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EDITORIAL

Mental ill health: the black plague of the twenty-first century

WHO created a list of 10 causes of the burden of disease in the world, comparing 2004 with predictions for 2030 (World Health Organization, 2008). Whereas lower respiratory infections and diarrhoeal diseases were the world's number 1 and 2 causes of ill health and premature death in 2004, the prediction is that depressive disorders and ischaemic heart disease will replace them at the top of the global morbidity and mortality table by 2030. Indeed, in most countries in the world, whether developed or developing, the common mental disorders of depression, anxiety and stress are now prevalent in roughly 1 in 4 of these populations. As an example, in a country like the UK, with a population of over 60 million, the costs of lack of mental ill health in terms of lost productive value, sickness absence, treatment and the like, cost the UK economy over £100b per annum (Cooper *et al*., 2009). Stress and lack of mental well-being is now the leading cause of sickness absence in the high added-value sectors of the economy (e.g. service- and knowledge-based businesses) in the developed and emerging BRIC (Brazil, Russia, India and China) countries. In addition, the German Federal Health Monitoring agency in 2007 showed that whereas musculoskeletal problems were the major cause of early retirement in 1990, by the year 1996 mental ill health passed them, and has been growing at double the rate of musculoskeletal problems and cancer as sources of ill health and early retirement from work.

In addition to mental ill health being one of the top health morbidity issues, a leading cause of premature early retirement from work and a costly source of workplace sickness absence, the issues surrounding the ageing population in many countries brings a new threat. In the UK government's Foresight project on Mental Capital and Wellbeing (the most comprehensive 2 year investigation undertaken by any government), comprising over 400 international scientists and over 85 major science reviews, it was predicted that within 40 years, the number of people aged over 65 will double to 21 million and the number over 80 will triple to 9.5 million (Cooper *et al*., 2009). Given that dementia currently costs the UK around £17b per annum, the prediction over these decades is that it will exceed over £50b in this four decade timeframe. With people living longer, the need will be to keep them as cognitively active as possible to offset the onset of dementia, otherwise this demographic time-bomb will create a healthcare funding crisis of monumental proportions. And this is the case in almost every developed and emerging country in the world.

Looking at the other end of the life-course continuum, the Foresight project also explored the issues of mental well-being in children and young adults. It found that children's mental capital was depleted by poor maternal nutrition, smoking, stress and poor housing. The report drew on a US cost–benefit analysis which suggested that for every $1 invested in preschool interventions (e.g. coaching parents on diet, smoking and 'parenting skills'), the return was $7.94 by the age of 21. In addition, it also found that if children suffer from some common learning difficulty, like dyslexia or dyscalculia, and if these are not identified early enough, they will suffer a depletion of their mental capital in later in life by engaging in anti-social behaviour, suffering mental health issues, with a reduced lifetime earnings of between £45 000–115 000. This also applied to 'looked after children', 45% of whom in the UK end up with a mental health problem. So, 'early intervention'

is critical for dealing with the issues that may adversely affect children's mental health later in the life.

And, thirdly, mental health and well-being in the workplace has become a very important topic in recent years, particularly as a result of the recession. The increasing demands on many of us during the 'good times' through globalization and intensification of work, had a major impact on our mental well-being, and now with the current dismal economic situation, will make jobs less secure, exacerbating stress and mental health problems. The costs of depleted mental capital are very high, with the Foresight report on the UK indicating that work-related absenteeism accounting for 10–14 million lost working days at £750m per annum; presenteeism (people being at work but ill and not delivering to their product or service) at £900m per annum; reduced firm profitability when employees lose their jobs as a result of work-related mental health problems at £82m per annum; and incapacity benefit costs of over £12b, of which 40% is due to mental ill health and stress (Cooper *et al*., 2009). In respect of work, a number of policies emerged from this government initiative to minimize stress at work and enhance mental well-being. First, it was felt that people needed continuous training and developing throughout their working life to have the skills to compete for jobs in a more insecure world. Second, one of the root causes of lack of mental well-being is poor management, so it was felt that training managers to develop their personal, social and interpersonal skills was fundamental. The research indicates that poor managers can undermine employees' well-being through an autocratic or bullying management style, by not letting their subordinates have enough autonomy and control over their job, by creating a long hours culture, etc. (Lundberg and Cooper, 2010). Third, given the increasing numbers of working families, and the negative impact of consistent long working hours (Burke and Cooper, 2008) on individuals' health, family life and productivity, it was felt that public and private sector bodies should implement the 'right to request' flexible working arrangement schemes (the evidence is that they are very cost-effective, particularly if the 'right to request' them is open to all employees, and not just those with children).

Many of the concepts of mental health are captured within the framework of happiness and well-being, which have received a boost, following a United Nations Resolution (United Nations, 2011) on happiness: towards a holistic development. The Resolution notes that unsustainable patterns of production and consumption can impede sustainable development, and recognizes the need for a more inclusive, equitable and balanced approach to economic growth that promotes sustainable development, poverty eradication, happiness and well-being of all peoples. The Resolution calls for additional country based indicators that better capture the importance of the pursuit of happiness and well-being in development. Promoting mental health and well-being can help achieve national and international health and development objectives, such as the Millennium Development Goals (World Health Organization, 2009, Nairobi Call to Action), as well as help to create fairer societies that enable people to lead lives that they value by creating supportive environments and by increasing their control over their health and the necessary resources for well-being (World Health Organization, 1986, Ottawa Charter for Health Promotion).

Special issues like this one, are extremely timely in supporting mental health promotion and well-being throughout the life course, and in a variety of potentially supportive environments and strengthened communities. This collection of outstanding contributions will take the international debate much further, as we attempt to prevent and treat those one in four across the globe who suffer from mental disorders. Henry David Thoreau wrote in 1853 'How prompt we are to satisfy the hunger and thirst of our bodies; how slow to satisfy the hunger and thirst of our souls'. This is our challenge, and the scientists in this Special Issue, are taking a step forward to achieve this important health objective.

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INTRODUCTION

Reducing the silent burden of impaired mental health

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SUMMARY

Mental and behavioural disorders account for about one-third of the world's disability due to all ill health amongst adults, with unipolar depressive disorders set to be the world's number one cause of ill health and premature death in 2030, affecting high- and low-income countries alike. There is a range of evidence-based cost-effective interventions that can be implemented in parenting, at schools, at the workplace and in older age that can promote health and well-being, reduce mental disorders, lead to improved productivity and increase resilience to cope with many of the stressors that are facing the world. These facts need to be better communicated to policy makers to ensure that the silent burden of impaired mental health is adequately heard and reduced.

Key words: mental health; mental health promotion; public health

SILENT BURDEN OF IMPAIRED MENTAL HEALTH

Leading up to the 2011 UN High Level Meeting on Non-Communicable Diseases (NCDs) (http://www.un.org/en/ga/president/65/issues/ncdiseases.shtml), it has been pointed out that the spread of NCDs, principally, heart disease, stroke, diabetes, cancers and chronic respiratory diseases, presents an ongoing global crisis (Beaglehole *et al*., 2011). Further, there are four simple highly cost-effective policy interventions in both low- and well-resourced countries that can have a high and immediate impact in averting ill health and premature deaths from NCDs, as well as reducing inequalities. These include reductions in alcohol, salt and tobacco intake, as well as the promotion of a diet low in saturated and trans fats and sugar, and physical activity.

However, there is another group of NCDs and disorders, often co-morbid with physical diseases, that are often neglected and far larger in terms of their impact on impaired health and disability. The World Health Organization uses a summary measure of health status, the disability-adjusted life year (DALY), which includes potential years of life lost due to premature death and equivalent years of 'healthy' life lost by virtue of being in states of poor health or disability (Murray and Lopez, 1996). One DALY can be thought of as one lost year of 'healthy' life, and the burden of disease can be thought of as a measurement of the gap between current health status and an ideal situation where everyone lives into old age, free of disease and disability. DALYs for a disease or injury cause are calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due

to disability (YLD) from the disease or injury, weighted for the severity of the disability. Unipolar depression makes a large contribution to the burden of disease, being at third place worldwide and eighth place in low-income countries, but at first place in middle- and high-income countries (World Health Organization, 2008). More important is that it is estimated that by the year 2030, unipolar depression will become the number one cause of ill health and premature death, contributing to 6.2% of all the worlds' DALYs.

Years lived with disability (YLD) measure the equivalent years of healthy life lost through time spent in states of less than full health. When all the years of life with reduced capability for all the sufferers of each condition are added up and weighted for disability, a total of YLD for each condition is obtained. YLD estimates are restricted to loss of health experienced by individuals, and do not take into account other aspects of quality of life or well-being, or the impacts of a person's health condition on other people (except as far as they experience directly assessed losses of health themselves). In all regions of the world, the World Health Organization notes that mental and behavioural disorders are the most important causes of disability, accounting for around one-third of YLD among adults aged 15 years and over (Table 1).

The disabling burden of mental and behavioural disorders is almost the same for males and females, but the major contributing causes are different. Whilst unipolar depression is the leading cause for both males and females, the burden of depression is 50% higher for females than males. In contrast, the male burden for alcohol and drug use disorders is nearly seven times higher than that for females, and accounts for almost one-third of the male burden from mental and behavioural disorders. In both low- and middle-income countries, and high-income countries, alcohol use disorders are among the 10 leading causes of YLD. This includes only the direct burden of alcohol dependence and problem use. The total attributable burden of disability due to alcohol use is much larger.

MENTAL HEALTH, THE ECONOMY AND UNEMPLOYMENT

Impaired mental health costs society and businesses and impacts on productivity. Taking England as an example, it has been estimated that the economic and social costs of mental ill health were over £105 billion in 2009, of which some £30 billion were the costs of output losses resulting from the adverse effects of mental health problems on people's ability to work (Centre for Mental Health, 2010). The annual cost of mental ill health to employers in the UK is significant, estimated at £25.9 billion in 2006 or £28.3 billion at 2009 pay levels (National Institute for Health and Clinical Excellence, 2009). The £25.9 billion can be broken down as £8.4 billion a year for sickness absence, £15.1 billion a year for reduced productivity at work and £2.4 billion a year for turnover, replacing staff who leave their jobs because of impaired mental health.

