).

Intervention modelled

The model compares usual care with collaborative care delivered in primary care for individuals living with diabetes and/or coronary heart disease. There is consistent evidence from the US that the approach in primary care settings is cost-effective in addressing depression in individuals with diabetes or coronary heart disease (Johnson et al., 2016, Katon et al., 2012, Molosankwe et al., 2012, Hay et al., 2012); furthermore, better management of depression can help reduce the costs of managing the physical health condition. Initially developed in the US, the approach involves a specially trained individual such as a nurse working in primary care settings who can help improve co-ordination between different health care professionals; these individuals or others will also be specially trained to provide psychological interventions such as problem-solving therapy or CBT (Katon et al., 2004, Katon et al., 2010). This intervention has been the subject of a recent randomised controlled trial and economic analysis in England (Coventry et al., 2015, Camacho et al., 2016).

Results

Table 9 shows the costs and costs averted for a population of 100,000 adults and the additional number of quality-adjusted years gained as a result of collaborative care. Tables 10 and 11 provide cost and outcome data for the collaborative and usual care groups. Over two years from a societal perspective there is a ROI of at least £1.52 from investing in this service. Excluding the impacts on productivity losses, the model suggests a cost per QALY gained of under £10,000; this would be considered highly cost-effective.

These results are likely to be conservative; it assumes that there are no sustained benefits of intervention beyond the first year; this will underestimate benefits. The model does not take account of the long-term impacts of better physical health management. The long term costs of diabetes related complications can however be substantial. For instance, although there have been comparatively few studies on the links between depression, diabetes and lower limb amputations there is some evidence pointing to significant increased risks, with one US study suggesting the risk of major amputation is 33% higher over a 4-year period in those with co-morbid diabetes and depression (Williams et al., 2011). In 2011/12 in England there were 673 major lower limb amputations in England, at an estimated immediate cost per amputation to the NHS (in 2015 prices) of around £33,900 (NICE, 2012).

Another analysis looking at all 94 amputations, both minor and major, in a long term follow up of 2,791 people with diabetes, reported initial mean hospital costs for a 60 year old woman of £10,247 and non-inpatient costs of £2,980, as well as costs in subsequent years of £2,097 and £1848 respectively (2015 prices) (Alva et al., 2015). Although the number of amputations is small, this illustrates the potential additional benefits of better management of diabetes; the

same argument might also be made for a wide range of diabetes and coronary heart disease-related complications that are not included in the model. For instance looking at heart attacks (myocardial infarctions) initial health care costs for a 60 year old woman would be £8,074 with annual costs of £2,242 in subsequent years (2012 prices).

Table 9: Total net costs and QALYs gained using collaborative care (100,000 population)

	Year 1	Year 2	Total Cost / Saving
Total cost Collaborative Care	£22,075	£0	£22,075
Health and Social Care Services	-£4,706	-£942	-£5,648
Productivity Impacts	-£23,194	-£4,644	-£27,838
Total cost consequences (saving if negative value)	-£27,900	-£5,586	-£33,486
Total cost	-£5,824	-£5,586	-£11,411
Cumulative Return per Pound Invested	£1.26	£1.52	£1.52
QALYs gained	0.84	0.17	1.01

Table 10: Costs and QALYs gained using collaborative care (Intervention Cohort)

	Year 1	Year 2	Total
Total cost collaborative care	£22,075	£0	£22,075
Health and Social Care Services	£865,161	£831,848	£1,697,009
Productivity Impacts	£336,909	£305,525	£642,434
Total cost	£1,224,144	£1,137,373	£2,361,518
QALYs gained	90.88	90.27	181.15

Table 11: Costs and QALYs gained (Usual Care Cohort)

	Year 1	Year 2	Total
Health and Social Care Services	£869,866	£832,791	£1,702,657
Productivity Impacts	£360,103	£310,169	£670,272
Total cost usual care	£1,229,969	£1,142,960	£2,372,928
QALYs gained	90.04	90.10	180.15

Addressing loneliness to protect the mental health of older people

Background

Investing in measures to promote mental health and wellbeing can help promote healthy ageing. Depression remains a common problem in older people. In high-income countries at least 12% of older people are affected by clinically significant levels of depression at any one time (Copeland et al., 2004); rates as high as 16% have been reported in some studies (Forlani et al., 2013, Regan et al., 2013).

One risk factor which has been associated with depression is involuntary social isolation and loneliness (Holvast et al., 2015, Peerenboom et al., 2015). Lower levels of contact with friends and neighbours were associated with significantly greater rates of depression in a survey of more than 6,800 older people living in two areas of Sweden and Finland (Forsman, Nyqvist and Wahlbeck, 2011). The increased rate of depression in people who are highly lonely is three times greater than for people who are not lonely (Steptoe et al., 2013). There may also be an association with mild cognitive impairment and/or dementia. A recent meta-analysis of 19 studies also suggests that the risk of developing dementia with high levels of loneliness is 1.58 that for those who are not lonely (Kuiper et al., 2015). There are also increased risks of premature mortality and poor physical health, such as coronary heart disease and stroke (Heffner et al., 2011, Cene et al., 2012, Valtorta et al., 2016).

Intervention modelled

Recent NICE guidelines on actions to promote the mental wellbeing of older people recommend actions to support, publicise and, if there is not enough provision, consider providing a range of group, one-to-one and volunteering activities that meet the needs and interests of local older people (NICE, 2015).

The intervention modelled here examined the provision of a signposting service for people aged 65 and older who are not in paid work. Individuals would then have an opportunity to have an assessment of needs to help identify opportunities for participation in a wide range of local social activities to reduce the risk of social isolation and loneliness. The comparator is no intervention. The model assumes the intervention covers a population of 100,000 people aged 65 or over and then follows impacts on the population who self-identify as being lonely. The impacts of subsequent participation in regular group activities over the next five years are then considered. Consistent with the status of many community activities for older people the model assumes that longer term nominal costs that may be charged for participating in group activities are borne by the participants or the activity deliverer (such as a charity or community group) and not the public purse.

Such signposting services have been put in place in different areas of England; they might be located in GP surgeries, others in local focal points such as shopping centres or libraries. An alternative approach (not modelled here) concerns services that proactively seek to identify and engage with potentially isolated individuals.

The analysis looks at impact on GP and GP nurse contacts, risk of hospital presenting self-harm, and avoidance of psychological therapy to treat depression. It also takes account of the benefits to society of an increase in the number of individuals contributing their time as volunteers as a result of coming into contact with signposting and navigation services.

Results

Table 12 shows the costs and costs averted for this population of 100,000 adults and the additional number of years lived without being lonely as a result of the intervention. Tables 13 and 14 provide cost and outcome data for the signposting plus group activities, face-to-face and no intervention groups. Over five years from a societal perspective there is a ROI of at least £1.26 from every £1 invested in this service. This is a highly conservative estimate as it does not take account of additional health benefits, such as improved physical health, as well as potential benefits for the protection of cognitive health. Any avoidance or delay in physical health decline may mean that local authority social services can avoid substantive costs linked with both community and residential care.

In the analysis, the potential costs avoided are restricted to those contacts that can be linked with loneliness and poor mental health. This is conservative as it does not look at any potential broader health benefits such as any impact on dementia or physical health. The model also does not include any estimate of benefits regarding the impact on premature mortality, nor does it factor in productivity gains that may be associated with social participation and more healthy ageing. The 0.003% estimate of increased willingness to volunteer is highly conservative; moreover the mental health benefits for the volunteers that deliver signposting services have not been considered.

Table 12: Total net costs and life years saved using signposting and group activities (100,000 65 plus population)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total Cost / Saving
Including Signposting Service	£55,500	£0	£0	£0	£0	£55,500
Including Group Activities	£120,000	£0	£0	£0	£0	£120,000
Total cost intervention	£175,500	£0	£0	£0	£0	£175,500
GP Visits	£0	-£39,718	-£37,673	-£35,817	-£34,052	-£147,261
Depression Treatment	£0	-£4,981	-£4,736	-£4,514	-£4,302	-£18,534
Self-Harm Treatment	£0	-£258	-£246	-£235	-£224	-£963
Additional Volunteering through Signposting	-£11,476	-£11,609	-£11,091	-£10,598	-£10,126	-£54,900
Total cost consequences (saving if negative value)	-£11,476	-£56,567	-£53,747	-£51,164	-£48,704	-£221,658
Total net costs (saving if negative value)	£164,024	-£56,567	-£53,747	-£51,164	-£48,704	-£46,158
Cumulative Return per Pound Invested	£0.07	£0.39	£0.69	£0.99	£1.26	£1.26
Loneliness Free Years Gained	0	341	332	324	316	1,313

Table 13: Costs and Loneliness Free Years Gained (Intervention Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Signposting Service	£55,500	£0	£0	£0	£0	£55,500
Group Activities	£120,000	£0	£0	£0	£0	£0
Total cost intervention	£175,500	£0	£0	£0	£0	£0
GP Visits	£0	£1,944,875	£1,858,400	£1,775,692	£1,696,665	£7,275,632
Depression Treatment	£0	£119,949	£114,621	£109,520	£104,646	£448,736
Self-Harm Treatment	£0	£3,181	£3,040	£2,904	£2,775	£11,900
Additional Volunteering through Signposting	-£11,476	-£11,609	-£11,091	-£10,598	-£10,126	-£54,900
Total cost	£164,024	£2,056,396	£1,964,970	£1,877,519	£1,793,960	£7,856,868
Loneliness Free Years Gained	1,830	2,154	2,099	2,045	1,992	10,120

Table 14: Costs, Costs Avoided and Life Years Saved (Comparison Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Signposting Service	£0	£0	£0	£0	£0	£0
Group Activities	£0	£0	£0	£0	£0	£0
Total cost intervention	£0	£0	£0	£0	£0	£0
GP Visits	£0	£1,984,593	£1,896,074	£1,811,509	£1,730,717	£7,422,893
Depression Treatment	£0	£124,930	£119,357	£114,034	£108,948	£467,270
Self-Harm Treatment	£0	£3,439	£3,286	£3,139	£2,999	£12,863
Additional Volunteering through Signposting	£0	£0	£0	£0	£0	£0
Total cost usual care	£0	£2,112,962	£2,018,717	£1,928,682	£1,842,664	£7,903,025
Loneliness Free Years Gained	1,830	1,813	1,767	1,721	1,677	8,807

Providing debt advice to protect mental health

Background

A survey in 2013 of 4,442 adults in Great Britain identified that 6% had three or more signs of problematic debt such as falling behind on essential bills, using credit to pay credit cards or relying on credit to last until payday. Extrapolated to the whole Great Britain population it was estimated conservatively that 2.9 million adults were likely to have problematic debts (de Santos, 2014). Separate analysis estimated that 1.5 million adults were seeking debt advice (Money Advice Service, 2013a). A more recent model, using data from 11,279 survey respondents, estimated that 16.1% of UK adults (8.25 million people) were over-indebted, but this was less conservatively defined as regularly missing monthly payments in at least three of the last six months or finding meeting commitments a heavy burden (Money Advice Service, 2016b).

A number of risk factors for problematic debt have been identified. Work in the UK suggests that 25% of renters are likely to be over-indebted compared to 12% of homeowners; 20% of families with children compared to 13% of families without children and 28% of single parents compared to 18% of two-parent families, and 24% individuals with incomes below £10,000 per annum compared to 15% for those with higher incomes (Money Advice Service, 2016a). Younger adults and people without savings or on welfare benefits are also at higher risk (Financial Conduct Authority, 2014). Almost 90% of Citizens Advice Bureaux (CAB) clients have incomes below £18,000 in 2013 and almost half of all clients of another major debt advice provider, Step Change, were in social housing (Centre for Social Justice, 2013). It is also well recognised that individuals with existing mental health problems are also at increased risk (Holkar and Mackenzie, 2016).

There is a substantial evidence base on the association between debt and poor health, including poor mental health. Unmanageable financial debt has been associated with increased risks of poor mental health in studies in the UK (Fitch et al., 2011, Meltzer et al., 2013) and elsewhere (Houle and Light, 2014, Zurlo, Yoon and Kim, 2014, Sweet et al., 2013). A recent longitudinal analysis in England focused on students has reported that those whose financial situation deteriorates are at higher risk of mental health problems (Richardson et al., 2016). In Spain, 90% of women and 84% of men in mortgage arrears and threatened with eviction had poor mental health compared with rates of 15% and 10% in the general population (Vasquez-Vera et al., 2016). Unmanageable debts may also increase the risks to the mental health of children and other family members; one survey estimated that 23% of children in families with problem debt have low levels of wellbeing compared to 5% in households without problem debt (Pinter, Ayre and Emmott, 2016).

Debt has also been associated with an increased risk of suicide, with a 0.54% increase in completed suicides observed for every 1% increase in indebtedness in aggregate level analysis of 20 EU countries, including the UK, during the recent recession (Reeves et al., 2015). A significant increase during the recession in men and women reporting problems with their finances during assessment at a hospital in England following a non-fatal suicidal event has been reported (Hawton et al., 2016a). Earlier English research using individual cross-sectional data from the Adult Psychiatric Morbidity Survey in 2007 suggested that those in debt were twice as likely to have suicidal thoughts; the risk increased as the number of debts increased (Meltzer et al., 2011). In the US, individuals in hospital for a non-fatal suicidal event had 1.68 times the rate of bankruptcy in the previous two years compared with the general hospital population (Kidger et al., 2011). Despite these impacts, only about half of all people with debt problems seek advice and without intervention between one in five and two-thirds of people with unmanageable debt problems will still face such problems 12 months later (Williams and Sansom, 2007).

Intervention and modelling assumptions

The intervention in the model is targeted at people who do not initially have mental health problems but are experiencing unmanageable debt. It is focused on debt advice as a potential preventive action and therefore does not look at the impact of debt advice for people who already have diagnosable mental health problems. Our literature review indicates that there is potential for debt advice interventions to alleviate financial debt, and hence reduce the risk of mental health problems resulting from debt. Better management of debt can also have an impact on the use of health services. In a survey of 1,546 StepChange clients, 47% said that they had visited their GP as a result of their debts, 5% had visited hospital accident and emergency departments and 7% other hospital departments. When asked about the impact of their debt, 71% reported experiencing insomnia, 70% experienced low energy and 66% experienced headaches (Surtees, 2015).

There may also be other indirect benefits that are not included in the model: if debt advice reduces the risk that an individual becomes homeless then this is likely also to reduce the risks of poor mental health linked to homelessness. Debt advice services are also able to help individuals develop financial literacy skills that may help reduce the risk of subsequent unmanageable debt. Debt advice may also help individuals remain in or return to employment; some individuals may be reluctant to return to employment if this means that their debt repayments rise. It may also help relationships: in one survey 55% of respondents put money worries in their top three strains on relationships (Undy et al., 2015).

The way in which costs are covered for debt advice is complex. Some not-for-profit debt advice services are predominantly funded through a percentage of Fair Share income - a financial subsidy from the lending industry that enables not-for-profit organisations to administer free-to-client debt management plans (free-to-client means creditors bear the cost of the plan with 100% of monthly payment going towards repaying debt). Others are funded through the Debt

Advice Levy imposed on consumer credit providers by the Financial Conduct Authority (FCA) and disbursed by the Money Advice Service, again at no cost to the individual. The model assumes that there are no costs to the individual in debt for using these services.

The model explores the cost-effectiveness of volunteer delivered debt advice services located in a GP surgery and targeted at a hypothetical cohort of working age adults without mental health problems but at risk of unmanageable debt. The model assumes a rate of 16.1% of problematic debt in the adult population. There is a substantial provision of debt advice services provided by major non-profit organisations in England. This includes GP prescriptions for advice services in some areas of England; these are not just targeted at individuals with existing mental health problems; many individuals who do not meet the criteria for depression or anxiety problems will contact GPs as a result of debt-related stress. Face to face services can be an alternative or complementary option to other not-for-profit debt advice services delivered online or by telephone.

Use of the services is then compared with a no action alternative. Over a 5 year period the model looks at the impact of subsequent debt related stress and depression on costs to the health and legal systems (including creditors), and from lost productivity due to absenteeism and reduced employment. It also takes account of the potential costs and health impacts of individuals who have further unmanageable debts in Years 2 to 5.

Results

Table 15 shows the costs and cost averted for a population of 100,000 adults and the additional number of life years saved per annum as a result of debt advice. Tables 16 and 17 provide cost and outcome data for the face-to-face and no intervention groups. Over five years from a societal perspective there is a ROI of at least £2.60 from every £1 invested investing in face-to-face debt advice services. This is a highly conservative estimate as it does not take account of additional health benefits, including benefits to families. It also uses a low estimate of the relative risk of developing mental health problems of 1.33 compared to those without debt. Some estimates suggest that the increased risk is at least three times greater, but there are difficulties in determining causality with some higher estimates, eg did mental health lead to debt or vice versa. In sensitivity analysis if the risk of mental health problems were three times greater than that for people without debt problems then the ROI would increase to £4.41 for every £1 invested.

There are also broader economic benefits associated with debt advice services that have not been included, which in some analyses mean the ROI is greater than £6 for every £1 invested (Clifford et al., 2014). Another analysis looking at impacts on creditors and issues such as homelessness has suggested a ROI of more than £50 per £1 (Farr et al., 2014). There are also substantial gains relative to no action for continuing to maintain existing telephone and web-based services. A very conservative estimate of the effectiveness of debt management services has also been used which may underestimate potential impacts.

Debt advice services also have an impact on quality of life; conservatively the model estimates a gain of 26.92 quality-adjusted life years from face-to-face advice services compared to no advice. The additional costs of face-to-face debt advice services relative to telephone and web-based services will also be more than covered if there is just a single percentage point higher level of effectiveness for face-to-face services. Face to face debt advice services should therefore be complemented by telephone and web based services in order to increase the ability to reach more potentially vulnerable people.

Table 15: Total net costs and QALYs gained for face to face debt advice (100,000 adult population)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total Cost / Saving
Total cost intervention	£1,216,180					
including GP Awareness Training	£69,300	£0	£0	£0	£0	£69,300
including Face to Face Debt Advice Service	£1,146,880	£0	£0	£0	£0	£1,146,880
GP Visits	-£44,352	-£38,957	-£37,639	-£36,366	-£35,137	-£192,451
Depression Treatment	£0	-£19,026	-£20,233	-£19,905	-£19,292	-£78,456
Legal and Debt Administration	£0	-£259,710	-£250,928	-£242,442	-£234,244	-£987,324
Workplace Stress Absence due to Debt	-£167,531	-£134,947	-£129,309	-£124,666	-£120,381	-£676,835
Depression Productivity Losses	£0	-£299,258	-£316,053	-£311,792	-£302,775	-£1,229,878
Total cost consequences (saving if negative value)	-£211,883	-£751,897	-£754,162	-£735,170	-£711,829	-£3,164,943
Total cost	£1,004,297	-£751,897	-£754,162	-£735,170	-£711,829	-£1,948,763
Cumulative Return per Pound Invested	£0.17	£0.79	£1.41	£2.02	£2.60	£2.60
Cumulative QALYs gained	0.00	6.34	6.87	6.90	6.82	26.92

Table 16: Costs and QALYs gained (Intervention Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Total cost intervention	£1,216,180					
including GP Awareness Training	£69,300	£0	£0	£0	£0	£69,300
including Face to Face Debt Advice Service	£1,146,880	£0	£0	£0	£0	£1,146,880
GP Visits	£574,848	£93,217	£90,065	£87,019	£84,077	£929,227
Depression Treatment	£0	£1,182,522	£1,246,125	£1,230,428	£1,195,570	£4,854,644
Legal and Debt Administration	£0	£621,449	£600,434	£580,130	£560,512	£2,362,525
Workplace Stress Absence	£2,171,382	£323,936	£310,512	£299,382	£289,097	£3,394,309
Depression Productivity Losses	£0	£4,440,179	£4,679,024	£4,620,075	£4,489,179	£18,228,457
Total cost	£3,962,410	£6,661,303	£6,926,159	£6,817,034	£6,618,434	£30,985,341
QALYs gained	13,616	13,021	12,793	12,595	12,406	64,431

Table 17: Costs and Life Years Saved (Comparison Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
GP Awareness Training	£0	£0	£0	£0	£0	£0
Face to Face Debt Advice Service	£0	£0	£0	£0	£0	£0
GP Visits	£619,200	£132,174	£127,704	£123,386	£119,213	£1,121,677
Depression Treatment	£0	£1,201,547	£1,266,358	£1,250,333	£1,214,862	£4,933,100
Legal and Debt Administration	£0	£881,159	£851,362	£822,572	£794,755	£3,349,848
Workplace Stress Absence	£2,338,914	£458,883	£439,821	£424,047	£409,479	£4,071,144
Depression Productivity Losses	£0	£4,739,437	£4,995,077	£4,931,867	£4,791,954	£19,458,335
Total cost usual care	£2,958,114	£7,413,200	£7,680,322	£7,552,204	£7,330,264	£32,934,104
QALYs gained	13,616	13,014	12,786	12,588	12,400	64,404

Suicide and self-harm prevention

Background

In 2015 there were 4,820 deaths recorded as suicide in England, a rate of 10.1% per 100,000 population (Public Health England, 2017). Rates of suicide around the country vary markedly from 5.6 suicides per 100,000 in Central Bedfordshire local authority to 17.4 per 100,000 in Middlesbrough. There are 191.4 emergency hospital admissions for deliberate self-harm per 100,000 population. Similarly the rate of emergency admissions varies between 58.9 and 629.9 per 100,000 population in different local authority areas (Public Health England, 2017).

There are substantial personal and economic costs associated with both completed and non-fatal suicidal events, although the number of studies estimating these costs remains limited (McDaid, 2016b). Previous work in the UK has estimated that the average cost per completed suicide for those of working age only in England is £1.67m (at 2009 prices) (McDaid, 2016b). This includes intangible costs (loss of life to the individual and the pain and suffering of relatives), as well as lost output (both waged and unwaged), police time and the costs of coroner inquests.

In addition to the costs of completed suicide, there are also costs to the public purse from recurrent nonfatal suicidal events; these are more substantial to health care systems than the cost of suicide; but they are difficult to estimate without access to detailed data because they will vary greatly depending on the means of suicide attempt. However, notwithstanding the very high costs associated with such trauma, one English study indicated that only 14% of costs are associated with A&E attendance and medical or surgical care; more than 70% of the longer-term costs are incurred through follow-up psychiatric inpatient and outpatient care (Sinclair et al., 2011).

This is in part because a proportion of individuals who survive suicide attempts are likely to make further attempts, in some cases fatal. There are nevertheless economic benefits from delaying completed suicide as the number of lost years of productive activity will be reduced; overall it is estimated that on average costs averted of around £60,000 per year per person of working age can be realised where suicide is delayed (McDaid, 2016b).

Intervention modelled

Guidance in England now recommends a multi-component approach to suicide prevention (National Institute for Health and Care Excellence, 2013). It should be stressed that many different actions can be adopted to tackle suicide. They include measures to restrict access to means, transportation safer, reduce harmful drinking and address risks to individuals while in police custody or prison. Guidelines also recommend training of service gatekeepers, such as GPs, the police and teachers to recognise potential risk of depression and suicide, while

psychosocial assessment is recommended for most individuals who present at hospital for deliberate self-harm (National Institute for Health and Care Excellence, 2013).

Previous work looked at the economic case for the training of GP gatekeepers followed by the use of appropriate psychological interventions, as well as measures to reduce risks at potential suicide hotspots (bridges) to reduce the risk of self-harm and suicide. The modelling work here focuses on increasing the use of psychosocial assessment when individuals present to hospital accident and emergency departments as a key action to complement population-wide approaches to suicide prevention.

Previous analysis in England looking at three hospitals reported that only 53% of individuals were assessed by specialist mental health staff (Geulayov et al., 2016). Increased use of psychosocial assessment has previously been associated with a lower rate of future self-harm events (Kapur et al., 2013) because it should increase the chance of receiving appropriate psychological therapies. A recent Cochrane systematic review also reports that the risk of subsequent suicidal events can be reduced significantly through the use of cognitive behavioural therapy following assessment (Hawton et al., 2016b).

The model runs over a ten-year period estimating the number of adults who present at hospital with deliberate self-harm using a hypothetical cohort of 100,000 working age adults. Most of the cost and effectiveness data for the model are drawn from English studies. The model also includes a range of costs: including ambulatory transport, attendance at accident and emergency departments, inpatient care, police/coroner activities, productivity losses for individuals and their families and intangible costs related to the premature loss of life.

Results

In the baseline case increased use of psychosocial assessment is associated with lower costs and more years of life saved. The additional treatment and support costs for individuals are more than offset by a reduction in the costs to the health care system of treating future self-harm events. The case for action becomes stronger still when taking account of productivity losses associated with premature death, costs to local authorities for inquests and costs to the police of investigating suspected suicides. Table 18 shows that, overall, for a strategy administered to a population of 100,000 adults, from a health system perspective net of costs to the health system for the suicide prevention strategy of £37,621, a total of £43,877 in costs averted to the NHS can be realised over a ten-year period. When the costs to the police (investigations), local authorities (coroners) and society are included these savings increase to £1.43 million per 100,000 population.

Overall, at the end of the 10 year time period the model estimates that there is a ROI of £39.11 for every pound invested in suicide prevention; 40 years of additional life are gained by the intervention cohort. Almost all of this ROI is due to productivity and intangible costs avoided, but even from a narrower health, local authority and police perspective the ROI would be £2.93

for every pound spent on the programme. This is a very conservative assessment of savings, as we have used a low estimate of the costs of treating self-harm associated with poisonings. There will be expensive health system costs associated with less common methods of self-harm; there may also be long term costs associated with major life changing injuries that might be sustained with some self-harm attempts. It conservatively assumes that impacts on costs and risk of suicide are only realised from year 2 onwards. It is also important to stress that there can also be permanent psychological and physical impacts of self-harming, such as scarring, that we have not considered in this model ('Rachel', 2013).

Table 18 also shows the additional number of life-years saved per annum. Over the ten years, 2,733 years of life would be saved with the suicide prevention intervention and 2,693 with usual support. Tables 19 and 20 provide data on costs and life years saved for the intervention and control groups. The results in sensitivity analysis are robust. For instance, from a narrower health, local authority and police perspective the cost of psychosocial assessment would have to increase from £232 to £660 before the intervention would no longer have a positive ROI.