Furthermore, evidence dating back over 80 years and from a variety of different regions of

Table 1: Leading cases of YLD, world, 2004 (World Health Organization, 2008)

Males				Females			
	Cause	YLD (millions)	Per cent of total YLD		Cause	YLD (millions)	Per cent of total YLD
1	Unipolar depressive disorders	24.3	8.3	1	Unipolar depressive disorders	41.0	13.4
2	Alcohol use disorders	19.8	6.8	2	Refractive errors	14.0	4.6
3	Hearing loss, adult onset	14.1	4.8	3	Hearing loss, adult onset	13.3	4.3
4	Refractive errors	13.8	4.7	4	Cataracts	9.9	3.2
5	Schizophrenia	8.3	2.8	5	Osteoarthritis	9.5	3.1
6	Cataracts	7.9	2.7	6	Schizophrenia	8.0	2.6
7	Bipolar disorder	7.3	2.5	7	Anaemia	7.4	2.4
8	COPD	6.9	2.4	8	Bipolar disorder	7.1	2.3
9	Asthma	6.6	2.2	9	Birth asphyxia and birth trauma	6.9	2.3
10	Falls	6.3	2.2	10	Alzheimer and other dementias	5.8	1.9

COPD, chronic obstructive pulmonary disease.

the world shows that an adverse economic climate, such as recession and consequential unemployment, is associated with poorer mental health. For example, in the member states of the European Union, between the years 1970 and 2007, a more than 3% rise in unemployment increased the risk of death from suicides 4-fold and deaths from dependence on alcohol 28-fold (Stuckler *et al.*, 2009). Younger populations were found to be more sensitive to the negative health effects of rising unemployment than were those older than 60 years. For men, death rates from suicide and ischaemic heart disease at ages 30–44 years were positively related to unemployment. For women, there were significant associations with suicides at ages 15–29 years. However, the association between unemployment and mortality is not fixed and can be modified by social protection. In the European Union, between the years 1970 and 2007, for every US$10 higher investment in active labour market programmes, there was a 0.04% lower effect of a 1% rise in unemployment on suicide rates in people younger than 65 years. And, when this spending was greater than US$190 per head per year (adjusted for purchasing power parity), rises in unemployment were found to have no adverse effect on suicide rates (Stuckler *et al.*, 2009).

MENTAL HEALTH PROMOTION

Mental health is crucial in today's society not only to identify and realize aspirations, to satisfy needs and to change or cope with the environment (World Health Organization, 1986, Ottawa Charter for Health Promotion), but also to stimulate growth and development and to contribute to prosperity, solidarity, social justice and increased quality of life. The huge burden of impaired mental health for individuals, families, society and the economy calls for action to prevent mental ill health and to promote mental health and well-being. The profound burden and costs of the health, social and economic impacts of impaired mental health necessitate public mental health actions, not only to treat, but also to prevent impaired mental health and to promote positive mental well-being. Promoting mental health is also fundamental to managing global challenges, such as climate change, conflict and economic crises (World Health Organization, 2009, Nairobi Call to Action).

This supplement is based on systematic reviews prepared for the Dataprev project, a 3-year project financed by the Research Directorate of the European Commission, updating and documenting the evidence base for mental health promotion and disorder prevention for four population groups, infants, children, working age and elder populations. The papers in this supplement summarizes the evidence for actions to prevent disorders and to promote positive mental well-being through parenting, at schools, at the workplace and in older age, supported by economic analyses, and a commentary on strengthening the evidence base for decision-making.

HEALTHY START IN LIFE

A healthy start is crucial for mental health and well-being throughout life, with parenting being the single most important factor. Parents provide for their children's basic needs for food and protection, they also care for them when sick, teach them language and help them master the basic skills of living in the community and society in which they are born. Without such care, babies and children do not survive. It is, however, in the more subtle aspects of parenting, including the quality of parent–child relationships and different approaches to socialization and discipline, that the origins of mental well-being and mental illness lie.

Based on a systematic review of 51 systematic reviews, Stewart-Brown and Schrader-McMillan (Stewart-Brown and Schrader-McMillan, 2011) identify a range of low-cost practices that if widely implemented could promote mental health throughout life. McDaid and Park (McDaid and Park, 2011), noting that the economic consequences of poor childhood mental health are profound and can last into adulthood, also find that investing in parenting interventions can be highly cost-effective, with the costs of parenting interventions being modest in comparison to the potential avoidable lifetime costs of poor mental health that some children may experience.

HEALTH PROMOTING SCHOOLS

Children and young people spend a large amount of time in schools and the school

represents an easy access environment with direct day-to-day contact with children, young people and, often, their families. Schools not only establish the competencies for learning, they are an important setting for mental health promotion and, indeed, health promotion in general, through their role in helping to establish identity, interpersonal relationships and other transferable skills. The school has for sometime now been seen as a unique community resource to promote and foster mental, emotional and social well-being, and calls for it to be more active in this respect are growing.

The past two decades have seen a significant growth of research and good practice on mental health prevention and promotion in schools. Across the world, an increasing number of schools are engaging in a wide range of mental health-related initiatives and policies, which in many places are showing promising results. Activities operate under a variety of headings, not only 'mental health' but also those such as 'social and emotional learning' 'emotional literacy', 'emotional intelligence', 'resilience', 'life skills' or 'character education'.

Based on a systematic review of 52 systematic reviews, Weare and Hind (Weare and Hind, 2011) find well-designed programmes with a very wide range of positive impacts, including aggression and depression; reduction of commonly accepted risk factors, such as impulsiveness, and antisocial behaviour; and development of the competences that promote mental health such as cooperation, resilience, a sense of optimism, empathy and a positive and realistic self-concept. Programmes have also been shown to help prevent and reduce early sexual experience, alcohol and drug use, and violence and bullying in and outside schools, promote pro-social behaviour and in some cases reduce juvenile crime. Children who receive effective and well-designed mental health and social and emotional learning programmes are more likely to do well academically, in some cases achieving higher marks in subjects such as mathematics and reading, to make more effort in their school work, and to have improved attitudes to school, with fewer exclusions and absences.

McDaid and Park (McDaid and Park, 2011) identify favourable return on investment ratios for school-based programmes. For example, the Caring School Community scheme can be delivered at a cost of $16 per pupil over 2 years, and potentially generate a return on investment of 28:1, even when just looking only at benefits of reduced drug and alcohol problems alone (even before placing monetary value was placed on the significant improvements seen in mental and emotional health) (Aos *et al*., 2004).

WELL-BEING AT WORK

Occupational stress and work-related mental health problems have a number of major socio-economic consequences such as absenteeism, labour turnover, loss of productivity and disability pension costs (Dewe and Kompier, 2008). Personal costs include lower self-esteem, physical conditions (e.g. heart disease) and negative impact on family life. For these reasons, the workplace is considered to be one of the most important settings for mental health promotion.

Actions can be implemented at both an organizational level within the workplace and targeted at specific individuals. The former include measures to promote awareness among managers of the importance of mental health and well-being at work and to improve their skills in risk management for stress and poor mental health, for instance looking at job content, working conditions, terms of employment, social relations at work, modifications to physical working environment, flexible working hours, improved employer–employee communication and opportunities for career progression. Actions targeted at individuals can include modifying workloads, providing cognitive behavioural therapy, relaxation and meditation training, time management training, exercise programmes, journaling, biofeedback and goal setting.

The results of the systematic review of Czabala *et al*. (Czabala *et al*., 2011) suggest a mismatch between what is being done by many businesses, particularly the larger and multinational ones in promoting mental health and a lack of published evaluations. McDaid and Park find that while the costs to business and to the economy in general of dealing with poor mental health caused by work has been the focus of attention by policy makers in recent years, less attention has been given to evaluating the economic costs and benefits of promoting positive mental health in the workplace. In part, this may be due to a lack of incentives for business to undertake such evaluations, as well as issues of commercial sensitivity. Nevertheless, it has

been estimated that effective management of mental health in an UK organization with 100 employees could save £250 000 per year (National Institute for Health and Clinical Excellence, 2009). Enhancing the well-being of workers and educating them about mental health issues has a beneficial impact on their families and friends as well as helping to reduce the harmful stigma that can accompany mental illness.

MENTALLY HEALTHY OLDER PEOPLE

Among the ageing population, anxiety and depressive disorders are the most prevalent mental health problems, with around 12% of adults aged 65 or older currently affected by depressive syndromes in Europe (Copeland *et al.*, 1999). Given the growth of the older adult population, depression in older adults is set to become an increasingly important health issue.

In their systematic review, Forsman and Wahlbeck (Forsman and Wahlbeck, 2011) note that associations exist between social capital in the ageing population and mental health. Crucial components of the individual-level social capital concept, such as social support, and social network size were shown to be negatively associated with depressive symptoms and depression, while loneliness showed a positive association with depressive symptoms and depression. They note that research has highlighted that civic mistrust and lack of reciprocity or of social participation (i.e. low individual-level social capital) are associated with depressive symptoms among older adults.

Forsman and Wahlbeck (Forsman and Wahlbeck, 2011) identify evidence that indicates that depressive symptoms and depression in older people can be prevented by psychosocial interventions. Policies that support access to social activities, peer support and skill training will protect mental health. In all policy arenas, the possible impact on mental health determinants of older people needs to be considered. Design of care services for older people needs to recognize the importance of providing access to meaningful social activities and possibilities for peer group support. McDaid and Park (McDaid and Park, 2011) report that programmes to reduce social isolation, including befriending schemes, can be cost-effective.

FROM EVIDENCE TO PRACTICE

Finally, Jané-Llopis *et al.* (Jané-Llopis *et al.*, 2011) reflect on what all of this means in terms of strengthening the evidence base for decision-making on promotion and prevention in mental health. They note evidence from research studies will be only one of a number of factors taken into account in the decision-making process. Some policy decisions and interventions may be considered worth doing on the basis of social justice, political, ethical, equity issues, reflecting public attitudes and the level of resources available, rather than be based on health outcomes alone.

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Parenting for mental health: what does the evidence say we need to do? Report of Workpackage 2 of the DataPrev project

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SUMMARY

The last decade has witnessed increasing interest in the promotion of mental health and well-being because of its importance for health and social functioning at individual level and for the social and economic well-being of societies. Recent research from a range of disciplines (including neurodevelopment, developmental psychology and genetics) has highlighted the importance of childhood, and particularly the first few years of life, for future mental, social and emotional development. The quality of the parent–child relationship and parenting more generally is one of the factors in determining outcomes. The objective of this review was to identify effective interventions to support parents, parenting and the parent–child relationship from the ante-natal period to adolescence. A systematic search of key electronic databases was undertaken to identify systematic reviews evaluating approaches to parenting support; 52 systematic reviews were identified. Results were synthesized qualitatively and reported under the following headings: (i) perinatal programmes; (ii) parenting support programmes in infancy and early years focused on enhancing caregiver sensitivity and attunement; (iii) formal parenting programmes focused on children's behaviour; (iv) parenting support for highest risk groups. The review provides a robust international evidence base of programmes which have been demonstrated to improve parenting and the mental health and well-being of children. Policies and programmes to support parenting offer much scope for improving mental health. Effective provision requires a skilled workforce and careful application of approaches that have been found to work. More research is needed to develop and identify interventions for some of the highest risk groups.

Key words: mental health; mental health promotion; childhood; mother; fatherhood

INTRODUCTION

The last decade has witnessed an increasing interest in the promotion of mental health and well-being, because of its importance for health and social functioning at the individual level and for the social and economic well-being of societies.

Research from a range of disciplines (including neurodevelopment, developmental psychology and genetics) has pointed to the particular importance of the first few years of life for future mental, social and emotional development (Shonkoff and Phillips, 2000). The quality of the parent–infant relationship is one of the factors in determining these outcomes. Excessive levels of stress, resulting from suboptimal parenting in the early years, can seriously disrupt the child's developing nervous system and stress hormone regulatory systems, damaging the developing brain architecture and chemistry (Shore, 2004; Centre on the Developing Child at Harvard University, 2007). These effects influence the child's neuroendocrine response to threat, resulting (among other things) in infants who are 'insecurely

attached' to their caregivers and at increased risk of problems with peer and intimate relationships (Sroufe, 1995), of future mental illness and of abnormalities of cardiovascular and immune functioning (Repetti *et al*., 2002; Surtees *et al*., 2003; Luecken and Lemery, 2004; Bell and Belsky, 2007; Weich *et al*., 2009).

Over the last half-century a large body of research has emerged which has shifted the balance of belief on the relative influence of nature and nurture, by illustrating just how much parenting influences children's development. The impact of different approaches to parenting and the quality of parent–child relationships is now known to extend over the life course, and parenting is coming to be recognized as one of the most important remediable determinants of future health, particularly mental health (Repetti *et al*., 2002; Stewart-Brown and Shaw, 2004; Weich *et al*., 2009). It is also strongly predictive of a wide range of detrimental health and social outcomes, including antisocial behaviour, delinquency, violence and criminality (Farrington, 1989); educational success and school dropout (Desforges, 2003); health-related behaviours including sexual promiscuity (Scaramella *et al*., 1998), drug and alcohol abuse (Garnier and Stein, 2002), smoking (Cohen *et al*., 1994) and unhealthy eating (Kremers *et al*., 2003); physical health in general and specific common diseases (Stewart-Brown *et al*., 2005; Bell and Belsky, 2007; Waylen *et al*., 2008). These aspects of parental nurture also appear to influence nature. Epigenetic studies have demonstrated that the quality of parenting influences the phenotypic expression of individual genes which carry risk for mental disorders (Caspi *et al*., 2002; Perry, 2002). Parenting is therefore hugely important to children, parents and society.

While parental sensitivity and attunement to infants and children's needs is very important in the early years, it is evident from the above that parenting also influences outcomes in older children and adolescents. In preschool, school-age children, and adolescents boundary setting, discipline and behaviour management become important alongside parental sensitivity. These attributes of parenting are important in the emergence of conduct disorder, delinquency and violence. Teachers, peers and the wider community also influence outcomes in older children, however, many studies have shown that parenting remains an important determinant of mental health and well-being even at these later ages.

Population-based studies of parenting styles and practices are surprisingly rare, and since parenting is, in part, culturally determined the results of studies carried out in one country do not necessarily transpose across borders. Statistics are available on abusive parenting, but definitions of abuse may vary from time to time and place to place. It is also clear that parenting does not have to be abusive to influence child outcomes. One UK study, which documented health effects of parenting in mid-childhood, identified sub-optimal parenting in a large proportion of the population (Waylen *et al*., 2008).

The wide range of developmental outcomes which are influenced by parenting has prompted practitioners and researchers in a variety of disciplines to develop interventions and programmes to support parenting. One group—primarily interested in the development of violence, criminality, educational failure and other social problems—has created the classic behaviour management programmes for families with children aged 3 years and up. This is the age when behaviour problems start to emerge and parents need behaviour management skills. These programmes form an important bedrock of parenting support. The best known are offered to groups of 8–12 parents weekly for 10–12 weeks.

Another group of researchers and practitioners has been more concerned with parent–infant relationships in very early life and the health and social effects of attachment disorders. This group has developed psychotherapeutically aware home visiting programmes, and interventions to support parents who are at high risk of problems with parenting, for example teenage parents or those with post-natal depression. While the classic parenting programmes are manualized and standardized, one-to-one home visiting programmes can be more flexible, tailored to individual needs and their length can vary considerably. As programme duration is an important driver of cost, what constitutes most effective length is an important research question. Another driver of programme cost involves the qualifications of the providers. Some programmes are provided by volunteers, others require skilled professionals.

A further group of concerned practitioners and researchers work with families in which children are abused. This involves engaging with parents who have themselves often had

profoundly damaging childhoods, histories of abuse and care, who may also have clinical level mental health problems and/or abuse drugs or alcohol, and be coping with varying levels of social and economic deprivation. Such parents are likely to require more intensive, skilled and longer-term support to improve their parenting than general population or high-risk families. Parenting interventions therefore need to be tailored to some extent to parents' needs and it is likely that interventions of varying length and intensity will be required to improve population norms in parenting, including low level, low cost approaches suitable for the general population and high-intensity programmes for high-risk groups.

While the bulk of literature on parenting focuses on mothers' role and care, research increasingly examines the highly significant and overlooked role of fathers (Burgess, 2008).

This paper summarizes the findings of a systematic review of reviews of interventions which aim to support parenting. Reviews of reviews can be wider ranging than reviews of primary studies, covering a much greater variety of programmes. They can also provide robust evidence of effectiveness; several reviews examining different aspects of the intervention literature and coming up with broadly similar conclusions provide strong evidence that these conclusions are valid. Reviews are also good at identifying areas where varying conclusions have been reached by different studies and research questions remain. The review of review methodology is therefore very useful in the context of parenting where it is clear that a wide range of different approaches have been tried and that the intervention literature, while well known to specialists, is not widely known to practitioners in all disciplines with an interest in promoting mental health.

The main drawback of reviews of reviews is timeliness. There is a lag period between the end of a study of an intervention trial and its publication. There is then a further lag between publication of an individual trial and its incorporation into a review. The searches for reviews may be undertaken some time before the publication of the review of reviews creating a further time lag.

Further drawbacks include a lack of detail about interventions. Parenting interventions are diverse and some reviews aim to cover many different approaches. Restrictions on the length of text for journal articles can mean that the reader can be left with the knowledge that something works without being clear what exactly it was. Some interventions with good-quality evidence may not ever be incorporated into systematic reviews because they fall outside the inclusion criteria. All these drawbacks need to be born in mind when interpreting the results of this study.

METHODS

A systematic review of systematic reviews was undertaken as part of Workpackage 2 of the DataPrev project, which aimed to establish a database of evidence-based programmes to promote mental health in Europe. Workpackage 2 covered reviews of intervention studies evaluating the effectiveness of programmes to support parenting and parent–child relationships.

The methods for this review are covered in detail in the full report of this study (Stewart-Brown and Schrader McMillan, 2010). They aimed to identify all systematic reviews of any interventions to improve the relational and behavioural aspects of parenting (mothers and fathers) in general population and high-risk samples. We excluded reviews of reviews.

The following international databases were searched from 1990 to 2008 for English language articles: Embase, CINHAL, PsychInfo, Medline, ERIC, ASSIA, Social Services Abstracts, Sociological Abstracts, HealthPromis, Child Data and the Cochrane Database of Systematic Reviews, Campbell Collaboration databases, Google and Google Scholar, using a combination of medical subject headings (MeSH) and free text search. Search terms were adapted for use in the different databases.

To be included reviews needed to cover primary studies, using any methodology, of interventions to improve parenting, in any settings with the exception of programmes delivered through schools. These are covered in the review of reviews undertaken for Workpackage 3 reported in a companion paper in this volume. We excluded reviews of interventions to treat established child mental disorders. Reviews were excluded if they did not include outcomes relating to infant or parental mental health, social and emotional aspects of parenting or aspects of the parent–child relationship. Studies

were selected for inclusion by two reviewers based on information in both abstracts and full papers if the authors defined an explicit, replicable search strategy, predetermined inclusion and exclusion criteria and undertook either a narrative or quantitative analyses. All included systematic reviews were critically appraized using a standard checklist (CASP, 2002). A table of study quality is presented in the full report (Stewart-Brown and Schrader McMillan, 2010). Quality was taken into account in the narrative synthesis of the findings reported in the full study and has informed the conclusions presented in this paper.

We extracted data on the intervention approach and setting, the characteristics of the populations studied, the methodology of the study and outcomes measuring infant or parent mental health, parenting or the quality of parent–child relationships. Data extracted from each of the included reviews have been synthesized using a narrative approach which aimed to group findings related to similar interventions or approaches reported in any review.

RESULTS

Over 5000 studies were identified. Of these, 52 systematic reviews (53 papers) met the inclusion criteria (see Appendix).