Table 18: Total net costs and quality adjusted life years saved for suicide prevention intervention (100,000 population)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total Cost / Saving
Cost of Additional Psychosocial Assessments	£24,230	£1,732	£1,665	£1,601	£1,540	£1,480	£1,423	£1,368	£1,316	£1,265	£37,621
Ambulance Costs	£0	-£419	-£432	-£443	-£451	-£459	-£464	-£468	-£471	-£473	-£4,080
Immediate Treatment for Self Harm/Suicide	£0	-£3,514	-£3,425	-£3,337	-£3,249	-£3,163	-£3,078	-£2,995	-£2,912	-£2,831	-£28,504
Ongoing Psychological Treatment	£0	-£6,784	-£6,402	-£6,041	-£5,699	-£5,376	-£5,071	-£4,782	-£4,508	-£4,250	-£48,913
Productivity Losses	£0	-£12,794	-£24,434	-£35,000	-£44,565	-£53,196	-£60,959	-£67,915	-£74,120	-£79,629	-£452,612
Police Investigations	£0	-£432	-£826	-£1,183	-£1,506	-£1,797	-£2,060	-£2,295	-£2,504	-£2,690	-£15,292
Coroner Inquests	£0	-£377	-£719	-£1,030	-£1,312	-£1,566	-£1,795	-£1,999	-£2,182	-£2,344	-£13,325
Intangible Costs	£0	-£25,682	-£49,050	-£70,260	-£89,459	-£106,786	-£122,369	-£136,332	-£148,789	-£159,846	-£908,573
Total cost consequences (saving if negative value)	£0	-£50,002	-£85,288	-£117,293	-£146,241	-£172,343	-£195,796	-£216,786	-£235,487	-£252,063	£1,471,300
Total costs (saving if negative value)	£24,230	-£48,270	-£83,622	-£115,692	-£144,701	-£170,863	-£194,373	-£215,417	-£234,172	-£250,799	£1,433,679
Cumulative Return per Pound Invested	£0.00	£1.93	£4.90	£8.64	£12.96	£17.71	£22.78	£28.07	£33.54	£39.11	£39.11
Quality Adjusted Life Years Saved	0.03	2.77	3.24	3.69	4.11	4.50	4.88	5.23	5.55	5.86	39.86

Table 19: Costs and Quality Adjusted Life Years Saved (Intervention Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Cost of Psychosocial Assessments	£72,328	£7,655	£7,316	£6,993	£6,684	£6,388	£6,106	£5,836	£5,578	£5,331	£130,215
Ambulance Costs	£22,656	£3,129	£3,218	£3,295	£3,362	£3,419	£3,466	£3,504	£3,534	£3,557	£53,139
Immediate Treatment for Self-Harm/Suicide	£198,300	£23,181	£22,839	£22,489	£22,132	£21,769	£21,402	£21,030	£20,656	£20,279	£394,077
Ongoing Psychological Treatment	£392,038	£41,490	£39,656	£37,903	£36,228	£34,626	£33,096	£31,633	£30,234	£28,898	£705,801
Productivity Losses	£199,068	£270,579	£336,213	£396,322	£451,238	£501,277	£546,738	£587,902	£625,037	£658,397	£4,572,771
Police Investigations	£6,726	£9,142	£11,360	£13,390	£15,246	£16,937	£18,473	£19,863	£21,118	£22,245	£154,500
Coroner Inquests	£5,861	£7,966	£9,898	£11,668	£13,285	£14,758	£16,096	£17,308	£18,402	£19,384	£134,625
Intangible Costs	£399,609	£543,160	£674,914	£795,576	£905,815	£1,006,263	£1,097,521	£1,180,154	£1,254,700	£1,321,665	£9,179,375
Total cost	£1,296,586	£906,302	£1,105,414	£1,287,636	£1,453,988	£1,605,437	£1,742,896	£1,867,230	£1,979,259	£2,079,755	£15,324,504
Quality Adjusted Life Years Saved	209	310	302	295	287	280	273	266	259	253	2,733

Table 20: Costs and Quality Adjusted Life Years Saved (Comparison Cohort)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Cost of Psychosocial Assessments	£48,098	£5,923	£5,651	£5,391	£5,144	£4,908	£4,683	£4,468	£4,262	£4,067	£92,594
Ambulance Costs	£22,656	£3,548	£3,650	£3,738	£3,814	£3,877	£3,930	£3,972	£4,005	£4,029	£57,220
Immediate Treatment for Self-Harm/ Suicide	£198,300	£26,695	£26,264	£25,825	£25,381	£24,932	£24,480	£24,025	£23,568	£23,110	£422,581
Ongoing Psychological Treatment	£392,038	£48,274	£46,058	£43,944	£41,927	£40,002	£38,166	£36,414	£34,743	£33,148	£754,715
Productivity Losses	£199,068	£283,373	£360,647	£431,322	£495,803	£554,473	£607,697	£655,817	£699,158	£738,025	£5,025,383
Police Investigations	£6,726	£9,574	£12,185	£14,573	£16,752	£18,734	£20,532	£22,158	£23,622	£24,936	£169,792
Coroner Inquests	£5,861	£8,343	£10,618	£12,698	£14,597	£16,324	£17,891	£19,308	£20,584	£21,728	£147,951
Intangible Costs	£399,609	£568,842	£723,963	£865,835	£995,273	£1,113,049	£1,219,890	£1,316,486	£1,403,488	£1,481,511	£10,087,948
Total cost usual care	£1,272,356	£954,572	£1,189,036	£1,403,328	£1,598,690	£1,776,300	£1,937,269	£2,082,648	£2,213,430	£2,330,554	£16,758,183
Quality Adjusted Life Years Saved	209	307	299	291	283	275	268	261	254	247	2,693

Summary of findings

There is already an evidence base on the economic case for investing in actions to promote better mental health and reduce the risk of developing mental health problems. The purpose of this report has been to undertake further modelling work to either update or build on this evidence, potentially including interventions that can affect any age group or segment of the population. Evidence on the effectiveness and cost effectiveness of a number of interventions was identified through a systematic mapping of meta-analyses, reviews and recent empirical studies, as well as discussion with the project advisory steering group.

Specifically, the report looks at:

- school-based programmes to prevent bullying
- social and emotional resilience programmes to reduce the risk of depression in adolescents
- two workplace programmes: a general work wellbeing programme and actions to support individuals who are identified in the workplace as being at high risk of depressive problems.
- supporting the mental health of individuals with chronic physical health needs in primary care
- primary care-based provision of debt and financial advice to people who have unmanageable levels of financial debt
- programmes to identify those who may be lonely (and thus at higher risk of poor mental health) to signpost them towards regular participation in social activities
- programmes to raise the level of use of psychosocial assessment for individuals who attend accident and emergency as a result of a non-fatal self-harm event

Tables 21 to 24 summarise the potential overall ROI for every £1 spent to different sectors for each of the modelled interventions over a number of time periods. Three of the eight interventions are not funded by the health system, while debt advice, is largely funded through a Fairshare⁸ income model, with potentially only a small contribution to the training costs in GP practices covered by the NHS. Models are also very conservative in their assumptions about the persistence of benefits over time and the potential level of costs that can be averted.

The overall ROI as shown in Table 24 varies from £1.26 for the loneliness alleviation programme to more than £39 for the suicide prevention programme. The difference in who pays and who benefits may be critical to the likelihood of implementation. This may mean that there is a need for greater focus on measuring outcomes of relevance to these different

⁸ Fair share" is a voluntary arrangement whereby supporting creditors credit their customer with the full value of their repayment but separately contribute an agreed percentage of that repayment, as a contribution towards the costs of establishing and maintaining their repayment plan. Creditors making voluntary contributions on a fair share basis to help debt management operators cover the costs of the plans they provide. This allows those organisations to offer the consumer a free service.

sectors, or persuading those sectors that do financially benefit to make a contribution to service delivery costs (McDaid, 2016a). Some of these issues are considered further in a separate report on barriers and facilitators to implementation.

Table 21: One year ROI to different sectors for each £1 investment in mental health promoting programme

Intervention	Who Pays	NHS	Local Authority	Families	Police	Legal Sector	Schools	Workplace	Productivity	Intangible costs	Total**
School-based anti-bullying programme	Schools or Local Education Authority	0.00		0.20							0.20
School-based SEL programme	Schools or Local Education Authority	0.33	0.01	4.71			0.01				5.05
Workplace wellbeing	Workplace	0.05						2.31			2.37
Workplace stress prevention	Workplace	0.15	0.09					0.76			1.01
Protecting the mental health of people with physical health problems	NHS	0.21							1.05		1.26
Tackling Loneliness	Local Authority (Signposting); Activities (Participants)	0.00							0.07		0.07
Support for people in debt	Finance Industry & NHS	0.04				0.00			0.14		0.17
Suicide and self-harm prevention	NHS	0.00	0.00		0.00				0.00	0.00	0.00

*ROI of less than 1% of total cost

** Totals may not add up due to rounding differences

Table 22: Cumulative ROI from two to five years for each £1 investment in mental health promoting programme

Intervention	Who Pays	NHS	Local Authority	Families	Police	Legal Sector	Schools	Workplace	Productivity	Intangible costs	Total**
School-based anti-bullying programme	Schools or Local Education Authority	0.68		0.70							1.38
School-based SEL programme	Schools or Local Education Authority	0.02									0.02
Workplace prevention	Workplace	0.15	0.09					0.75			0.99
Protecting the mental health of people with physical health problems	NHS	0.04							0.21		0.25
Tackling Loneliness	Local Authority (Signposting); Activities (Participants)	0.95							0.24		1.19
Support for people in debt	Finance Industry & NHS	0.18				0.81			1.44		2.43
Suicide and self-harm prevention	NHS	1.31	0.11		0.13				3.80	7.62	12.96

*ROI of less than 1% of total cost

** Totals may not add up due to rounding differences

Table 23: Cumulative ROI from six to a maximum of ten years for each £1 investment in mental health promoting programme

Intervention	Who Pays	NHS	Local Authority	Families	Police	Legal Sector	Schools	Workplace	Productivity	Intangible costs	Total
Suicide and self-harm prevention	NHS	0.86	0.24		0.28				8.23	16.53	26.14

*ROI of less than 1% of total cost

Table 24: Cumulative ROI to different sectors for each £1 investment in mental health promoting programme (all years)

Intervention	Who Pays	Years	NHS	Local Authority	Families	Police	Legal Sector	Schools	Workplace	Productivity	Intangible costs	Total**
School-based anti-bullying programme	Schools or Local Education Authority	4	0.68		0.90							1.58
School-based SEL programme	Schools or Local Education Authority	2	0.35	0.01	4.71			0.01				5.08
Workplace wellbeing	Workplace	1	0.05						2.31			2.37
Workplace stress prevention	Workplace	2	0.30	0.18					1.52			2.00
Protecting the mental health of people with physical health problems	NHS	2	0.26							1.26		1.52
Tackling Loneliness	Local Authority (Signposting); Activities (Participants)	5	0.95							0.31		1.26
Support for people in debt	Finance Industry & NHS	5	0.22				0.81			1.57		2.60
Suicide and self-harm prevention	NHS	10	2.17	0.35		0.41				12.03	24.15	39.11

*ROI of less than 1% of total cost

** Totals may not add up due to rounding differences

Comparisons with the 2011 report

How does this compare to previous modelling work?

Table 25 provides a brief summary of the ROI for each of the interventions examined in previous work published in 2011 on the economic case for investment in mental health promotion and disease prevention (Knapp, McDaid and Parsonage, 2011). If shaded red, the findings in the 2017 report have been superseded by this report, yellow if they complement the new report and green if they are not impacted by this report.

Table 25: Return on investment report in the 2011 report and implications of the 2017 report

Intervention	Return on Investment
Early intervention for conduct disorder	7.89
Health visitor interventions to reduce postnatal depression	0.80
Early intervention for depression in diabetes	0.33
Early intervention for medically unexplained symptoms	1.75
Early diagnosis and treatment of depression at work	5.03
Early detection of psychosis	10.27
Early intervention in psychosis	17.97
Screening for alcohol misuse	11.75
Suicide training courses provided to all GPs	43.99
Suicide prevention through bridge safety barriers	54.45
Prevention of conduct disorder through social and emotional learning programmes	83.73
School based interventions to reduce bullying	14.35
Workplace health promotion programmes	9.69
Debt advice services	3.55
Befriending for older adults	0.44

Table 26 provides a brief summary of the similarities and differences between the interventions in the 2017 report and the 2011 report. In general the work in this report should be seen as a complement rather than an update to work undertaken in 2011. In some cases models have been updated to reflect changes in the evidence base, but in the majority of cases these models relate to different interventions or focus on different outcomes to those covered in the 2011 report.

Table 26: A summary of how interventions examined in this report compare with relevant interventions modelled in 2011 report on the economic case for mental health promotion and disease prevention.

Intervention Examined	Comparisons between current 2017 report and 2011 report	Implications for 2011 report findings
Addressing Bullying Targeted at Young People	<p>In the 2017 report evidence on effectiveness is based on several controlled evaluations of an anti-bullying intervention now being implemented in England (KiVa). This intervention was not modelled in the 2011 report. The current model identifies immediate impacts for the health sector, families and schools as a result of preventing bullying.</p> <p>The 2011 report did not include any estimate of the impacts that could be averted during school years; it only included adulthood benefits of reduced bullying based on potential impact on potential future earnings. The evidence on effectiveness used in this model concerns children aged between 8 and 12. Therefore it does not include an estimate of the longer term benefits of preventing bullying for health, employment and use of social welfare services into adulthood. The report however notes that there are <u>likely to be substantial costs avoided well into adulthood if bullying is prevented in young people.</u> This includes potentially reduced incidence of psychosis and depression at age 18</p>	<p>Unlike the 2011 model, the current model provides a monetary estimate of some of the costs that can be avoided during childhood if bullying is avoided. This was not available in 2011. It is also based on more robust evidence of effect for an intervention now being delivered and evaluated in England and Wales.</p> <p>This demonstrates that preventing bullying is likely to be cost effective in terms of years of bullying averted. Like the 2011 report it also indicates that in addition there will be other (unquantified) benefits to schools and strongly suggests that there will be long term costs avoided in adulthood. It does not place a monetary value on these benefits as the likelihood of averting frequent bullying until age 18 of an intervention evaluated up to age 12 is unknown.</p>
School based	In this report the focus is on the impact of a school based	The model does not directly have implications

<p>social and emotional learning programmes</p>	<p>resilience focused programme that has been implemented in England to reduce the risk of depression drawing on the results of a recent systematic review (Lee et al., 2016). In the 2011 report the focus was on a different outcome, the prevention of conduct disorder, using evidence on the effectiveness of a different social and emotional learning programme. The models are therefore not directly comparable as they use different interventions and are focused on different outcomes.</p>	<p>for the 2011 results. However the new model adds to the economic arguments for investing in social and emotional learning programmes. It indicates programmes can, in addition to helping address the issue of conduct disorder, also have a modest impact on depression. It identifies short term impacts on costs and outcomes for schools, the health system and families. The economic impacts are conservative as the model only reports the benefits for one cohort of school children for one year. It does not report the benefits generated to subsequent cohorts of children from the same trained teachers, so is conservative. Nor does it quantify any benefits in terms of academic performance, although it notes that these have been observed in a recent evaluation in England.</p>
<p>Promoting mental wellbeing in the workplace</p>	<p>The same intervention and outcomes are modelled in current and 2011 reports but the new model additionally looks at the impacts of the intervention on the use of GP services in addition to impacts falling on employers</p>	<p>The new model updates figures and additionally identifies the monetary value of potential contacts with GPs that can be avoided as a result of protecting mental health in the workplace.</p>
<p>Workplace</p>	<p>Both the new model and that in 2011 look at interventions to</p>	<p>The new model focuses on experience from the</p>