The reviews which were identified for inclusion differ in key respects. Some had a highly focused aim (e.g. measuring the impact of media-based parenting programmes) and others more wide-ranging objectives (e.g. assessing the effect of a wide range of interventions on early fathering). Several reviews had findings which overlapped: for example, some included all outcomes in studies of home visiting programmes while others covered a range of interventions, including home visiting, but extracted data only on one outcome (e.g. parental sensitivity). This complex material was organized under four broad headings:

(i) Perinatal programmes including antenatal parenting programmes and perinatal maternal mental health programmes.
(ii) Parenting support programmes in infancy and early years with a focus on maternal sensitivity and attunement, and infant attachment.
(iii) Formal parenting programmes with a focus on children's behaviour for general population and high-risk groups: including group-based, one-to-one and media-based parenting programmes.
(iv) Parenting support in the highest risk groups where parents have severe mental health problems, are addicted (typically to drugs or alcohol) or are abusing their children.

Perinatal programmes including antenatal parenting programmes and perinatal maternal mental health programmes

This group of programmes covers diverse approaches and interventions. The dividing line between those in this group and that in group 2 is subtle and there is some overlap. We aimed in this group to include programmes that are potentially applicable to all families including prevention, identification and intervention in perinatal depression.

Antenatal classes

Antenatal classes have until recently been one of the central methods of preparing parents for pregnancy and childbirth, but most have focused on the physical aspects of pregnancy child birth and child care. We included reviews that covered outcomes relevant to parent and infant mental health and relationship. Three relevant reviews were identified (Barnes and Freude-Lagevardi, 2003; Magill-Evans *et al.*, 2006; Gagnon and Sandall, 2007). Together they provide limited evidence that antenatal programmes can enhance parenting.

The first (Gagnon and Sandall, 2007) covered traditional antenatal care but included two very small studies which aimed to enhance 'intrauterine' attachment by increasing mothers' awareness of foetal activity and promoting abdominal massage to develop sensitivity to the foetus. Two out of four attachment-based outcomes in these studies showed positive results 2–4 days post-delivery.

Barnes and Freude-Lagevardi was a wide ranging review which included antenatal programmes (Barnes and Freude-Lagevardi, 2003). This review provides some indication that programmes have the potential to improve outcomes such as dyadic adjustment, maternal psychological well-being, parental confidence and satisfaction with the couple and

parent–infant relationship in the post-natal period. This review concluded that antenatal programmes should be responsive to the priorities of participating parents and include sessions addressing: the transition to parenthood, relationship issues and preparation for new roles and responsibilities; the parent–infant relationship; problem-solving and conflict-resolution skills.

Magill-Evans *et al.* provided some evidence from a small number of studies, that antenatal classes can enhance men's support for their partner during pregnancy, childbirth and beyond, and prepare men for fatherhood (Magill-Evans *et al*., 2006).

Skin-to-skin contact

One review (Moore *et al*., 2007) investigated skin-to-skin contact between mother and infant immediately post-partum and found it to be associated with a range of improved outcomes, including mother–infant interaction, attachment behaviours, infant behaviour and infant physical symptomatology in full-term and pre-term infants. Skin-to-skin contact involves placing the naked infant on the mothers' body at birth. It is now routine practice in many European labour wards.

Kangaroo care

Four reviews (Bakermans-Kranenburg *et al*., 2003; Conde-Aguedo *et al*., 2003; Dodd, 2004; Magill-Evans *et al*., 2006) included studies of the impact of parents carrying their infants in slings or pouches. This approach was originally studied as an alternative to incubator care for pre-term infants in developing countries. Two reviews included single trials of kangaroo care in normal weight and low socio-economic status babies. These provide evidence of improved outcomes on measures relevant to attachment and infant regulation for fathers (Magill-Evans *et al*., 2006) and mothers of low socio-economic status, with infants of normal weight (Bakermans-Kranenburg *et al*., 2003). Dodd reviewed outcomes of kangaroo care for pre-term babies by mothers and found increased attachment in two out of the three studies that measured this, and evidence of better regulated infant behaviour (Dodd, 2004). Conde-Aguedo *et al.* found insufficient evidence to recommend kangaroo care as an alternative to hospital care for low-birthweight infants (Conde-Aguedo *et al*., 2003).

Advice on infant capabilities and prevention

One review (Das Eiden and Reifman, 1996) covered the provision of information about the sensory and perceptual capabilities of infants to parents of neonates, the Brazelton Neonatal Behavioural Assessment Scale (NBAS) being the best-known prototype. The NBAS showed a small to moderate impact on parent behaviour, knowledge, parental representations, and increases in mother–infant and father–infant interaction. Further research with NBAS-based interventions is needed to identify the role of moderator variables including the frequency with which the NBAS is administered, and who administers it.

One review (Regalado, 2001) evaluated the effect of physicians and other healthcare workers providing preventive advice (anticipatory guidance) for parents, in healthcare settings during the perinatal period and early infancy. Results indicate that anticipatory guidance with written instructions can be effective in promoting better infant sleep patterns, reducing stress and increasing parents' confidence during the first 2 months of life, although further studies showed that behavioural modification techniques were not always effective for children with severe sleep problems.

Infant massage

Two reviews (Vickers *et al*., 2004; Underdown *et al*., 2006) evaluated the effectiveness of infant massage (delivered by the mother or other primary carer) in improving a range of outcomes for both mothers and infants. Infant massage involves the carer gently stroking the infant using rotational movements and sometimes oils, and is used in some special care baby units and more recently in the community, to improve parent–infant interaction, increase parental sensitivity to infant cues and to reduce post-natal depression. Underdown *et al.* reported that infant massage may improve mother–infant interaction, sleep and relaxation, reduce crying, and have a beneficial impact on a number of hormones controlling stress in healthy full-term babies (Underdown *et al*., 2006). Concern about methodological quality precluded the possibility of reaching conclusions about the effectiveness of infant massage with

pre-term or low-birthweight babies (Vickers *et al*., 2004).

Supporting fathers

A range of interventions have been used to support fathers and promote the father–infant relationship during pregnancy and the postnatal period. We identified one systematic review that specifically focused on fathers (Magill-Evans *et al*., 2006). This identified potentially effective methods, including—father–toddler play groups, application of the NBAS, infant massage and participative parenting groups with enhanced sessions for men and father–toddler groups. Effectiveness was associated with programmes that involved men's active participation with and/or observation of their own infants/children and multiple exposures to the intervention. Further research is needed to determine the appropriate dose of effective interventions, impact over time and differential impact of interventions on mothers and fathers.

Maternal depression: prevention, identification and treatment

Prevention. Four reviews [Gamble *et al*., 2002; Dennis and Creedy, 2004; Shaw *et al*., 2006; National Institute for Health and Clinical Excellence (NICE), 2007] evaluated the effectiveness of a variety of interventions to *prevent* the onset of depression among general populations during the perinatal period. Interventions included psycho-educational strategies, cognitive behavioural therapies (CBT), interpersonal psychotherapies, non-directive counselling, psychological debriefing and social support, delivered by telephone, in home visits or group sessions, by professional or lay person. All the reviews confirmed *effectiveness* of interventions in high-risk groups and *ineffectiveness* in women in the general population during either the antenatal or postnatal period. Interventions which were effective in high-risk groups included nurse home visiting and peer support (Shaw *et al*., 2006).

Debriefing is a one-off, semi-structured conversation that is used by psychologists to support individuals who have experienced traumatic childbirth, with the aim of reducing the effects of the trauma and preventing depression. One review (Gamble *et al*., 2002) concludes that a one-off debriefing session is not effective in reducing psychological morbidity in women who have experienced a traumatic childbirth, and may even be harmful.

Identification. One review (NICE, 2007) included techniques used to identify maternal depression. The predictive power of two measures [the Edinburgh Postnatal Depression Score (EPDS) and '2–3 questions'/Whooley questions] is low in *general* populations but is more sensitive in identifying depression among women who have had a previous episode of depression. The use of '2–3 questions' is more acceptable to women than the EPDS questionnaire.

Treatment. Three reviews focused on the treatment of depression (Gjerdingen, 2003; NICE, 2007; Poobalan *et al*., 2007) in the perinatal period. These presented evidence that Interpersonal psychotherapy, CBT and listening visits in the home are equally effective for women who have developed symptoms of depression. One-to-one therapy appears to be more effective than group work. Interventions should be combined with patient education about the illness, the intervention and other mechanisms for promoting health such as social support and a healthy lifestyle. Social support (individual, including home visiting, or group-based interventions) is valuable for women who have sub threshold symptoms and who have not had a previous episode of depression or anxiety (NICE, 2007).

The impact of these interventions on infant mental health and mother–infant interaction is less certain (Poobalan *et al*., 2007), but conversely mother–infant interaction interventions may alleviate some of the symptoms of depression (NICE, 2007).

Parenting support programmes in infancy and early years with a focus on enhancing maternal sensitivity and attunement and infant attachment security

This section covers interventions which have been designed specifically for the purpose of enhancing parental sensitivity and infant attachment in families at risk of problem parenting, and targeted home visiting programmes. Home visiting can be the delivery mechanism for programmes focusing on a wide range of outcomes, including immunization and improved feeding,

but are often also used to influence sensitivity and attachment security and therefore are included here.

Enhancing sensitivity, attunement, attachment security and trusting parent–child relationships in general

Three reviews focused on such interventions (Bakermans-Kranenburg *et al*., 2003, 2005; Doughty, 2007) One further large narrative review (Barnes and Freude-Lagevardi, 2003) covered a very wide range of interventions including many relating to attachment security. Together these reviews also included a small number of studies of general population approaches described above (infant massage, the NBAS and treatment of post-natal depression) so there is some overlap with the reviews reported under 'Perinatal programmes including antenatal parenting programmes and perinatal maternal mental health programmes'. They covered studies of a wide range of interventions that aimed to promote the development of positive parent–child relationships, sensitivity, attunement and attachment security in children 0–4 years, including one-to-one and group-based programmes, parent training and education programmes, relationship-based programmes, home visiting and centre-based programmes and parent–infant psychotherapy.

The earliest of these reviews (Bakermans-Kranenburg *et al*., 2003) contained 81 studies, which were coded according to intervention focus as follows—interventions that aimed to enhance sensitivity; interventions that aimed to enhance sensitivity and maternal representations and interventions to increase social support; or any combination of the three. For example, interaction guidance with or without video was used to enhance parental sensitivity; psychotherapy was used to transform maternal representations and in social support interventions, experienced mothers befriended and offered practical help to highly anxious mothers. Several interventions combined different strategies. The meta-analysis encompassed 7636 families and 88 outcomes. The authors found that a variety of types of intervention could enhance maternal sensitivity, and to a lesser extent attachment security. Nearly all of the different approaches involved home visiting to deliver the intervention. Behaviourally focused interventions (including video interaction) delivered one-to-one were found to be effective in increasing parental sensitivity. Infant–parent psychotherapy showed some promise, while group educational interventions generally did not. Results of studies with mothers with post-natal depression were inconsistent.

This review showed that interventions with a clear behavioural orientation which focused on enhancing maternal sensitivity were more effective in increasing sensitivity and infant attachment than those with other orientations (i.e. that focused on support and/or changing maternal representations). The authors suggested that although infant attachment is slower to improve as a result of interventions there may be 'sleeper' effects. The review concluded that short-term interventions (with fewer than five sessions) are as effective as those with 5–16 sessions and more effective than interventions of >16 sessions. A later review by the same team (Bakermans-Kranenburg *et al*., 2005) was restricted to studies which measured disorganized infant attachment (the most disturbed infant response to the strange situation test with the poorest prognosis for the future). This review found no overall effectiveness and possible evidence of harm. Sensitivity focused interventions, however, had a small positive impact.

The third review (Doughty, 2007) covered 18 studies. Although its general conclusions did not differ from those of the two earlier reviews (outlined above), it included several promising psychotherapeutic interventions not covered elsewhere. Parent–infant psychotherapy involves specialists (parent–infant psychotherapists) working with both mother and baby using psychotherapeutic methods to treat a range of problems, including attachment difficulties and abusive parenting. They focus on the relationship between the parent and infant, parental representations and parenting practices. The results of four trials in Doughty showed that parent–infant psychotherapy can be effective in reducing infant-presenting problems, decreasing parenting stress and reducing maternal intrusiveness and mother–infant conflict (Doughty, 2007). The results of one included study also showed improvements in maternal sensitivity, responsiveness and reciprocity and another showed improvements in infant attachment.

A broad-based review (Barnes and Freude-Lagevardi, 2003) included a section on trials of interventions that aimed at enhancing

attachment security, sensitivity and attunement. It concluded that no single approach is effective with all populations; the quality of the relationship established between caregiver and the practitioner may be more important than the theoretical orientation of the intervention. However, interventions focusing on the positive—enhancing positive mother–infant interaction and enjoyment—with a strengths based, empowering approach were found to be more effective than psychodynamic programmes focusing on problems in the relationship and difficult past life histories. This review concluded that the impact of brief interventions with high-risk families may be short lived, unless these families are offered additional ongoing support, since factors that increase vulnerability also reduce families' capacity to engage with or respond to interventions. These families are likely to need flexible, multi-modal programmes, grounded in ecological approaches, spanning at least two generations, which respond to individual circumstances. Offering a small number of high-intensity services to a family is likely to be more effective than a large number of low-intensity components. Prenatal contact enhances intervention effectiveness enabling practitioners to attend to primary engagement factors and establish a therapeutic alliance. Weekly contact continuing for the first year appears optimum. Longer term, more intensive psychodynamic therapies are less effective with young high-risk mothers.

Home visiting programmes

We identified eight systematic reviews which covered the effectiveness of home visiting interventions on outcomes relevant to this review (Benasich *et al*., 1992; Ciliska *et al*., 1996; Roberts *et al*., 1996; Guterman, 1997; Elkan *et al*., 2000; MacLeod and Nelson, 2000; MacMillan, 2000; Bernazzini, 2001). One additional review (Kendrick, 2000) presents a focused meta-analysis of studies reviewed in Elkan *et al.* (Elkan *et al*., 2000). The largest and most comprehensive review of 102 original studies (Elkan *et al*., 2000) reported positive findings on outcomes relevant to parenting and infant mental health, including parent–child interaction, parental attitudes, maternal mental health and child behaviour. Findings were less positive for infant temperament and only one of ten studies showed a reduction in measures of child abuse. Findings on this measure are equivocal because of the increased likelihood that child abuse, if present, will be detected and reported by home visitors.

Evidence suggests that the effectiveness of home visiting is dependent on a range of process factors such as the intensity and frequency of the service and the skills of the programme provider. Programme effect sizes are stronger for interventions that last for 6 months or more, and that involve >12 home visits. Interventions that begin early (either antenatally or at birth) are more effective than those that begin in later parenthood, as are programmes that are delivered by professionals as opposed to paraprofessionals/lay visitors. Home visiting programmes also appear to be most effective where they are focused on a broad range of outcomes and are multi-focused, targeted, and are of medium to long-term duration.

One review of 18 studies (Guterman, 1997) found evidence that programmes which employed screening for psychosocial risk, reported less good outcomes than those which offer enrolment to all parents with certain recognized demographic risk factors (e.g. youth and poverty).

Home visiting as an approach to abuse prevention. Four of the reviews (MacMillan, 1993; Roberts *et al*., 1996; Guterman, 1997; Macleod and Nelson, 2000) examined the effects of home visiting as a primary preventive intervention for child abuse. Many of the programmes were holistic aiming to influence many aspects of child health. While there is evidence that these programmes can impact on proxy measures of abuse, reviews do not show an overall effect on actual abuse, possibly because home visiting increases the identification of abusive behaviours. Proxy measure trials were more likely to be positive if they were intensive, carried out over 6 months or more, took a strengths based approach and included social support.

Home visiting for teenage parents. Letourneau *et al*. focused on home visiting programmes for teen mothers, the most well known of which is the family–nurse partnership (Letourneau *et al*., 2004). The evidence suggests that multimodal support/education interventions that combine home visiting with other supports can have

positive effects on parenting by young mothers. The most successful interventions begin before, or soon after birth and continue for at least a year, include frequent home visits (e.g. visits two to three times a month) with hands-on parental education, use of video interaction therapy and group-based support and discussions. Such interventions should, as far as is possible, be tailored to meet the needs of individual young parents in terms of their developmental stage, coping strategies and exposure to stressful situations.

Formal parenting programmes with a focus on prevention of behavioural problems for general population and high-risk groups

Parenting programmes comprise manualized interventions aimed at improving the capacity of parents to support their children's emotional and behavioural development. They are underpinned by a range of theoretical approaches, cognitive behavioural training, social learning and relationship-based education being the most common. These approaches are often combined. They may be offered using a range of media (e.g. leaflets, videos etc), on a one-to-one basis, or in groups. Programmes generally last 8–12 weeks. Most programmes have been developed for parents of 3–10 year olds.

Most trials of these programmes recruited participants from demographically high-risk groups, but some recruited general populations, and both individual studies and reviews sometimes combined both. Some studies included parents of children with clinical level behaviour problems alongside high-risk groups.

Twelve reviews examining the effectiveness of these parenting programmes were identified. Ten focused on the impact of programmes on children's behaviour; two focused, respectively, on maternal mental health (Barlow *et al*., 2003) and on prevention of abusive parenting (Lundhal *et al*., 2006a). Two reviews covered all population groups (Serketich and Dumas, 1996; Lundhal *et al*., 2006b). Five focused on specific risk groups—parents of children aged 0–3 years (Barlow and Parsons, 2003); parents of 3–10 year olds (Barlow, 1999); teenage parents (Coren and Barlow, 2001); parents with intellectual disabilities (Feldman, 1994) and parents from minority ethnic groups (Barlow *et al*., 2004). Two focused on specific programmes—on Triple P (Nowak and Heinrichs, 2008); on parent effectiveness training (PET) (Cedar and Levant, 1990) and one on media-based programmes (Montgomery, 2006). In addition, Magill-Evans *et al*. reported the results of trials of parenting programmes in a review covering a wide range of programmes for fathers (Magill-Evans *et al*., 2006).

Two reviews (Reyno and McGarth, 2006; Wyatt Kaminski *et al*., 2008) examined the factors associated with success in parenting programmes, and one (Kane *et al*., 2007), based entirely on qualitative studies, examined parents' perceptions of the impact of programmes.

Children's behaviour

Parenting programmes have been shown to have a positive effect on children's behaviour (Serketich and Dumas, 1996; Lundhal *et al*., 2006b) particularly in the 3–10 year old age group (Barlow, 1999). One review (Lundhal *et al*., 2006b) observed greater effects for interventions that included mixed home- and clinic-based provision, involved a range of theoretical approaches, combined group and one to one delivery and high numbers of sessions. Long-term follow-up showed that changes in attitudes were sustained and changes in child behaviour declined in magnitude but persisted. This review concluded that effectiveness of programmes declined with child age, showing most effect for children 5 years and under and least for children over 12 years. Lundhal *et al.* found relational and behavioural programmes to be equally effective, but that behavioural programmes have been more rigorously tested (Lundhal *et al*., 2006b).

Another review concluded that the evidence was less strong for the under 3 years (Barlow and Parsons, 2003). However, evidence on the extent to which results are maintained over time is limited because most studies measure only short-term or immediate impact.

Effects in different population groups

Parents from minority ethnic groups. One review (Barlow *et al*., 2004) of controlled trials and qualitative studies of parenting programmes with and for parents from minority ethnic groups included formal parenting programmes, culturally specific programmes (such as the Effective Black Parenting Programmes) and

versions of formal parenting programmes [e.g. *Systematic Training for Effective Parenting* (STEP), PET and *Confident Parenting*] adapted to different minority ethnic groups. The evidence was most robust for formal parenting programmes. Both quantitative and qualitative studies strongly suggest that these programmes are valuable for parents from different minority ethnic groups. The evidence base to support the effectiveness of culturally specific parenting programmes is not strong. However, this may be because it is easier to evaluate the effectiveness of standard parenting programmes than the more diverse culturally specific programmes. Successful adaptation of mainstream parenting programmes includes (i) sensitivity to traditional childrearing practices (ii) exploring and making explicit the values underpinning the programme and (iii) recognizing diversity in family composition.