<p>interventions to prevent stress, depression and anxiety problems</p>	<p>better identify and then support individuals with work-related stress and depression. The new model also looks at the impact re anxiety problems. The 2011 model was based on the delivery of a hypothetical programme in a workplace. The new model makes use of actual practice whereby a public sector employer contracted NHS services to provide psychological therapy to employees who were identified by employer human resource specialists as being at high risk of poor mental health. Detailed information on the costs and cost offsets of this intervention are also available.</p>	<p>delivery of a workplace programme in Wales to intervene early to protect the mental health of employees. It also provides a more detailed breakdown of areas where potential costs are averted than in the 2011 mode. It represents observed experience in an uncontrolled workplace based evaluation.</p>
<p>Protecting the mental health of people with physical health problems</p>	<p>Both the 2011 model and the 2017 model look at the benefits of collaborative care delivered in GP practices for people with chronic physical health problems. The new model has the advantage of being able to make use of recently published evidence on the effectiveness of collaborative care in an English context. Unlike the 2011 model it looks at individuals with coronary heart disease as well as diabetes. This analysis also makes use of information from these recent studies on the impact on resources used and detailed information on the costs and cost consequences of collaborative care.</p>	<p>The new model takes account of more recent English empirical data on the costs and benefits of collaborative care for individuals with chronic physical health problems. It supersedes the findings of the 2011 modelling work.</p>
<p>Addressing loneliness to protect the mental health of older people</p>	<p>The new model looks at the economic case for investing in a basic self-identification and signposting service to social activities, with a view to reducing self-perceived loneliness. This was not examined in 2011, and reflects recent public health guidance from NICE that supports these types of activities. The 2011 report instead looked at a one to one befriending intervention. The new analysis also takes account of more information that is now available both on the costs</p>	<p>The new model focuses on a different intervention to addressing the risks to mental health and loneliness in older people, and is in line with recent NICE public health guidance on the promotion of mental health and wellbeing. More detailed information is also included on the potential health system costs of loneliness that can be avoided, including the potential risk</p>

	and uptake of signposting services and group activities, as well as more longitudinal information on the risks to mental health associated with loneliness.	of self-harm.
Providing support for people in debt	This new report models the provision of face to face financial and debt counselling services in GP surgeries, including signposting to these services by GPs, alongside telephone and web based financial and debt counselling services. The 2011 report looked at face to face, telephone and web-based services but did not assume any role for GPs (nor any cost outlay for GP surgeries). The outcomes considered in the model here are debt-related stress and depression. Sources of data on the prevalence of unmanageable debt, effectiveness of interventions and costs of services and some of the consequences eg related to the legal side of debt reflect current evidence on these impacts.	The new model supports the case for investing in a more complex version of a debt advice service that includes the face to face delivery of advice in GP surgeries for individuals who are identified as potentially benefiting from face to face support rather than initially being signposted to web and telephone based support. Despite the more complex and costly intervention in the new analysis, the new model identified more costs that can be avoided by the health system and still generates a ROI that is only marginally lower than that seen in 2011.
Suicide and self-harm prevention	This report models a complementary intervention to that assessed in the 2011 model. This model looks at the potential benefits of increasing the use of psychosocial assessments (in line with NICE guidance) for individuals who subsequently present at accident and emergency departments following a deliberate non-fatal self-harm event. It also takes further account of costs to local authorities associated with coroner inquests and provides more detailed information on the costs of self-harm events.	The new model takes account of data now available on the current use of psychosocial assessments and their potential contribution to reducing subsequent risk of self-harm events. The new model therefore complements the findings of the 2011 report by looking at a secondary prevention intervention. The new model reports a very favourable ROI, taking account of more detailed costs to the health system, as well as local authorities of coroner inquests. However, it has a lower population impact as it only reaches people who already have self-harmed and needs to be considered

		alongside investment in community measures, such as those modelled in 2011 on better identification and referral to treatment by GPs and actions to restrict access to means or reduce risks at suicide hotspots such as bridges.
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Recommendations for future research

In this final section of the report we make some brief recommendations for future research to strengthen the evidence base and support implementation.

1. Evaluations of the effectiveness and cost-effectiveness of interventions to promote mental health and wellbeing and the prevention of mental health problems. Interventions should evaluate impact on key outcomes of interest to all relevant sectors that would commission and/or deliver these interventions. This would typically mean looking at wider impacts to sectors such as schools, employers and the police, housing and fire sectors in addition to impacts for the NHS and local authorities. The challenge however will be to find a way to do this in a manner that does not hugely increase costs; it also requires much better cross-government access to administrative data (something that would wider benefits beyond mental health research).
2. In particular, research needs to be better at capturing the wide range of economic consequences of poor mental health, both across all relevant service systems and in terms of effects on productivity, family support and other unpaid care, and other potentially 'hidden' costs.
3. National and local commissioners of pilot projects should consider how best to build evaluation and routine monitoring of outcomes into these projects. In doing so, consideration should be given to making more consistent use of established robust outcome measures, allowing more potential to compare and pool results from small-scale individual studies.
4. There is a need to update estimates of the longer-term health system costs of some poor mental health states, such as depression, to take account of changes in types and modes of services that are delivered, such as the use of Improving Access to Psychological Therapies (IAPT).
5. There is a need for a more consistent and aligned approach to data, coding and linkage frameworks across all agencies and databases (McIntosh et al., 2016). Improving the scope to link different administrative datasets and make better use of longitudinal surveys can be used to help identify both triggers and the long term consequences of poor mental health, including risks on physical health. More efforts in England in this field could help enable better identification of avoidable causes of poor mental health, and aid in determining the potential population impacts of promotion and prevention actions.

6. There is a general need to strengthen the evidence base on what works. For instance, there are schools and workplaces making use of mindfulness-based approaches to supporting wellbeing; they have not been considered in this report because the evidence base on the effectiveness and cost-effectiveness of these approaches remains very limited. This will change; for instance there is a newly funded five year evaluation of school-based mindfulness programmes underway (Wellcome Trust, 2015). Another area that may benefit from further evaluation concerns investment in universal parenting programmes, where the evidence to date appears to be mixed. More generally, there are many ideas for mental health promotion for which there is little or no cost-effectiveness evidence, and these should be evaluated as soon as possible.
7. Evaluations should be well-designed but proportionate. For many interventions, there will be a clear need for robust evidence of a kind that probably can only come from a randomised controlled trial. But perfection must not be the enemy of the good, and evidence generated from other study designs will often have the potential to inform discussions about the most sensible way to invest to improve population mental health. We have also demonstrated through this report how simulation modelling can provide valuable insights.
8. In all evaluations there is also a need for longer-term follow up of interventions. There are, for example, few long-term empirical studies of recent interventions either promoting mental health or preventing mental health problems. It may be possible to make more use of existing longitudinal cohort datasets to help inform what is known about their long-term costs and effectiveness.
9. There is a pressing need for more process evaluation to help understand why individuals do or do not make use of intervention that promote mental health or prevent mental health problems. This would help to support better tailoring of activities to meet the needs and preferences of different groups within the population, and also help to address at least some of the inequalities in uptake and outcomes between different population groups.
10. Relatedly, there is a need to understand what factors influence how local decision-makers allocate their resources. In particular, how is evidence used and what evidence needs do those decision-makers have to support their thinking and actions?
11. It would be helpful if either national or local bodies could map the availability of mental health-promoting / problem prevention services in different localities around England to have a better sense of the current level of service provision. The PHE-led Prevention Concordat for Better Mental Health which is scheduled at launch in

Summer 2017 will increase the feasibility of this as more areas become involved in prevention planning.

12. National bodies could consider if there are ways to routinely monitor investment in public mental health programmes and also where feasible across sectors. This potentially could be something that could be included in an expanded version of the new Mental Health Dashboard.
13. One continuing challenge in this area is to identify current and planned evaluative research. National bodies such as Public Health England could consider developing a register of ongoing evaluations (both large and small) of mental health promotion and mental problem prevention interventions, as well as epidemiological modelling and projection studies that can help inform future demand for mental health services. There is currently no single place where such information is stored. This would be helpful in determining how additional research funding might be best spent to complement ongoing research. It would also make it easier for local decision-makers to access research-based evidence to inform their decisions.

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Appendices

A1: Acronymns

A&E	Accident and Emergency Department
ALSPAC	Avon Longitudinal Study of Parents and Children
AMSTEL	Amsterdam Study of the Elderly
CAB	Citizens Advice Bureau
CAMHS	Child and Adolescent Mental Health Service
CBT	Cognitive Behavioural Therapy
CCG	Clinical Commissioning Group
CMD	Common Mental Disorders
DALY	Disability Adjusted Life Year
EU	European Union
GCSE	General Certificate of Secondary Education
GP	General Practitioner
HSE	Health and Safety Executive
IAPT	Improving Access to Psychological Therapies
IY	Incredible Years
LSE	London School of Economics and Political Science
NHS	National Health Service
NICE	National Institute of Health and Care Excellence
PHE	Public Health England
PSHE	Personal, Social, Health and Economic Education
PSSRU	Persona Social Services Research Unit
QALY	Quality Adjusted Life Year
ROI	Return on Investment
UK	United Kingdom of Great Britain and Northern Ireland
US	United States of America
YLD	Years Lived with Disability

A2: Literature review search strategies

Search strategies using EBSCO versions of Medline and Psycinfo

Medline search strategy

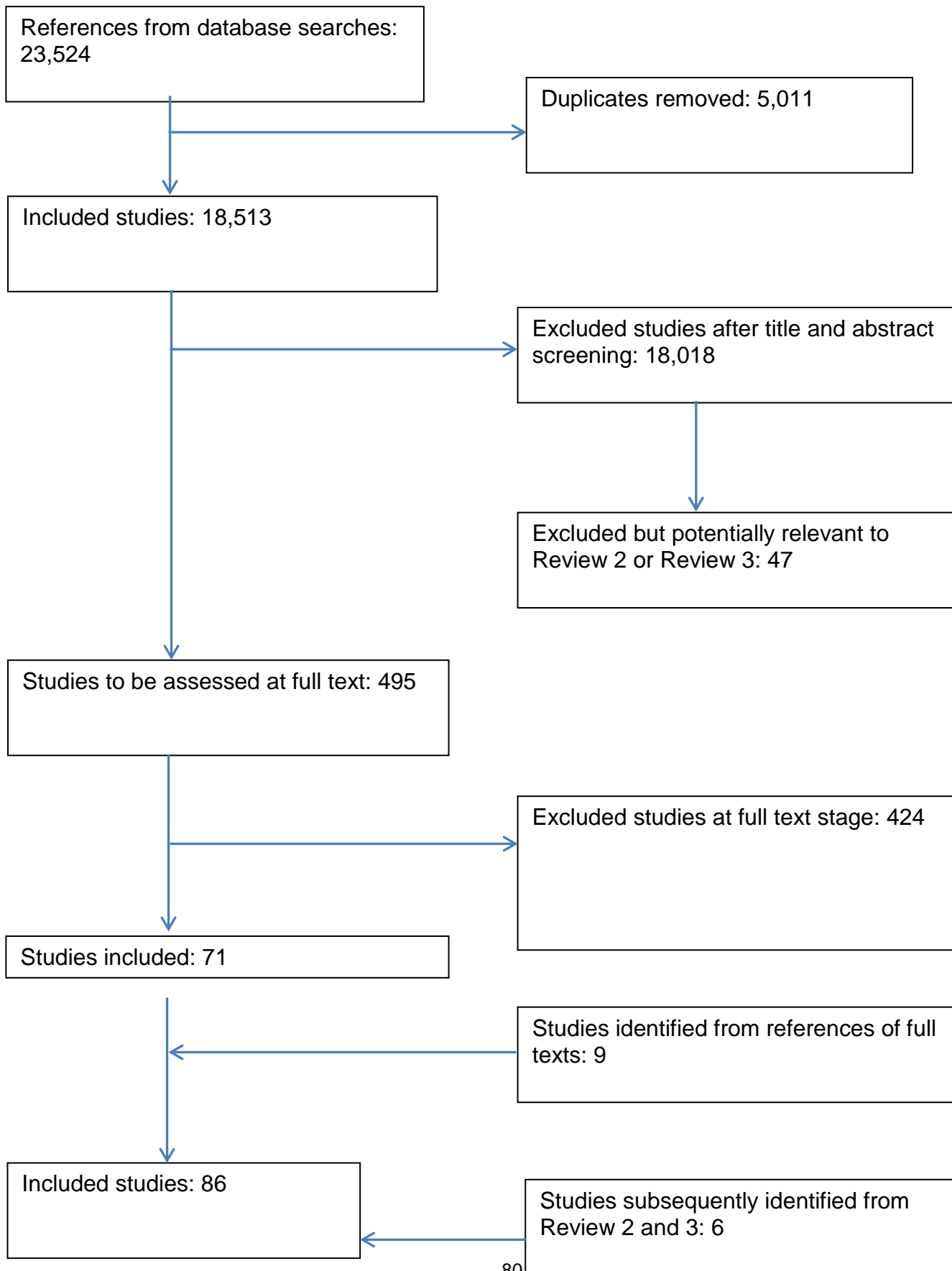
1. Health promotion /
2. Mental health /
3. 1 AND 2
4. Primary prevention/
5. 4 AND 2
6. mental health promotion.ti, ab
7. mental wellbeing.ti, ab
8. Meta Analysis.pt
9. Review.pt
- 10.6 OR 7
- 11.3 OR 5 OR 10
- 12.8 OR 9
- 13.11 AND 12
- 14.Costs and Cost Analysis/
- 15.Debt.ti, ab
- 16.Parenting.ti,ab
- 17.Lonel*.ti,ab
- 18.Suicide/
- 19.Workplace/
- 20.Bully*ti,ab
- 21.15-20/OR
- 22.(11 OR 14) AND 21
- 23.22 OR 13
- 24.Limit PY 2011-2016

Psycinfo search strategy

- a) MM Health Promotion
- b) DE "Mental Health" OR DE "Community Mental Health"
- c) 1 AND 2
- d) DE "Primary Mental Health Prevention" OR DE "Suicide Prevention"
- e) 2 AND 4
- f) mental health promotion.ti, ab
- g) mental w1 wellbeing.ab OR mental w1 wellbeing.ti
- h) 6 OR 7

- i) 3 OR 5 OR 8
- j) DE "Costs and Cost Analysis" OR DE "Budgets" OR DE "Healthcare Costs"
- k) Debt.ti, ab
- l) Parenting.ti,ab
- m) Lonel*.ti,ab
- n) Suicide/
- o) MM Workplace
- p) Bully.ti,ab
- q) 11-16/OR
- r) (9 OR 10) AND 17
- s) 9 OR 18
- t) Limit 19 PY 2011-2016
- u) Limit 20 NOT Dissertation

Review flow chart



A3: Background literature

Bullying

Impacts

A meta-analysis of 34 studies found an increased risk of suicide attempts in children who had been the victims of bullying (odds ratio⁹ (OR) 2.55) (van Geel, Vedder and Tanilon, 2014). Young people who have been bullied also have an increased risk of depression in adulthood (Ttofi et al., 2011). One study looking at data from the 1958 UK Birth Cohort found that individuals bullied in childhood had increased levels of psychological distress at ages 23 and 50. Victims of frequent bullying also had higher rates of depression (OR 1.95), anxiety disorders (OR 1.65) and suicidality (OR 2.21) compared with children who had not been bullied. The study also found that being bullied in childhood was associated with a lack of social relationships, economic hardship, and poor perceived quality of life at age 50 (Takizawa, Maughan and Arseneault, 2014).