Teenage parents. The evidence that parenting programmes are effective with teenage parents is limited. One review (Coren and Barlow, 2001) showed modest effects on parenting efficacy and attitudes, but non-significant effects on children's behaviour.

Parents with learning difficulties/developmental delay. One-to-one parent-training is effective in improving the care-giving of parents with a learning disability, and should involve specific skill assessment and training, using direct observational techniques and modelling in the home or home-like settings (Feldman, 1994).

Fathers. Magill-Evans *et al*. included three studies reporting the effects of parenting programmes on fathers (Magill-Evans *et al*., 2006). One study reported increased father involvement with child care and higher self-reported competence, another reported positive dose effects with fathers who participated more fully showing more positive outcomes and one study showed no effects.

Specific parenting programmes

Triple P behavioural parent training. Triple P is a comprehensive suite of parenting programmes suited for varying levels of need from general population media-based programmes to very high-risk groups (see Discussion). Most studies of this programme involve families at demographic high risk or with clinical indications for intervention. Nowak and Heinrichs found Triple P to produce small to moderate positive effects on parenting, child outcomes and parental well-being. Larger effects were found on parent report as compared with observational measures and more improvement was associated with more intensive interventions and with families who were initially more distressed (Nowak and Heinrichs, 2008).

Parent effectiveness training. PET is a programme suitable for both general populations and high-risk groups. Cedar and Levant reported modest effect sizes overall for this programme, with strongest effects on parents' knowledge acquisition and smaller ones on attitudes to parenting, and children's self-esteem (Cedar and Levant, 1990). The importance of trained group leaders was highlighted by the lower effect sizes associated with lack of leader certification.

Media-based parenting programmes. 'Media-based' programmes are suitable for general populations and can be offered through written materials, audiovisual resources and electronic media. Montgomery found that such approaches have a moderate, if variable, effect on children's behaviour, alone and as an adjunct to medication (Montgomery, 2006). Significant improvements were made with the addition of up to 2 h of therapist time.

Impact of parenting programmes on outcomes other than child behaviour

Maternal psychosocial health. Barlow *et al.* found that programmes with a range of orientations—behavioural, cognitive-behavioural, multi-modal, behavioural-humanistic and rational-emotive therapy—were successful overall in producing positive change in maternal psychosocial health (Barlow *et al*., 2003). The number of studies precluded examination of effects of specific orientations.

Outcomes relating to abuse. Lundahl *et al.* found that parenting programmes reduced the risk of parental child abuse measured by parents' attitudes towards abuse, emotional adjustment, child-rearing skills and actual abuse (Lundahl *et al*., 2006a). Effectiveness of

interventions was significantly enhanced by combining group training in a group environment outside the home with one-to-one parent training in a home setting. Non-behavioural interventions were more effective than behavioural interventions in affecting parental attitudes associated with increased risk of abuse. However, the reverse was true in terms of effect on child behaviour: behavioural interventions were more effective than non-behavioural approaches. Long-term follow-up showed that changes in attitudes were sustained and changes in child behaviour declined in magnitude but persisted.

Engaging and retaining parents

Irrespective of the type of programme being provided, engagement and retention of parents is an important factor in success. Several reviews have noted the importance of understanding reasons for attrition, particularly in trials involving high-risk groups—teenage parents, those at risk of abuse, those who abuse drugs and alcohol and those who have been convicted of abuse. Several reviews also commented on the need for skilled facilitation to achieve success.

Reyno and McGarth reviewed 11 studies which reported on dropout from programmes in order to identify key predictors (Reyno and McGarth, 2006). In a meta-analysis, she identified low family income, low maternal education, young maternal age and minority group status as predictors. Parental psychopathology was also an important predictor of dropout. This reviewer also examined impact on outcomes and found a similar pattern of influence with greater effect sizes.

Wyatt Kaminski synthesized the results of 77 studies in families with children 0–7 years aiming to identify the impact of different programme components (i.e. content and form of delivery) on the behavioural adjustment of children aged 0–7 (Wyatt Kaminski, 2008). This review found that programmes with the most positive outcomes focused the parent–child relationship and specifically (i) taught emotional communications skills and ways of fostering more positive parent–child interaction; (ii) taught use 'time out' and consistency; (iii) had a curriculum or manual and (iv) required that parents to practice new skills with their children during sessions. Contrary to what might have been expected, the effectiveness of programmes was not improved by inclusion of adjunctive components, such as problem-solving techniques, a focus on the development of children's academic and cognitive and social skills and/or provision of additional services and supports.

Kane *et al.* provides a different perspective on factors influencing success in a meta-ethnographic review of qualitative studies which analysed parents' own views (Kane *et al.*, 2007). The need for parents' own needs to be recognized and respected, combined with non-judgemental, strengths based support from programme facilitators were identified as key. Support and acceptance by other parents (which can require skilled facilitation) is critical to retention of participants and the success of the intervention. It is therefore essential to offer non-judgemental, strengths based support and encourage the development of support among participating parents.

Parenting support in the highest risk groups

The highest risk groups are those in which parents suffer from mental illness or drug and alcohol misuse and families in which abuse has already occurred. In the latter interventions aiming at secondary and tertiary prevention aiming to reduce some of the most harmful effects on the mental health of offspring and escalation or recurrence.

Abuse and neglect

Five reviews were relevant to this area: MacLeod and Nelson studied prevention and treatment of physical and emotional abuse and neglect (MacLeod and Nelson, 2000); physical abuse and neglect (Corcoran, 2000); emotional maltreatment (Schrader McMillan *et al.*, 2008); sexual abuse (Corcoran and Pillai, 2008) and physical, emotional and sexual abuse and neglect (Skowron and Reineman, 2005).

Physical abuse and neglect. MacLeod and Nelson identified multicomponent programmes, intensive family support and parent training as effective (MacLeod and Nelson, 2000). High levels of participant involvement and strengths based approaches increase effectiveness. In families where there is a risk of escalating abuse, promising approaches include (i) behavioural interventions, including behavioural parent

training and (ii) multisystemic family therapy. Skowron and Reineman provided evidence that psychological treatments to prevent the escalation of abuse are more effective than no treatment or community case management (Skowron and Reineman, 2005). There is some evidence that length of treatment may reduce the risk of re-occurrence/escalation of abuse.

Emotional abuse and neglect. Schrader McMillan *et al.* focused on interventions to prevent the escalation of emotional abuse and emotional neglect where this does not co-occur with other forms of maltreatment (Schrader McMillan *et al*., 2008). Although there are very few studies in this area, there is emerging evidence from qualitative studies of the effectiveness of interaction guidance and of parent–infant psychotherapy (in particular mentalization-based approaches) in enhancing caregiver sensitivity in parents with more severe psychopathology. Study quality is an issue with research on psychotherapy. There is some evidence that group-based behavioural parent training (Triple P), with additional individual support and with anger management components can help parents regulate anger and achieve more realistic expectations of children.

Child sexual abuse. Corcoran and Pillai assessed parent or parent and child-focused interventions aimed at preventing deterioration of child mental health and/or recurrence of abuse (Corcoran and Pillai, 2008). There is some evidence that CBT offers greater benefits than non-directive treatments to preschool survivors of sexual abuse and their parents in spite of research showing more limited effectiveness of CBT with preschoolers in other contexts. There is also evidence that CBT for non-abusing parents and children is effective with school-aged children. Parent-focused interventions (e.g. instructional videotapes based on social learning theory) at the time of a sexual abuse disclosure also appear to benefit children's psychosocial functioning. Parental support is critical for recovery and interventions need to include provision of adjunctive (e.g. social) supports for parents. No review level evidence was identified that involved parenting interventions with parents of adolescent survivors of sexual abuse.

Parental drug and alcohol abuse

Three reviews (Doggett *et al.*, 2005; Suchman, 2006; Schrader McMillan *et al*., 2008) examined the limited evidence of studies of psychosocial interventions with a parenting component for drug and alcohol misusing parents. There is no evidence that generic programmes that are successful with mainstream populations, or even populations at demographically high risk alone, are effective with drug-addicted adults. Home visiting is associated with higher levels of referral of children where there is high risk of child abuse due to increased opportunity for observation of parents and children.

There is emerging evidence, based on a small number of studies that the multi-component Parents Under Pressure (PuP) can affect positive change in the families of parents on methadone treatment (Schrader McMillan *et al*., 2008). PuP combines home-based parent and relationship education with initiatives to integrate families into social networks and access adjunctive supports.

Parents with severe mental health problems

One systematic review of parenting interventions for parents with conditions such as schizophrenia, mood disorders or puerperal psychosis has been undertaken (Craig, 2004) but this identified no studies that met its inclusion criteria. There is an urgent need for research to evaluate the effectiveness of parenting programmes with parents experiencing severe mental health problems.

DISCUSSION

Methods

The systematic review of reviews methodology is good for describing the evidence base of diverse approaches and programmes such as we have included here. It can provide a robust overview giving readers insight into the range of approaches that can work. It can also show which areas have been subject to a great deal of research (e.g. formal group-based parenting programmes and home visiting programmes) and which have received less attention (e.g. low cost general population approaches). Synthesizing this literature was not straightforward. Although we have reported our results in four separate sections, there were no neat divisions in this

literature. Other reviewers might have presented the results in different categories. The exclusion of primary studies that have not been covered in reviews, which will include the most recent studies, is a drawback. Another drawback is exclusion of non-systematic reviews [e.g. (Olds *et al*., 2007)]. While these can be biased in the choice of studies they include, they often provide careful description of programmes and thoughtful reflection on what works and what does not work. Such contributions may be lacking in systematic reviews undertaken by review rather than subject experts.

Although we excluded reviews of parenting programmes designed to *treat* mental illnesses such as conduct disorder [e.g. (Dretzke *et al*., 2005)] it was clear that some primary studies in the reviews included families with clinical level problems alongside families with subclinical behaviour problems and those at demographic high risk. In both cases it could be argued, the programmes were offering prevention of escalation of the behavioural problem and the adult mental health sequelae of behaviour problems. Differentiating between 'prevention' and 'treatment' in this area of intervention is therefore more complex than in some other fields.