An associated study found that individuals who were frequently bullied were more likely to use mental health services, both in childhood and adolescence (OR 2.53) and in midlife (OR 1.30) (Evans-Lacko et al., 2016). The 1958 Birth Cohort also indicates that children who have been bullied also are significantly more likely to have poor academic results and also lower levels of earnings than those who had not experienced bullying (Brown and Taylor, 2008).

Bullying is also a reason for unauthorised absence from school. Bullying may sometimes be the decisive factor in a small minority of cases for a parental decision to home educate a child. The parents of 3% of children educated at home in 2014-15 in Dorset said this was due to bullying (Mansell and Edwards, 2016). In 2011 it was estimated that 16,000 young people aged 11-15 are absent from school at any one time due to bullying (Jane-Llopis et al., 2011).

Evidence on what works

One systematic review reported that several different approaches to tackling bullying are effective, reducing the level of bullying victimisation by around 20% (Ttofi and Farrington, 2012). Another recent review reported mixed evidence on the effectiveness of interventions, with some evidence on the short-term effectiveness of programmes, but little on their long-term impact (Cantone et al., 2015). There has been relatively little evaluation of approaches that solely tackle online abuse. In Germany the school-based 'Medienhelden' (Media Heroes) cyberbullying programme, which has been shown to have a positive effect on cognitive

⁹ An odds ratio shows the increased likelihood of something happening, given a difference in background characteristics or experiences between two groups. In this case children who had experienced bullying were 2.55 times more likely to have a suicide attempt than children who had not experienced bullying.

empathy (which has been associated with cyberbullying), has recently also been shown to have an effect on traditional bullying (Chaux et al., 2016) (Schultze-Krumbholz et al., 2016). In Australia the Cyber Strong Schools initiative which involves actions for teachers and pupils when examined in a randomised controlled trial involving more than 3,000 students in 35 schools was found to be associated with lower levels of pupil involvement in cyberbullying at one-year follow-up (Cross et al., 2016).

A very promising approach which addresses all types of bullying in and beyond school, including cyberbullying is the KiVa programme. It has been developed and now is implemented in more than 90% of all schools in Finland for children between the ages of 8 and 16. In a non-randomised trial involving more than 150,000 students, participants in the control group were 22% more likely to be victims and 18% more likely to be perpetrators of bullying during the first 9 months of the study (Karna et al., 2011). In another large cluster randomised trial in Finland there was a also small but significant reduction specifically in cyberbullying among KIVA participants whose mean age was below 12.87 years (Williford et al., 2013).

KiVa has also been implemented in multiple countries, including a pilot study in three schools in England and 14 schools in Wales that has demonstrated the feasibility of implementation (Yahner et al., 2015). In England the KiVa curriculum covers half of the KS2 PSHE curriculum components, meaning that it can fit well within existing PSHE commitments in schools. This study also showed significant improvements in victimisation, with positive feedback from pupils and teachers on the approach. Following this initial positive evaluation, a larger scale evaluation is taking place across Wales (Clarkson et al., 2016).

Evidence on cost-effectiveness

There have been few previous economic studies of anti-bullying interventions. Since the modelling work undertaken for the 2011 report that focused on a different broader violence prevention intervention, we have identified one modelling study that examined the cost-effectiveness of the Olweus programme to tackle bullying in Sweden. The cost per bullying event averted in that analysis was less than the value that Swedish society is willing to pay for the avoidance of bullying (Beckman and Svensson, 2015).

Intervention and modelling assumptions

The economic model looks at the potential ROI of implementing the KiVa school-based programme to support young people within and outside the school environment to counter the impacts of all bullying, including cyberbullying and other forms of online abuse.

KiVa focuses on enhancing the empathy, self-efficacy, and anti-bullying attitudes of classroom peers; positive changes in the behaviour of pupils who are neither bullies nor victims can reduce the rewards that bullies perceive that they receive and thus reduce the incentives for bullying.

KiVa has two elements: “Universal actions include classroom-based lessons that (a) raise awareness of the role that the group plays in maintaining bullying, (b) increase empathy toward victims, and (c) promote young people’s strategies for supporting the victim and thus their self-efficacy to do so.....Indicated actions target specific incidents of bullying, including cyberbullying, through adult intervention and peer support for the victimized student” (Williford et al., 2013). The programmes are delivered by teaching staff within the school day. It includes specific teaching on cyberbullying.

A Markov decision-tree model was designed for a hypothetical primary school cohort of 200 pupils, initially in year 3 of school (aged 7). The model then runs for 4 years until the end of primary school; this is consistent with the approach currently being implemented in Wales. The programme is delivered as part of curriculum for Key Stage 2 class teachers (years 3-6 ages 7 to 11).

Evidence on effectiveness is taken from the previous KiVa evaluations in Finland, and the incidence of bullying in schools is based on observed data in the Welsh pilot evaluation. The model looks at the impact that KiVa has on a child being bullied intermittently or frequently during the school year. These include immediate impacts on the use of specialist Child and Adolescent Mental Health services (CAMHS) for children who are intensely bullied, drawing on observations in the international literature. The baseline rate for use of CAMHS services and referral rates from GPs to CAMHS are based on a recent survey from the Children’s Commissioner for England (Children’s Commissioner, 2016).

The model assumes that there is no difference in the use of CAMHS services by children who are infrequently bullied and those that are not bullied at all. The impact on contact with GPs is also included: this makes use of information on referral routes from the Children’s Commissioner survey to identify consultations with GPs. This is very conservative as there are likely to be multiple contacts with GPs by those who have been bullied.

Being the victim of bullying also increases the chances of significant periods of absence from school (defined here as being at least 28 days rather than the Department of Education definition of persistent absence of 15% absenteeism) (Jane-Llopis et al., 2011). In addition to short term outcomes considered in the model, data from the Avon Longitudinal Study of Parents and Children (ALSPAC) is used in sensitivity analysis to look at the potential association between bullying at age 12 and levels of depression (Bowes et al., 2016) or psychosis at age 18 (Lereya et al., 2015) compared with rates seen in young people who have not experienced bullying.

Bullying is also associated with an increase in self-harm and suicidal behaviour. One recent survey suggests that 31% of schoolchildren who have been bullied will self-harm (Ditch the Label, 2016); not all those who self-harm will come into contact with health services, and it is estimated that 12.6% of those who are frequently bullied receive some hospital treatment for self-harm . The costs of self-harm vary enormously; here we include the cost of a psychosocial

assessment for self-harm plus attendance at the accident and emergency department valued using a national tariff for a major emergency department contact.

The costs of funding the KiVa programme are assumed to be borne by either the school itself or local education authority. Information on the resource use and costs of implementing KiVa are taken from a micro-costing study in Wales (Charles, 2016). This analysis included details of the initial sunk and recurrent costs of KiVa. These costs include initial training costs for two members of the teaching/management team from school to attend the two-day training course delivered by KiVa accredited trainers. The analysis does not allow for any difference in costs between Wales and England. It assumes that KiVa is delivered by teachers within time already allocated to PSHE activities; additional costs are incurred if the programme is delivered outside of the PSHE timetable.

The average costs of a CAMH multidisciplinary team contact and GP consultations are taken from the PSSRU *Unit Costs of Health and Social Care* volume (Curtis and Burns, 2015). The model assumes that parents bear the cost of absence from school; it is assumed that parents have to give up working days, valued at the 2015 minimum wage rate, when their children are absent from school due to bullying. In the sensitivity analysis scenario looking at costs at age 18, the average costs of IAPT treatment for depression are taken from a detailed English costing analysis (Radhakrishnan et al., 2013). In that sensitivity analysis the average costs per case of early intervention care for first-episode psychosis are based on an NHS England consultation with clinical experts to establish their best estimate of the size of team required to deliver NICE-concordant care to a population of 100,000 with 32 cases of first episode psychosis per year (NHS England, 2016b).

School based social and emotional learning

Evidence on what works

There is evidence that a range of interventions can be delivered in school for the benefit of mental health, as well as social, emotional and educational outcomes (Weare and Nind, 2011). Social and emotional literacy programmes may help protect mental health and wellbeing in school-aged children. In addition to potential longer term benefits associated with better mental health, there may be more immediate impacts including better school attachment (or the sense of belonging that children have about the school that they attend), as well as having less risky behaviours, and development of assets including better resilience and cognitive skills. They may also have an impact on educational attainment: a meta-analysis of 213 universal school-based programmes delivered to promote pupils' social and emotional development found that programmes were associated with a significant 11% improvement in academic performance

(Durlak et al., 2011). Significant effects were maintained in the 15% of studies that reported at least a 6-month follow-up.

Many interventions have not been evaluated in controlled trials so the strength of much of the evidence is weak (Hart and Heaver, 2015). There are also mixed findings in different contexts. For instance, examples of universal school-based programmes for younger children include recent evaluation in a controlled trial in Norway of the benefits of a programme called “Zippy’s Friends” (Holen et al., 2013). This programme has been implemented in many different country settings and is designed to protect the emotional health and wellbeing of young children by increasing their range of coping skills for stressful situations both within and outside school (Bale and Mishara, 2004). In Norway, the programme was found to have had a positive effect on classroom atmosphere, as well as significantly reducing bullying and improving academic scores. However, another study in Ireland found that, while the programme improved emotional literacy scores, it did not have a sustained impact on mental health problems at 1-year follow-up, with the authors suggesting that a more holistic approach to mental health at school was needed (Clarke, Bunting and Barry, 2014). A US randomised trial that evaluated the impact of RULER, a social and emotional learning programme delivered to 10-11-year-old children over a two-year period (Hagelskamp et al., 2013). Like Zippy’s Friends, in comparison to classes in control schools, short-term benefits were observed, but there were also significant sustained improvements in emotional support, improved classroom atmosphere and organisation, as well as in the learning environment.

There is some economic evidence supporting school-based resilience programmes, although much this evidence is from very different contexts around the world. A recent meta-analysis and economic model developed in Australia showed that universal interventions, including resilience programmes to prevent depression, can be cost-saving (Lee et al., 2016).

One school-based initiative included in that analysis is the Penn Resilience programme. This has been shown to have a modest impact (relative risk reduction 0.55) in reducing the incidence of depression in the short term (6 months) in a number of non-UK settings (Lee et al., 2016, Stockings et al., 2016). An English non-randomised controlled trial in 16 schools in England looked at an adapted version of the Penn Resilience Programme. It aimed to improve children’s psychological well-being by building resilience and promoting accurate thinking (Challen et al., 2011, Challen, Machin and Gillham, 2014). Delivered by trained school staff, the programme was also found to have positive short-term (less than one year) impacts on child depression, emotional, behavioural, social, and school wellbeing. There were also impacts on school performance and level of school absenteeism. On average, children whose psychological wellbeing improved had higher levels of academic achievement and were more engaged in school than children who did not experience those levels of emotional wellbeing.

Intervention and modelling assumptions

The model looks at the impact of a universal social and emotional resilience programme, assumed to be similar to the UK Penn Resilience Programme, is compared with treatment as usual. Treatment as usual is assumed to be no more effective than a 'do-nothing' option. The model follows 150 hypothetical pupils in one school year (aged 11 to 12) for a 7-year period (ie until school leaving age). It is assumed that the intervention is offered to all pupils as part of their PHSE curriculum and that each course consists of 18 one-hour sessions during the school year. All pupils are assumed to be depression-free at baseline. The model then looks at the potential ROI associated with a reduction in new cases of depression at 6-month follow-up. Beyond six months the model assumes there is no further impact on the relative risk of developing or remaining in a state of depression.

There are few published estimates of new cases of depression in children and adolescents (Thapar et al., 2012). In this model we assumed that 6% of all children would meet the criteria for depression without intervention; this was the level of depression identified in the English trial (Challen, Machin and Gillham, 2014). It is also assumed that the intervention will be delivered as part of the PSHE curriculum (which was the case in most of the schools in the English evaluation) and that teacher time costs in delivering the intervention represent an opportunity cost to the school, but not a financial cost, as they would still be delivering a PSHE curriculum during this time. The model conservatively assumes that only 60% of children receive the intervention, based on the observation in the English evaluation that only 60% of children attended at least 17 hours of the 18 hour course (Challen, Machin and Gillham, 2014).

Implementation costs are restricted to training costs and materials for the intervention using the price per teacher offered by the one organisation in the UK that provides this training (Thrive, 2016). This five-day course currently has a cost of £1,375. However, it is assumed in this model that teachers would not need any booster training for at least three years. Therefore, while from a budgetary perspective these costs are incurred upfront, for the economic analysis the initial costs of the training are assumed to be apportioned over three years, adjusted to take account of the need to train replacement teachers as a result of the nationally reported 10% rate for staff leaving the profession every year (Department for Education, 2016).

The costs associated with depression are assumed to be the same as those reported for control group children in a trial in England of another psychological intervention to prevent depression (Anderson et al., 2014). These costs cover school health services, NHS primary and secondary care, including child and adolescent mental health services. The model takes account of the impact on families of a reduction in days absent from school due to the resilience programme. There were 1.5 fewer days of absence per pupil in the year of intervention in the English evaluation (Challen et al., 2011). It was assumed that one parent would incur opportunity costs due to child absence. This time was valued using the minimum wage rate for a full 7-hour working day.

Workplace stress prevention

What do we know about what works?

There is evidence on the impacts of universal mental health promotion programmes in workplaces. A recent systematic review and meta-analysis for preventing depression in workers using CBT-based programmes showed significant positive results (Tan et al., 2014). A recent Cochrane systematic review on preventing occupational stress in health care workers found that CBT with or without relaxation was as effective as no intervention in alleviating stress in studies with a very short term follow-up period (one month). However, CBT with or without relaxation with slightly longer-term follow-up from 1 month to 6 months showed a 13% decrease in relative risk. In addition, studies with follow-up periods lasting 6 months or longer showed more improvements in stress levels than no intervention. Physical relaxation techniques such as massage were found to be better in relieving stress than no intervention after 1 to 6 months (Ruotsalainen et al., 2015).

There is only limited evidence on effectiveness or cost effectiveness to support mindfulness-based interventions in workplaces, relative to no intervention or other active control groups, although there have been some studies reporting some benefits (Aikens et al., 2014, Burton et al., 2016, Wolever et al., 2012, Zolnierczyk-Zreda, Sanderson and Bedynska, 2016). Most recently, mindfulness-based stress reduction for managers based on a RCT in Poland showed significant improvements in subjective work-related stress, absenteeism due to sickness, and self-esteem based on self-report (Zolnierczyk-Zreda, Sanderson and Bedynska, 2016). There is very little evidence on economic aspects of the interventions.

In addition, a mindfulness-based online workplace programme showed significant improvements in perceived stress levels, resilience, vigour, and mindfulness (Aikens et al., 2014). However, a most recent systematic review and meta-analysis on mindfulness-based interventions to reduce stress in health care professionals suggested that these types of interventions may have the potential for alleviating stress, and more studies of high quality would be needed to draw a firm conclusion (Burton et al., 2016). The evidence base in the workplace setting will be strengthened once results become available from an on-going trial, including a cost-benefit analysis, evaluating mindfulness-based training in NHS settings in England (Hadley, 2013).

Intervention and modelling assumptions

The intervention modelled is the universal provision of a workplace CBT service offered to all employees who are identified by occupation health services as being stressed. The model looks at the impact of an intervention over a 2-year time period. Employees were either offered the CBT option consisting of up to 12 one-hour sessions of CBT and other support or a do-nothing option. The structure of the intervention, resource use and costs averted were based

on observed experience of a workplace CBT programme available to employees of Cardiff City Council, a public sector organisation with approximately 11,000 employees (Hitt, 2016). CBT was conservatively assumed to lead to a reduced risk of stress of 13% relative to no intervention; observed experience in Cardiff suggested that significant positive impacts on mental health were seen in 46% of those who received CBT.

Set-up costs of the programme and recurring running costs were taken from the Cardiff Council programme. The Council contracted with the local Health Board for the provision of psychological services, which included nurse therapists, consultant psychiatrists, and administrator time input. The annual cost of these services was £37,458. Benefits to the NHS from reductions in GP visits, physical care costs, use of secondary mental health care services and drugs were included in the analysis. In addition, there were potential benefits to the local authority from productivity gains through reduced absenteeism and presenteeism, better levels of employee retention and reduced need for occupational health and local authority wellbeing services. The rate of completion of CBT of 66% was based on observed participation and completion rates in this workplace programme; conservatively it was assumed that there were no benefits from partial completion of CBT.

Protecting the mental health of people with physical health problems

What do we know about what works?

Depression is frequently missed in people with diabetes despite effective screening tools being available. Both psychological interventions and antidepressants are effective in treating depressive symptoms in people with diabetes but have mixed effects on glycemic control. Clear care pathways involving a multidisciplinary team are needed to obtain optimal medical and psychiatric outcomes for people with comorbid diabetes and depression (Holt, de Groot and Golden, 2014).

One effective approach for multi-disciplinary action is collaborative care. Initially developed in the US, the approach involves a specially trained individual such as a nurse working in primary care settings who can help improve co-ordination between different health care professionals; these individuals or others will also be specially trained to provide psychological interventions such as problem-solving therapy or brief cognitive therapy (Katon et al., 2004, Katon et al., 2010). There is consistent evidence from the US that the approach in primary care settings is cost-effective in addressing depression in individuals with diabetes or coronary heart disease (Johnson et al., 2016, Katon et al., 2012, Molosankwe et al., 2012, Hay et al., 2012); furthermore, better management of depression can help reduce the costs of managing the physical health condition.

More recently, economic studies have looked at the value of collaborative care in specialist care settings. In the US, collaborative care had a cost per QALY gained of under £3,000 when delivered to acute coronary heart disease patients in an inpatient setting (Celano et al., 2016). In a UK context, a modelling study has recently suggested that there is a very high probability that collaborative care to address depression in cancer patients will be cost-effective from a health system perspective, with a cost per QALY gained of under £10,000 (Duarte et al., 2015).

Intervention and modelling assumptions

The intervention modelled here is collaborative care delivered in primary care for individuals living with diabetes and/or coronary heart disease. This intervention has been the subject of a recent randomised controlled trial and economic analysis in England (Coventry et al., 2015, Camacho et al., 2016). In our model, results are shown assuming that collaborative care is potentially being offered to all individuals with a diagnosis of diabetes or coronary heart disease who are identified as being at risk of developing depression. It does not consider individuals with established depression who might also benefit. The model also assumes that if individuals do not complete or decline collaborative care then they will continue to receive usual care.

Loneliness

Background

Investing in measures to promote mental wellbeing can help promote healthy ageing. Depression in particular remains a common problem. In high-income countries at least 12% of older people are affected by clinically significant levels of depression at any one time (Copeland et al., 2004); rates as high as 16% have been reported in some studies (Forlani et al., 2013, Regan et al., 2013).

One risk factor which has been associated with depression is involuntary social isolation and loneliness (Holvast et al., 2015, Peerenboom et al., 2015). For instance, lower levels of contact with friends and neighbours were associated with significantly greater rates of depression in a survey of more than 6,800 older people living in two areas of Sweden and Finland (Forsman, Nyqvist and Wahlbeck, 2011). Meta-analyses of the prevalence rates of depression in older people range from between 4.6% and 9.3%, with subthreshold rates ranging between 4.5% and 37.4% (Rodda, Walker and Carter, 2011, Meeks et al., 2011). The increased rate of depression in people who are highly lonely is three times greater than for people who are not lonely (Steptoe et al., 2013).

Although loneliness is by no means a phenomenon restricted to older people, they are a high-risk group. After retirement there may be a reduction in the size of social networks, particularly

for men; mobility issues and poor access to public transportation may also increase the risk of social isolation. Inevitably, older people will also experience bereavements. This is another determinant of social isolation and loneliness. The death of a spouse or long term partner is a major life event; one recent European longitudinal analysis indicates that married older people who lose a spouse are at significantly increased risk of having depressive symptoms compared to couples who do not experience such a bereavement (Schaan, 2013).

Analysis of cross-sectional data from the 2007 Adult Psychiatric Morbidity Survey in England indicates that increased feelings of loneliness are significantly associated with higher levels of suicidal ideation and attempted suicide events. Although these results are cross sectional and do not measure change over time the risks of serious deliberate self-harm in a year are 17.37 times greater for those who are highly lonely and 3.6 times greater than for those that are sometimes lonely (Stickley and Koyanagi, 2016). There is also an increased risk of premature mortality from all causes in people who are highly lonely. The Dutch AMSTEL study, a ten-year follow-up of individuals aged 65 to 84 reported a 30% greater chance of dying compared to those that are not lonely (Holwerda et al., 2012) .

While the focus in this report is on mental health and wellbeing it is critical to note that in addition to impacts on mental health, loneliness is also a risk factor for poor physical health, such as coronary heart disease and stroke (Heffner, Waring et al. 2011; Cene, Loehr et al. 2012; Valtorta, Kanaan et al. 2016). There may also be an association with mild cognitive impairment and/or dementia. In further analysis of the AMSTEL cohort, older adults who felt lonely were found to have a 64% higher risk of developing dementia than those who did not (Holwerda et al., 2014). A recent meta-analysis of 19 studies also suggests that the risk of developing dementia with high levels of loneliness is 1.58 that for those who are not lonely (Kuiper et al., 2015).

What do we know about what works?

Meta-analyses of studies with psychological or social interventions to prevent depression in older people have reported a small but statistical effect; being most pronounced for the use of social activities (Forsman, Nordmyr and Wahlbeck, 2011, Forsman, Schierenbeck and Wahlbeck, 2011, Lee et al., 2012).

A recent systematic review to inform NICE guidance looked at non-health sector delivered interventions to promote the mental wellbeing and independence of older people (McDaid et al., 2015b). It found that a wide variety of actions to improve access to social contacts and networks and participation in social activities, including various arts and cultural activities, initiatives to sign post individuals to social activities and friendship building programmes could all help protect mental wellbeing. The review did note, however, that the nature of these interventions meant that many of the evaluations have been small in scope, limiting potential to detect significant effect sizes. Other reviews and recent empirical have reached similar conclusions, both on potential actions, including social activities and friendship-enhancing

programmes, as well as the strength of the evidence base (Gardiner, Geldenhuys and Gott, 2016, Dickens et al., 2011, Lawlor et al., 2014, Masi et al., 2011).

As well as universally delivered interventions, there is also evidence that actions targeted at high-risk groups of older people for depression, such as those with chronic physical illness or the bereaved, can be cost-effective (Cuijpers et al., 2011). Becoming a volunteer or enrolling on an educational course can also reduce the risk of mental health problems. One example is the evaluation of the American Association of Retired Persons' Experience Corps programme which operates in 20 cities in the US, helping children who are struggling with their reading and literacy. It may also help maintain the cognitive brain health of the volunteers (Carlson, 2011).

Evidence on the cost-effectiveness of the non-medical interventions that promote group activities for mental wellbeing include economic analysis alongside a pilot randomised controlled trial of participation in a 14-week professionally led community choir group on mental wellbeing. This study reported a significant improvement in mean SF-12 mental health scores for the intervention at 6-month follow-up and an approximate 60% chance of being cost-effective at a cost per QALY gained of £20,000 (Coulton et al., 2015).

Some economic analysis also supports the use of stepped care as a cost-effective means of preventing depression and anxiety among at-risk older people. Stepped-care encompassing (i) watchful waiting, (ii) guided self-help using bibliotherapy, (iii) problem-solving and (iv) referral to a primary care physician for further evaluation and treatment when required, was successful in reducing the incidence of anxiety or depressive disorders in the Netherlands by 50%, with effects maintained over twelve months (van't Veer-Tazelaar et al., 2011). Modelling analysis based on trial data reported an incremental cost of \$5,204 for a depression-free year and a 57% likelihood of being more cost-effective than routine primary care (Van't Veer-Tazelaar et al., 2010). Cognitive behavioural therapy (including online therapy) has also been shown to be effective and cost-effective in reducing symptoms of depression in older people with either sub-clinical threshold or clinical depression (Titov et al., 2015a, Titov et al., 2015b, Dear et al., 2015).

Another economic study from the Netherlands compared a home-visiting service provided by trained volunteers with a brochure providing information on depression. This programme was targeted at older people who had been widowed for between 6 and 9 months and who were experiencing some degree of loneliness (Onrust et al., 2008). Although improvements in quality of life were marginal, the intervention still had a 70% chance of being cost-effective, with a baseline cost per QALY gained of \$10,366.

Intervention modelled

Recent NICE guidelines on actions to promote the mental wellbeing of older people recommend actions to support, publicise and, if there is not enough provision, providing a

range of group, one-to-one and volunteering activities that meet the needs and interests of local older people (NICE, 2015).

The intervention modelled here focuses on the provision of a signposting service for people aged 65 and older who are not in paid work to help identify opportunities for participation in a wide range of local social activities. Such signposting services have been put in place in different areas of England; they vary in the way they operate with some located in GP surgeries, others in local focal points such as shopping centres or libraries, and others that proactively seek to identify and engage with potentially isolated individuals. The service in the model here is assumed to be similar to that by Dorset Wayfinders; a programme managed by the charity Help and Care and operating across the entire county. It has been the subject of evaluation of economic impact (Harflett and Bown, 2014). The role of the Wayfinders is to provide signposting and support to older people who may require information or activities to support health promotion and independence. There are 33 Wayfinders working in Dorset, each of whom volunteers for 9 hours a week on a flexible basis. They base themselves in convenient locations such as libraries, GP surgeries, community pharmacies or supermarkets. They can provide information on local social activities, education courses etc.

Other more intensive schemes to support individuals include the village and community agents programme in Gloucestershire. This has also been the subject of a ROI analysis (Gloucestershire Rural Community Council, 2014). This service had reported savings of £1.90 to health and social care services and a further £1.20 in financial benefits to clients for every £1 invested. This analysis included impacts on mental health due to a reduction in social isolation and loneliness, but it also included many other positive impacts in areas that the present economic model does not cover – falls prevention, cancer support, fuel poverty, income maximisation and helping individuals to maintain their independence.

Based on experience with Dorset Wayfinders, the model assumes that the signposting scheme may be expected to have contact with 6% of the over 65 population who specifically identify that they are experiencing social isolation or loneliness in the model. This model also assumes that all who contact the service will either have severe or moderate levels of loneliness, with the balance between severe and moderate levels of loneliness is the same as that seen in the ONS Opinions and Lifestyle Survey 2015 (Thomas, 2015). The cost per contact is assumed to be £9.26 based on costs in the Wayfinders evaluation (Harflett and Bown, 2014). The cost of the social activity will be highly dependent on the nature of the activity. In this case we have assumed participation in professionally led group singing classes at an initial cost per course per participant of £20 – similar to that seen in a favourable evaluation of this intervention (Coulton et al., 2015). In most cases, the costs of participation in such activities are borne by the participant. Participation in regular group activities is assumed to reduce the chance of an individual being lonely by 9%; this is in line with modest effect sizes reported in meta-analyses and in individual studies (Masi et al., 2011, Martina and Stevens, 2006, Saito, Kai and Takizawa, 2012).