We have included reviews of the *treatment* as well as prevention of 'child abuse' on the grounds that treatment of abusive parenting can prevent the development of mental illness concomitant on abuse and could have beneficial effects on children other than the victim of abuse. In this regard 'child abuse' was regarded as an extreme form of suboptimal parenting, rather than a medical condition.

We have excluded reviews that did not report mental health or parenting outcomes and thus the report does not cover trials of nutrition or physical activity promotion in a family setting. These are both distal risk factors for mental health problems in children and could have a place in an expanded review.

We excluded reviews of parenting programmes based in schools. Such programmes are usually combined with school-based mental health promotion programmes which are covered in a companion review. We also exclude one review of interventions to prevent child sexual abuse (MacMillan *et al*., 1994) since this covered school-based programmes which aimed to train children to recognize stranger danger rather than targeting parents and parenting.

Findings

The first three sections all yielded a significant evidence base of programmes which have been shown to be effective in improving parenting and children's mental health. Several of these programmes have been tested in multiple robust trials and been recommended in multiple systematic reviews. These programmes range from very low cost universal programmes to high cost intensive support for high-risk families. The group of families for which the evidence base is most sparse is those at the greatest risk of very damaging parenting, including families where parents have a mental illness, families were parents abuse drugs and alcohol and families where serious abuse and neglect has already occurred. This gap in the literature almost certainly reflects the complexity of working with a group of families who are usually very hard to reach and equally hard to help. There is an indication in these reviews that such families can be helped but also that this is an area urgently in need of further investment, both in terms of programme development and research and evaluation.

Most of the studies covered in the reviews have been undertaken in the USA on programmes developed in the USA. A small number have been developed in Australia and Europe. However, it would seem from the studies included that programmes can travel successfully from one continent to another. Cultural differences are important for families but if offered sensitively standard programmes still seem to be helpful in minority ethnic groups.

This review found evidence of effectiveness for programmes suitable for families with infants and those for older children and show that if parenting can be influenced for the better, outcomes for children can be changed. Programme approaches differ according to developmental needs, those for families with older children often focusing on behaviour, but all have in common the sensitization of parents to children's needs. It also found evidence for both relatively low cost programmes suitable for the general population as well as programmes for higher risk groups. There is a wide-ranging debate about whether preventative services should be offered universally or targeted. There are several arguments in favour of providing universal programmes. First, they reduce the potential for stigma attached to programmes for parents who are deemed to be failing. Second,

universal programmes may be better able to address problems before they reach clinical levels, and are therefore more genuinely preventive than programmes that become available only after problems have developed. Third, the 'population paradox' refers to a situation in which a relatively large number of lower risk individuals carry the main burden of risk of disease in the population as a whole, such that while people living in a specific area may be at high risk, the majority of high-risk people are actually spread out across a range of areas. A combination of both universal and targeted approaches to support for parenting is likely to be most effective because improvements in 'normal' parenting are necessary to promote mental well-being and targeted approaches are necessary to work on more intractable problems.

Elements of success

Recruitment and retention of parents in parenting programmes is an issue many reviewers commented on and both factors were more common in the higher risk families. The success of most interventions with parents, or with parents and children, is inevitably influenced by contextual factors—poverty, poor housing, the absence of safe space for children's play and recreation, unemployment and a range of other sources of community and environmental stress. These are rarely discussed in controlled trials. Programme providers clearly need to give careful consideration to how participants are to be recruited and to the potential barriers to participation. The fact that parenting programmes were found to improve parents psychosocial health could probably be made more of in advertizing these programmes.

One component of effectiveness which is discussed by many reviewers is the skills of the facilitators and all agree that these are critical. Non-judgemental, strengths based approaches are essential, but these are not skills in which health professionals are routinely trained or skilled. The development of a skilled workforce is likely to be a prerequisite for successful mental health promotion through parenting approaches. It is one of the disadvantages of the sort of research evidence on which this report is based that few of the studies have measured facilitators' skills.

In terms of the content of programmes evidence, primarily from group-based formal parenting programmes, suggests that programmes with a manual or curriculum, covering emotional communication and relationship skills, and based on experiential learning in which parents' practices new skills like the use of 'time out' were more effective. Overall these interventions need to adopt key principles, these are: positive framework, realistic expectations and an ecological framework.

Two areas where there is some element of disagreement in the literature relate to length of programmes and the qualifications of the practitioners, both of these were more relevant to home visiting programmes. Most studies suggest the need for frequent visits over an extended period of time especially with high-risk families where the establishment of trust in the practitioner is important. One review suggested that a small number of sessions were more effective than many. The latter evidence related to specific behaviourally focused interventions like video interaction guidance and some of the studies may have been on lower risk families. Another area of discrepancy relates to the extent of training needed to provide such programmes. Some programmes have been provided by volunteers and some with the help of intensively trained, highly skilled professionals. In general it seems that volunteer programmes can be useful with lower risk families and possibly for outreach with higher risk groups, but that achieving change in parenting with high-risk groups requires skilled facilitator. Research on the formal group-based parenting programmes, however, is much clearer about both the 'dose' of intervention needed—2 h a week for between 8 and 12 weeks—and the need for training of practitioners.

Gaps in the literature

We identified several gaps in the literature. There was only one review with a number of studies that involved older children (to age 12 years) and that focused on parents of adolescents. Most of the programmes included in the latter were offered through schools. It may be that reviews of parenting programmes for teenagers focus on outcomes which were excluded from this review; for example reviews exist of the impact of parenting programmes on teenagers' smoking, alcohol and drug misuse (Petrie *et al.*, 2007). Another gap in the literature relates to programmes to support fathering. We only identified one review and this focused

on fathers of children to age 5. These studies show that it is possible to provide programmes which improve fathering, but by no means all interventions were successful and many included studies were of weak design. More research in this area is urgently needed. Perhaps the most important gap as we identified above relates to the highest risk families where parents suffer mental health problems: there is an urgent worldwide need for the development and evaluation of effective programmes for this very high-risk group.

Summary of findings

Overall the review findings allow the recommendation of the following programmes:

Low cost universal

- Skin-to-skin contact at birth.
- Kangaroo care.
- Abdominal massage in pregnancy.
- Media-based parenting programmes.

Slightly higher cost universal

- Developmental guidance.
- Anticipatory guidance.
- Infant massage.

Targeted programmes for high-risk groups

- Psychosocial interventions offering emotional and practical support for the prevention of post-natal depression.
- Treatment for post-natal depression using cognitive behavioural approaches, interpersonal therapy or non-directive counselling.
- Long-term multicomponent home visiting programmes starting antenatally offering both support for parenting and support for parents particularly for teenage parents.
- Short-sensitivity focused interventions including parent–infant interaction guidance training for high-risk infants.
- Manualized group based and one-to-one parenting programmes addressing behaviour management and parent–child relationships.

Promising programmes which need more research

- In all families—antenatal education focusing on transition to parenthood and emotional and attachment issues and programmes to support parenting of fathers.
- In families experiencing attachment difficulties and where there is a risk of abuse: parent–infant psychotherapy and infant led psychotherapy.
- In families in which physical abuse has occurred—intensive, multicomponent, multisystemic family support approaches and cognitive behavioural-based parenting programmes.
- In families in which emotional abuse has occurred—parent–infant psychotherapy; and where anger management is also an issue—group-based behavioural parent training with additional anger management components.
- In families where sexual abuse has occurred—CBT for the non-abusing parents; abused children can also benefit.
- In families where parents abuse drugs: multicomponent programmes targeting affect regulation, parental mood and views of self as a parent, drug use and parenting skills delivered on a one to one basis.

We also identified ineffective interventions

- Psychological debriefing after birth.
- Universal approaches to prevention of post-natal depression.

CONCLUSION

A robust international evidence base exists of programmes which have been demonstrated to improve parenting, both in the general population and in high-risk groups. Policies and programmes to support parenting offer much scope for improving mental health. Effective provision requires a skilled workforce and detail with regard to approaches that have been found to work. More research is needed to develop and identify interventions for some of the highest risk groups.

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APPENDIX: INCLUDED REVIEWS

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Mental health promotion and problem prevention in schools: what does the evidence say?

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SUMMARY

The European Union Dataprev project reviewed work on mental health in four areas, parenting, schools, the workplace and older people. The schools workpackage carried out a systematic review of reviews of work on mental health in schools from which it identified evidence-based interventions and programmes and extracted the general principles from evidence-based work. A systematic search of the literature uncovered 52 systematic reviews and meta-analyses of mental health in schools. The interventions identified by the reviews had a wide range of beneficial effects on children, families and communities and on a range of mental health, social, emotional and educational outcomes. The effect sizes associated with most interventions were generally small to moderate in statistical terms, but large in terms of real-world impacts. The effects associated with interventions were variable and their effectiveness could not always be relied on. The characteristics of more effective interventions included: teaching skills, focusing on positive mental health; balancing universal and targeted approaches; starting early with the youngest children and continuing with older ones; operating for a lengthy period of time and embedding work within a multimodal/whole-school approach which included such features as changes to the curriculum including teaching skills and linking with academic learning, improving school ethos, teacher education, liaison with parents, parenting education, community involvement and coordinated work with outside agencies. Interventions were only effective if they were completely and accurately implemented: this applied particularly to whole-school interventions which could be ineffective if not implemented with clarity, intensity and fidelity. The implications for policy and practice around mental health in schools are discussed, including the suggestion of some rebalancing of priorities and emphases.

Key words: Mental health; Social and emotional learning; Schools; Children; ~~Violence; Bullying; Young people;~~ Systematic review~~; Meta-analysis~~

BACKGROUND

Mental health and schools

Childhood and adolescence provide key opportunities to develop the foundations for mental health and prevent mental health problems, and the school is a unique resource to help achieve this. Schools can help tackle the problem of the substantial number of children and young people who experience mental health problems. Around 25% of children and young people in the developed world have an identifiable mental health problem (Harden *et al.*, 2001), of whom 10% fulfil criteria for a mental health disorder. Schools can also promote positive mental health and create resilience, providing the child or young person with resources to thrive and, in adverse conditions, to cope by buffering negative stressors. For children who come from less than optimum home backgrounds and neighbourhoods the intervention of the school can be the turning point for many children with few other supports (Gross, 2008).