In the analysis, the potential costs avoided are restricted to those contacts that can be linked with loneliness and poor mental health, rather than the wider benefits arising from improved physical health and avoidance of falls etc. The analysis includes an estimate of GP contacts avoided due to avoidance of severe loneliness. This increased rate of consultation in those who have high levels of loneliness has been combined with national data on average number of GP consultations by age group to estimate the additional number of consultations per year. We have conservatively used the male mean per person cost per GP practice consultation rate of 7.63 contacts per year (comparable rates for women were 8.42 contacts per year) (Hippisley-Cox, 2009). Two-thirds of these contacts are with GPs and one third with practice nurses and the latest weighted costs combining GP and GP nurse consultations are used in the model (Curtis and Burns, 2015). This analysis is conservative: the increase in the number of consultations may be even greater for older cohorts. Mean consultation rates for the over 70s in the 2009 analysis were 9.82 and 9.36 for women and men respectively while rates for older age groups rise to more than 12 in the over 80s.

The analysis also takes account of the initial costs associated with the increased risk of hospital presenting self-harm, as well as the avoidance of treatment for depression, assumed to be equivalent to the mean costs of a stepped care approach to IAPT (Radhakrishnan et al., 2013). It also takes account of the benefits to society of a very small (0.003%) increase in the number of individuals contributing their time as volunteers as a result of coming into contact with signposting and navigation services (Gloucestershire Rural Community Council, 2014). This time has been very conservatively valued as being equivalent to the rate for the minimum wage in 2015 and is only applied to those who are no longer lonely as a result of the intervention.

Debt

Background

A survey in 2013 of 4,442 adults in Great Britain identified that 6% had three or more signs of problematic debt such as falling behind on essential bills, using credit to pay credit cards or relying on credit to last until payday. Extrapolated to the whole Great Britain population it was estimated conservatively that 2.9 million adults were likely to have problematic debts (de Santos, 2014), with around 1.5 million adults seeking debt advice (Farnish, 2015). In England and Wales in 2014/15 local authorities passed on debts to bailiffs on 2.1 million occasions (Money Advice Trust, 2015). These estimates of the numbers in problematic debt may be conservative, with another definition suggesting that there are 8.8 million individuals who 'feel their debt is a heavy burden' (Money Advice Service, 2013b). Individuals with low incomes and a lack of savings are at particular risk; they can include younger adults, those in receipt of benefits and living in rented and/or other insecure accommodation (Financial Conduct Authority, 2014). Almost 90% of Citizens Advice Bureau (CAB) clients have incomes below £18,000 in 2013 and almost half of all clients of another major debt advice provider, Step

Change, were in social housing (Centre for Social Justice, 2013). It is also well recognised that individuals with existing mental health problems are also at increased risk (Holkar and Mackenzie, 2016).

There is a substantial evidence base on the association between debt and poor health, including poor mental health. Unmanageable financial debt has been associated with increased risks of poor mental health in studies in the UK (Fitch et al., 2011, Meltzer et al., 2013) and elsewhere (Houle and Light, 2014, Zurlo, Yoon and Kim, 2014, Sweet et al., 2013). A recent longitudinal analysis in England focused on students has reported that those whose financial situation deteriorates are at higher risk of mental health problems (Richardson et al., 2016). In Spain, 90% of women and 84% of men in mortgage arrears and threatened with eviction had poor mental health compared with rates of 15% and 10% in the general population (Vasquez-Vera et al., 2016). Unmanageable debts may also increase the risks to the mental health of children and other family members; one survey estimated that 23% of children in families with problem debt have low levels of wellbeing compared to 5% in households without problem debt (Pinter, Ayre and Emmott, 2016).

What do we know about what works?

The literature review indicates that there is potential for debt advice interventions to alleviate financial debt, and hence reduce mental health problems resulting from debt. Past analysis has indicated that for the general population, contact with face-to-face advice services has been associated with a 56% likelihood of debt becoming manageable (Williams and Sansom, 2007), with telephone and services achieving a success rate of 47% (Pleasence and Balmer, 2007). It has also been suggested that without intervention only around one third of debts will become manageable.

A more recent conservative regression analysis of longitudinal debtor survey data in England reported that 25% of those that used debt services had manageable debts within twelve months compared with 14% of those that did not use advice services. There were no substantive differences in effectiveness or satisfaction between face-to-face, telephone and web-based services (YouGov, 2012). Another survey of 2,700 users of CAB services found that 69% of those with debt problems reported that these had been partially or completely dealt with, while 81% reported a positive impact on mental wellbeing (Citizens Advice Bureau, 2014). 75% of a survey of callers to the National Debtline at six weeks and 12 months after they had used the service reported feeling less stressed (Money Advice Trust, 2016).

Better management of debt can also have an impact on the use of health services. In a small scale study in Sefton a significant reduction in the number of GP appointments and use of anti-anxiety medications, along with non-significant reductions in the use of antidepressants and nurse time was observed in patients who had been referred to a CAB advice service (Krska et al., 2013). There may also be other indirect benefits: if debt advice reduces the risk that an

individual becomes homeless then this is likely also to reduce the risks of poor mental health linked to homelessness.

DeCoDer, a controlled trial of CAB services targeted at individuals identified to have depression or anxiety disorders within GP practices in four locations in England and Wales was also funded by the NIHR but was not completed due to low levels of recruitment. Debt advice services are also able to help individuals develop financial literacy skills that may help reduce the risk of subsequent unmanageable debt.

Intervention modelled

There is a substantial provision of debt advice services provided by major non-profit organisations in England. The bulk of contacts are with telephone and web-based services; indeed it would not be feasible for face-to-face services to provide support for all individuals needing help with their debts. In 2013, the StepChange Debt Charity helped 507,863 clients, of whom 57% used telephone advice and 43% online advice (StepChange, 2015), while National Debtline supported a further 268,000 (67%) online and 128,000 (33%) by phone in 2015 (Money Advice Trust, 2016). In 2014/15 the CAB provided debt advice to 402,000 clients with 1.6 million debt problems (Citizens Advice Bureau, 2015), mostly on a face-to-face basis. This included face to face advice services in 712 different health settings: 605 GP surgeries, 78 hospitals or hospices and 29 mental health day centres or groups.

GP prescriptions for advice services have been set up in some areas in England; these are not just targeted at individuals with existing mental health problems; many individuals who do not meet the criteria for depression or anxiety disorders will contact GPs as a result of debt-related stress. A survey of more than 1000 GPs in 2014 reported that 88% felt that poor access by their patients to legal and welfare advice services can increase the risk of stress, anxiety and hospitalisation (Hynes and Sandbach, 2014). The English and Welsh Civil and Social Justice Panel Survey waves 1 and 2 also indicate that around 50% of people with problematic debt report that they experience adverse health problems and 80% visit a GP or other health service (Hynes and Sandbach, 2014).

The model here focuses on addressing the needs of the 6% of adults who are experiencing problematic debt. A third of all adults in one survey who contact debt advice services contact the CAB which predominantly provides face-to-face services (YouGov, 2012). Thus the intervention is the prescription of free debt advice services delivered by a not-for-profit organisation provided within a GP surgery as an alternative or complementary option to other not-for-profit debt advice services delivered online or by telephone. Individuals could also self-refer to all or any one of these services.

The way in which costs are covered for debt advice is complex. Most not-for-profit debt advice services are predominantly funded through a percentage of Fairshare income - a financial

subsidy from the lending industry that enables not-for-profit organisations to administer free-to-client debt management plans (free-to-client means creditors bear the cost of the plan with 100% of monthly payment going towards repaying debt). In all cases we are assuming that there are no out-of-pocket costs for those in debt; the model does not look at IVAs (individual voluntary agreements) or debt relief orders for which there are specific standard professional fees.

The model assumes that face-to-face advice services are provided by volunteers. Costs can vary, with estimates reported of £84 (Farr et al., 2014) per case for some face-to-face CAB services and £123 per case for another face-to-face service supported in part by the local county council (Derbyshire CABx, 2016). It is this higher estimate that we have used in this analysis. We do not make any assumptions about how these costs will be covered. Costing models will vary, for instance the costs of some face-to-face tenancy advice services have been shared between housing associations and the CAN in England (Citizens Advice Bureau, 2012). In the case of services delivered within GP surgeries the model assumes therefore that GPs will receive some training to recognise signs of financial distress and then to prescribe or refer individuals to the advice service. These costs would be covered by CCGs. It is assumed that the cost of this training would be equivalent to one day's GP salary, reflecting the possible need for a locum.

In contrast to face-to-face services the model assumes that the costs of telephone and web-based services are fully covered by levies on the financial industry and other contributions to funding, eg by utility companies. There are no costs to the NHS or to individuals. We have used conservative low estimates on the uptake and effectiveness of face-to-face and telephone-based services in England (Plesence and Balmer, 2007, Williams and Sansom, 2007). We have assumed that web-based services have similar levels of uptake. We have conservatively used an estimate of 25% rate of success in making debts manageable using any of the three advice interventions compared with 14% for those who did not receive advice. We have also assumed that if web advice is not successful individuals will then potentially also make use of telephone advice services.

The model assumes that all individuals initially have no mental health problems but if they find themselves having persistent unmanageable debts within a 12-month period they are assumed to have a 33% higher risk of developing depression and anxiety-related problems compared to the general population who do not experience financial problems (Skapinakis et al., 2006). The model assumes that 9% of individuals whose debt problems are resolved will have further unmanageable debt problems in the following year compared to 19% of individuals who do not receive advice (YouGov, 2012). Published UK utility values for depression and no health problems are used to estimate annual QALYs gained for individuals with or without depression (Roberts et al., 2014).

The model then assumes that the annual costs to the health care system for cases of depression conservatively will be equivalent to the average costs of treatment received through

the Individual Access to Psychological Treatment programme. In addition to the costs of depression the model also very conservatively assumes that there is a cost of just one additional GP visit associated with unmanageable debt, even if the transition to depression is avoided.

The model also assumes that there are debt recovery costs which will be borne by lenders and/or the courts. These costs, in line with a previous economic analysis of the cost of debt are assumed to be equivalent to 5% of average individual debt (Clifford et al., 2014). We conservatively have assumed that average problematic debt is £6,000. This is equivalent to average unsecured debt for each adult in England in 2014 (Financial Conduct Authority, 2014). Productivity losses include short-term absenteeism due to the stress of problematic debt and withdrawal/ cutback from employment due to depression. The average number of days of absence for stress used by the Health and Safety Executive is valued at the average wage per day in December 2015. Stress-related productivity losses consist of a conservative assumption of a 10% increase in the risk of having to take days off work due to stress for those individuals who are in employment. Longer-term productivity losses for individuals who develop depression are conservatively assumed equivalent to average annual wages forgone, adjusted to take account of the lower rate of employment for individuals with depression and the baseline rate of employment.

Preventing suicide and self-harm

What do we know about what works?

A comprehensive suicide prevention strategy will typically involve a number of different actions rather than relying on any one measure (van der Feltz-Cornelis et al., 2011), but the evidence base on effective actions has been rather limited, with restriction on access to means being consistently effective. A recent review of reviews found robust evidence on the effectiveness of measures to restrict access to lethal means, eg by limiting the number of co-proxamol / paracetamol pills in a packet, as well as suicidal 'hotspots' such as bridges (Zalsman et al., 2016). The effectiveness and economic case for investing in structural safety measures, i in major suicide hotspots, including bridges, railway lines and underground stations have previously been made in the UK and in other settings around the world (Atkins Whitmer and Woods, 2013, McDaid, 2016b, Pirkis et al., 2015, Law and Yip, 2011).

The review found some evidence to support awareness-raising programmes for young people in school, the use of some drug and psychological therapies and taking action to provide information and signposting. The evidence on training service gatekeepers, such as primary care doctors, social workers, the police and teachers, to recognise the signs of self-harm and suicide was inconclusive because of study design limitations. While the evidence on

effectiveness of such training is far from conclusive some non-randomised control evidence suggests that better awareness training can have an impact as part of a population level interventions to prevent suicide, if it leads to adequate subsequent support and treatment (Appleby et al., 2000) while an randomised trial in Australia of GP training to recognise signs of depression and self-harm in older people was found to have a significant reduction over 2 years in future risk of self-harm (Odds Ratio 0.8 versus control group) (Almeida et al., 2012) but a meta-analysis of GP interventions around the world was unable to find significant impact of effect; however this review noted that many studies were poorly designed for detecting effect of interventions such as GP awareness training (Milner et al., 2016).

Another key location to identify and plan an appropriate course of treatment for those at risk is the hospital. Current NICE guidelines on management of self-harm recommend that all individuals who attend a hospital accident and emergency department for a self-harm event should receive a psychosocial assessment (National Institute for Health and Care Excellence, 2013) There is limited information at national level of the use of psychosocial assessments; one analysis looking at three hospitals reported rates ranging between 41% and 69% of attendees (Geulayov et al., 2016). In two of these three locations psychosocial assessment had previously been associated with a lower rate of future self-harm events (Kapur et al., 2013). A recent Cochrane systematic review also reports that the risk of subsequent suicidal events can be reduced through the use of cognitive behavioural therapy following assessment, but it should be noted that all of the studies in this review were of moderate to low quality (Hawton et al., 2016b).

Intervention and modelling assumptions

Guidance in England now recommends a multi-component approach to suicide prevention (National Institute for Health and Care Excellence, 2013). Previously we modelled the cost-effectiveness of a multi-component suicide prevention programme that involved better training and appropriate treatment for those health and other sector professionals who may come into contact with suicidal individuals (McDaid, Park and Bonin, 2011). This model suggested that if there were modest favourable impacts on the future risk of suicidal behaviour then the intervention would be cost effective.

To complement this we have developed a new model which looks at increasing in the routine use of psychosocial assessments upon presentation to accident and emergency departments. Most of the cost and effectiveness data for the model are drawn from English studies.

The cost of a referral to IAPT is assumed to be £961 per person per year (Radhakrishnan et al., 2013). This takes account of the higher costs of IAPT related to failed treatments and the need for more intensive support for some individuals.

Individuals who attend hospital for self-harm will then have a chance of receiving psychosocial assessment based on current or increased rates of assessment by specialist mental health personnel. The costs of psychosocial assessment are based on an estimate for adults used in NICE guidance (National Institute for Health and Care Excellence, 2011).

It is challenging to estimate the costs to the healthcare system associated with a non-fatal self-harm event, as these costs can vary substantially depending on the nature of the injury. The model incorporates costs for accident and emergency attendance, as well as for ambulatory transport (for 24% of individuals consistent with proportion of adults in England who attend A&E). Poisoning is the most frequent presentation for self-harm in England. We have conservatively assumed an average cost of inpatient treatment costs of £334.36 using national tariff values from the 2015 / 2016 tariff of £668.72 for a short term unelected stay for treating a poisoning with single intervention (critical care score 0-1); this is a low tariff compared with those for more complex injuries. We have halved this tariff reflected the difference in reported rates of hospital presenting self-harm (Geulayov et al., 2016) compared to rates of hospital admission for self-harm (Public Health England, 2017). The model assumes that those who complete suicide only incur ambulance costs as well as costs for an A&E admission, but we have not included an inpatient costs for unsuccessful lifesaving procedures. The analysis of costs/savings also includes expenditure on police/coroner activities, productivity losses for individuals and their families as well as intangible costs associated with the loss of life.

In 2015, 14% of all deaths in England and Wales reported to a coroner led to an inquest. 11% of all coroner inquests in England and Wales led to a ruling of suicide. In the case of coroner activities, it is assumed in the model that all deaths will be subject to a coroner's inquest, as this is what should happen when a death is uncertain or unnatural. We make no assumptions as to whether or not this death is recorded as a suicide, but rather that it will at least have been subject to an inquest. In the vast majority of cases, these inquests do not involve a jury and this is the assumption we have used in modelling (Ministry of Justice, 2016). We have assumed that all of the public purse coroner costs fall on local authorities (in some localities the local police force may also contribute towards these costs). While there are detailed schedules published of fees and allowances associated with coroner inquests, few estimates appear to have been published of the typical costs of a coroner inquest. Costs of £569 per inquest have been used in the model; making use of a reported estimate of the costs of inquests in Cornwall (Centre for Mental Health, 2016). We have not included costs to families of coroner inquests – legal fees for representation also can be substantial; there are also costs of as much as a £1,000 for post-mortem CT scanning to families (the Chief Coroner supports the idea of imaging being more widely available) (Thornton, 2016).

The model runs over a ten-year period for a cohort of working age adults. The model could be adapted for children and young people: the pathways would be similar but the costs different. The model uses a conservative estimate of 16% from a meta-analysis of the risk of subsequent self-harm events within a one-year period (Carroll, Metcalfe and Gunnell, 2014). Rates of more than 20% have been reported in the multi-centre study of self-harm (Geulayov et al., 2016).

The same meta-analysis reports a rate of 1.6% for completed suicide within a 12-month period. The risk of future self-harm events reduces over time, so that if an individual goes a whole year without a suicidal event their risk of a future event will be lower than that for someone who has self-harmed in the previous year (Hetrick et al., 2016, Bennardi et al., 2016, Zahl and Hawton, 2004). We were not able to identify a precise estimate of reduced risk beyond one year so conservatively we have used the same future risk rate as for a previous self-harm event. This will overestimate the longer term risk of future events equally in intervention and comparison groups for individuals who do not have a self-harm event in the previous 12 months. The model assumes that the risk of serious fatal and non-fatal events in the year following a nonfatal suicide attempt falls by 41% if an individual has had a psychosocial assessment in the previous 12 months (Kapur et al., 2013). This reduction in risk will be due to greater use of appropriate treatments, with a recent review suggesting that the risk of repetition after receiving psychological therapy is almost halved compared with those who do not receive such support (Hawton et al., 2016b).

The model does not assume any other decrease in the risk of self-harm or suicide and that individuals identified as being at risk will continue to receive appropriate treatment to help maintain reduced risk. Using an approach initially developed to estimate the costs of suicide in Scotland (Platt et al., 2006) and data from the Office of National Statistics productivity for the employed and economically inactive are estimated. Intangible costs associated with the loss of life (net of productivity losses) have been estimated using the willingness to pay to avoid unexpected death in a road traffic accident published by the Department of Transport (Department for Transport, 2016). To be conservative these productivity and intangible costs associated with suicide are assumed to be of only ten years duration rather than taking account of all potential years of life lost. The model conservatively assumes therefore that the intervention is focused on preventing suicide over a ten-year period alone; no assumptions are made about longer-term suicidal behaviour.

A4: Parenting interventions for conduct disorders and behavioural problems

Background

There is a substantial literature available on the adverse socio-economic impacts of poor wellbeing in young people. For instance, one recent analysis looked at the three-year costs for children between the ages of 5 and 15 in Great Britain who were identified as having mental health problems in the year 2000 (Snell et al., 2013). Annual costs of health, education and social services for all mental disorders were reported to be 1.657 billion or a mean cost of £2,051 per child (2015 prices). The mean cost per child with a conduct disorder was estimated to be £2,111. These estimates are certainly conservative as they do not include the costs of contacts with the police and other elements of the criminal justice system.

It is not just these immediate impacts that have to be considered. Many adverse impacts of conduct disorders may last well into adulthood (Fergusson, Horwood, and Ridder 2005a; Scott et al. 2001; Case, Fertig, and Paxson 2005; Case and Paxson 2006; Allen 2011). These may include higher rates of health service use, increased contact with the criminal justice system, reduced levels of employment and often lower salaries when employed and personal relationship difficulties. Poor mental wellbeing and poor mental health in children may also contribute to poor educational performance, which in turn may limit career options and the level of income that may be earned (Case and Paxson 2006). It can also have additional adverse consequences for parents, siblings and for their own future children.

Targeted parenting programmes

One area for potential investment is parenting. Programmes targeted at children and young people already identified as having or being a high risk of conduct disorders and other poor mental health have been associated with positive mental wellbeing and reduced risk of emotional poor development and behavioural problems in children (Goldie et al., 2016), as well as short-term improvements to the psychological health of parents (Barlow et al., 2014).

The review found that many different parenting programmes have been implemented in England, with some targeted at high-risk groups and others provided universally to a specific group such as children in nursery or in primary school. There is promising evidence from controlled evaluations on the effectiveness of some of these interventions, for example in terms of reductions in child behavioural problems, better parenting skills and parental wellbeing (Furlong et al., 2013). However, most of this evidence covers outcomes for less than two years.

In respect of targeted actions one well-known programme which has been shown to be effective is the Webster-Stratton Incredible Years (IY) programme (Webster-Stratton and Hancock, 1998). It focuses on a group-based behavioural therapy approach to promoting positive parenting, often targeted at the parents of children already identified as having or being at risk of conduct problems. Different modules are available covering issues for different child age groups, and also for children with special needs. Role-playing and discussion of videos of different parent-child scenarios are discussed in group sessions over a number of weeks, supplemented by further homework for parents.

Evaluation of the national roll-out of the Parenting Early Intervention Programme in all local authorities in England, which covered eight different interventions including IY rather than one agreed parenting programme, reported sustained improvements in parental mental wellbeing and in child behaviour at one-year follow-up (Lindsay and Strand, 2013). A two-year follow-up of the Swedish National Effectiveness Trial of Parenting Programmes found that IY and another similar behavioural therapy programme, as well as two programmes focused on attachment and family therapy, had similar levels of sustained effectiveness (Hogstrom et al., 2016).

There is also economic evidence supporting IY, including previous analysis modelling the economic case for investing in a range of mental health promotion and problem prevention interventions (Knapp, McDaid and Parsonage, 2011). In Wales, IY was found to be cost-effective for the parents of all 3-5-year-old children at risk of conduct disorder, but even more cost-effective if targeted at children with the highest risks of developing conduct disorder (Edwards et al., 2007). Another evaluation of IY targeted at children aged 3-4 years in Birmingham reported mean increased costs compared to controls for use of health, local authority and education services; an additional 23% of children were no longer at risk of conduct disorder after intervention at a cost of between £1,612 and £2,418 depending on the size of the parenting group (Edwards et al., 2016). Longer-term analyses of the benefits associated with the avoidance of conduct disorder suggest that investment in this parenting programme is likely to be cost-saving (NICE, 2013, Knapp, McDaid and Parsonage, 2011).

Analysis in Ireland also found that participation in IY was associated with later reductions in the use of health, social care and special needs education services by families (McGilloway et al., 2014), with economic modelling analysis suggesting from a cost-benefit perspective a highly favourable 11% annual ROI when potential benefits in adulthood, eg reduced contact with the criminal justice system were considered (O'Neill et al., 2013). Analysis from another trial looking at 3-8-year-old children in the USA also suggested that combining the parenting component of IY with child-based training and teacher training, even though more expensive, can be more cost-effective (Foster, 2010).

In summary, many evaluations of targeted parenting programmes suggest that they are effective in the short-term. Potentially there is also an economic case for parenting programmes because of the adverse impacts of poor mental health for children and parents that can be

avoided. There are, however, methodological issues in some studies, including whether they have been adequately powered to determine effects (Coyne and Kwakkenbos, 2013). The evidence base on the sustainability of short-term outcomes over longer time periods is also limited.

What do we know about universal parenting programmes and the prevention of conduct disorders?

Given that there is an evidence base on the effectiveness and cost effectiveness of targeted parenting programmes. As part of this report we wanted to see what could be said about the case for parenting programmes that are delivered *universally to all children* to prevent conduct disorders. The evidence is however on effectiveness and cost effectiveness is mixed, with limited information on long term impacts, while trials may not always be entirely independent of a programme's developers (Wilson et al., 2012, Mihalopoulos et al., 2011, Sampaio et al., 2015) .

Potential for further modelling

Our review of the literature indicates that the most consistent evidence of effect is for programmes remains that focus on at risk children rather than those that are delivered to the population as a whole.

The lack of evidence on effectiveness of universal parenting programmes meant that no intervention was modelled. It should, however, be noted that there has been some preliminary evaluation of a version of the Incredible Years intervention that has been offered to some pre-school age children and their parents in disadvantaged areas in the north of Wales (Hutchings et al., 2016). There were significant improvements in parental wellbeing at 6-month follow-up compared to controls; parental wellbeing and child development were also significantly improved in the intervention group at 12-month follow-up compared with baseline values. This suggests that the intervention could be rolled out further on a universal basis in areas of disadvantage and potentially reach more individuals who otherwise might develop conduct disorders and behavioural problems with all their long term impacts. The existing data on the cost-effectiveness of a targeted version of IY could be used to quantify potential longer-term ROI, but this would depend on how these areas of social disadvantage are defined.

A5: Methods

Review methods

A rapid review, supplemented with consultation with the PHE Mental Health ROI steering group, was used to create a library of information to help determine the strength of the evidence on potential interventions to model. This review was also used to identify sources of information on costs and effectiveness for the interventions and comparators that were modelled. The starting point for this work was to look at systematic reviews on the effectiveness (and cost-effectiveness) of mental health prevention and promotion interventions published in the last five years, supplemented by searches for new primary studies published during the last three years (including early on-line publications). Searches were undertaken in the PubMed and PsychINFO literature databases, as well as through a limited search of key terms in Google and by following citations of relevant literature. Additional references were also added through ongoing feedback and comments from the steering group as the report developed as well as by drawing on the results of a previous review undertaken for NICE on the mental health and wellbeing of older people (McDaid et al., 2015a). In addition to looking at the strength of evidence, the evidence needed to be relevant to England. The evidence ideally had to come from England, Scotland, Wales or Northern Ireland but we looked at evidence from other or another high-income¹⁰ countries. Evidence from non-UK sources potentially may be more different to transfer to an English context; where non-UK evidence is used in models this is highlighted.

The search strategy used is provided and a flow chart showing the results of the literature review are included in an Appendix to this report. Essentially this combined terms on mental health promotion or the prevention of mental health problems or wellbeing, with terms related to economic evaluation and/or systematic reviews or meta analyses. Terms related to specific sectors, such as schools and workplaces were also included. Gaps in research evidence and areas where future research may be merited are also noted. The appendix contains a more detailed summary of the findings of the literature review for each of the areas modelled.

Approach to modelling

Eight entirely separate and distinct models have then been constructed. In all of these eight models the comparator is usual care or practice, which in the case of some of the models is actually no intervention. The analysis takes no account of any interaction effects of interventions for the ROI of any other of the modelled interventions. Data are drawn from published literature to inform parameter estimation for these eight models. This includes

¹⁰ For the purposes of this report the World Bank list of high income dependent territories and countries was used. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

information on the probability of uptake of different interventions, the level of resource use, as well as on the effectiveness of interventions; supplementary searches specifically to identify studies with information on the resources and costs associated with these interventions were undertaken where necessary. Common assumptions have been made about relevant unit costs and consequences of poor mental health where these are common across models, for example on the costs of treating hospital presenting self-harm and the costs of treating depression in adults.

For each area complex decision analytic models have been built, initially using TreeAge Pro and subsequently replicated in Excel, to synthesise information on effectiveness and costs to estimate cost-effectiveness and ROI. Some of the analyses take the form of Markov models where individuals have a probability of moving between many different health states over different Markov 'cycles' (periods of time). In all cases we have modelled a one-year perspective and then as many subsequent years as possible, depending on the strength of the evidence.

This modelling work is cautious in baseline assumptions with respect to the potential effectiveness and costs of interventions. Sensitivity analyses performed on models have involved changing the values of key parameters, including the level of uptake and continued use of some interventions, something that can be a major determinant of the cost-effectiveness of health-promoting interventions.

The models form the basis of an ROI tool which separately allows for comparison of the level of investment in any one of these actions with the level of costs that can be avoided in different local authority areas and CCGs in England.