The importance of the school for mental health, and the opportunities it provides for interventions have been evident for some time, and the last two decades have seen considerable growth in mental health research and interventions. There are literally thousands of school mental health interventions in operation across the world, some of which have been evaluated. These go under many names: mental health, 'social and emotional learning' (SEL), 'emotional literacy', 'emotional intelligence', 'resilience', 'lifeskills' and 'character education' (Weare, 2010). The world leader in terms of interventions is the USA, generating the most interventions and investing the most in evaluation. Thousands of what are effectively mental health interventions are operating with various levels of demonstrable success. Of these, ~20 major interventions are consistently identified as successful by rigorous systematic reviews (Zins *et al*., 2004; CASEL, 2010). Australia is also the scene of thriving work with some interventions starting to produce robust and positive evaluations (Adi *et al.*, 2007a; Shucksmith *et al.*, 2007).

The objectives of the DataPrev schools work package

Against this background, one of the work packages of the DataPrev project reviewed mental health interventions in schools. The schools' work package aimed to clarify the evidence for and create a database of key evidence-based principles, approaches and interventions that are relevant to Europe and produce policy and practice guidelines to assist policy-makers as they select approaches and interventions for implementation. A full report is available on the Dataprev website. http://dataprevproject.net/

Objectives of this paper

This paper will draw upon the review of the schools work package. It will describe the methodology used in the systematic review and outline its main findings in terms of the quality and content of the reviews, the impact of interventions across a range of mental health issues and outline the themes that emerged from the review, including the apparent characteristics of more effective interventions. It will discuss the implications of these finding for work in school mental health promotion, including in Europe.

METHODOLOGY

Identifying reviews

As there were already many good quality reviews of primary studies in the field, both the schools and the parenting work packages did not look at primary studies but instead sought existing good quality systematic reviews, reviews of reviews, data synthesis, data extraction, meta-analyses and evidence-based databases. The scope was: from 1990, school-aged children and young people (4–19 years in mainstream, special and independent institutions), and included universal, targeted, indicated, school-based, and classroom-based interventions, including those in which schools worked with families and the community, to improve mental health, to prevent mental illness and problems and/or tackle mental health problems.

The databases searched included MEDLINE, EMBASE, ERIC, CINALH, Sociological Abstracts, ASSIA, Psycinfo, the Cochrane Database of Systematic Reviews, DARE CENTRAL, SIGLE, and the Social Sciences Citation Index. Additionally, reviews were found through research agencies in the field that use rigorous evaluation methods, personal contacts with established reviewers, pursuing references from previous reviews and overviews, and hand-searching two journals: *Advances in School Mental Health Promotion* and *International Journal of School Mental Health*.

In keeping with most modern definitions mental health was broadly conceptualized and over 80 search terms were used to reflect the wide and inclusive nature of the field, paralleling the concepts of mental health and search terms used in the parenting review. Mental health was seen as including positive wellbeing, and so generic terms such as wellbeing and quality of life and descriptions of positive mental states such as happiness and self-esteem were used. It was thought to encorporate mental health skills and capacities, so terms such as communication and resilience were included. It was also seen as including both internalizing and externalizing mental health problems, so terms such as depression and anger were used. It was appreciated that taking such a broad and inclusive view would result in a set of reviews which would be somewhat heterogeneous in terms of focus, subject, target group and so on, but, in line with other good quality large scale reviews entitle

'mental health and wellbeing' in recent years [e.g. (Adi, 2007a,b; Shucksmith *et al.*, 2007)] it was felt important to reflect the breath of the field and bring together findings from a range of studies to try to achieve a comprehensive picture which reflected current broad concept of mental health.

Content and thematic analysis

Data were extracted using two standardized forms. One noted aspects of the content: the focus of review, aims of the intervention, who delivered, frequency and duration, population, setting and timing. The second noted results: number of included studies, relevant outcomes including effects sizes where given, findings and authors' conclusions. The reviews were subjected to content and thematic analysis, with recurrent themes and trends identified and particular attention paid to any quantitative estimates of effectiveness. Descriptive data on the reviews, and the authors' results and conclusions are summarized in Table 1.

Critical appraisal and the weighting of evidence from the reviews

A third standardized form was used for critical appraisal, using criteria, informed by a seminal paper by (Oxman *et al.*, 1994), by the practice of other well-conducted reviews of reviews in this area (Browne *et al.*, 2004; Adi *et al.*, 2007a,b) and by the parallel review of reviews of parenting by the Dataprev project (Stewart Brown and Shrader McMillan, this volume). The criteria used are outlined in Table 2, they included the relevance of the focus of the review, whether the interventions included took place only in schools and related community and family settings (the focus of this review) or included clinical settings (not within the focus of this review). Further criteria were whether the review addressed a focussed question; included only studies with an element of control (RCTs and CCTs) had a stated effective, appropriate and comprehensive search and review strategy, appraised the quality of the studies included, provided a meta-analysis and/or data synthesis, and included quantitative presentation of results quantitatively with effects sizes, percentages and/or confidence intervals.

Table 2 rates the quality of the 52 reviews. Reviews were graded to the extent to which they met the various criteria. The reviews on which this review placed most weight and from which the key results are derived were those judged to be of high quality (which only included those where the interventions reviewed did not include clinical contexts, as it was felt that this inclusion was a dilution of the relevance of the findings). Those of medium quality were then consulted to support or shed further light on the key results already identified. Reviews of low quality were used as additional support only where there was already strong evidence from high-and medium-quality reviews. (The starring system used in Table 2 has been used throughout the text, with references to the reviews starred appropriately to help make the weight of evidence clear to the reader.)

RESULTS

The reviews

Over 500 studies were identified, of which 52 reviews met the inclusion criteria.

Universal/targeted

Most (46) of the reviews were universal in scope, i.e. they targeted all children in the group, including those without problems, and 14 of these also explored the impact of interventions and approaches on targeted or indicated populations within their larger sample (discussed in more detail below). Six reviews were entirely focused on targeted and/or indicated populations, focusing on children with or showing signs of various mental health problems (2) violence and aggression (2) and emotional and behavioural problems (2). See Table 1 for more details.

Critical review and quality of the reviews

As Table 2 shows, 27 of the reviews were of high quality (6 or 7 criteria met), 18 were of medium quality (5 criteria met) and 7 of low quality (4 or less criteria met). The major area of methodological weakness was the inclusion of studies without an element of control, most commonly interrupted time line (18 reviews). The second most common weakness was the failure to enumerate results in any way (15 reviews). Third weakness was the inclusion of

Table 1: Critical review and quality assessment

Author (year)	Review focused only on interventions centred around schools, i.e. not clinical?	Clearly focused question?	Only controlled trials (RCTS, CCTs) included?	Stated and appropriate and comprehensive search strategy?	Quality of studies assessed and used to guide results?	Substantial meta-analysis/ data synthesis?	Results presented to allow quantitative assessment of impact?	Quality[1]
(Adi *et al*., 2007a)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Adi *et al*., 2007b)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Bayer *et al*., 2009)	Yes	No	Yes	Yes	Yes	Yes	No, a narrative review	**
(Beelman *et al*., 1994)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Beelman and Losel, 2006)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Berkowitz and Bier, 2007)	Yes	Yes	No, also included pre and post design	Yes	Yes	Yes	Yes	***
(Blank *et al*., 2009)	Yes	Yes	No, also included interrupted time series	Yes	Yes	Yes	Yes	***
(Browne *et al*., 2004)	Yes	Yes	No, included reviews using wide range of studies but mostly with controls	Yes	Yes	Yes	Yes	***
(Catalano *et al*., 2002)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Clayton *et al*., 2001)	Yes	No	No, included wide range of studies	Yes	No, programmes with low quality evaluations and inconclusive results included as 'promising'	Yes	No	*
(Diekstra, 2008a)	Yes	Yes	No, review of reviews using wide range of studies	Yes	Yes	Yes	No, described features of the review	*
(Diekstra, 2008b)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Durlak and Wells, 1997)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Durlak *et al*., 2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Durlak and Weissberg, 2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Durlak *et al*., 2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Ekeland *et al*., 2004)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Farrington and Ttofi, 2009)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Gansle, 2005)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Garrard and Lipsey, 2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Green *et al*., 2005)	Yes	No	No, review of reviews but no requirement that the primary research used controls or comparison groups	Yes	Yes	Yes	No, described features of the reviews	*
(Greenberg *et al*., 2001)	No	Yes	Yes	Yes	Yes	Yes	No, descriptively by features of the programmes	**
(Hahn, 2007)	Yes	No	No, included wide range of designs	Yes	Yes	Yes	Yes	**
(Haney and Durlak, 1998)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Harden *et al*., 2001)	No	Yes	No, included wide range of designs	Yes	Yes	Yes	Yes, for the systematic review and in depth review	**
(Hoagwood and Erwin, 1997)	Yes	No	Yes	Yes	Yes	Yes	No, results described as significant, programmes as effective, or not	**

(Horowitz and Garber, 2006)	No	Yes	Yes	Yes	Yes	Yes	No, results described as effective, mixed or not effective	**
(Kraag *et al.*, 2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Maxwell *et al.*, 2008)	No	No	No, included wide range of designs	Yes	No, wide range of studies included some of medium methodological quality	Yes	No, thematically and descriptively.	*
(McCarthy and Carr, 2002)	Yes	Yes	No, included wide range of designs	Yes	Yes	Yes	No, descriptive/narrative review	**
(Merry *et al.*, 2004)	No	Yes	Yes	Yes	Yes	Yes	Yes	**
(Mytton *et al.*, 2002)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Neil and Christensen, 2007)	Yes	Yes	No, included before and after	Yes, of studies from Australia only	Yes		No, descriptive/narrative review	**
(O'Mara *et al.*, 2006)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Park-Higgerson *et al.*, 2008)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Payton *et al.*, 2008) (indicated)	Yes	Yes	Yes	Yes		Yes	Yes	***
(Reddy *et al.*, 2009)	Yes	Yes	No, included various research designs	Yes	Yes	Yes	Yes	***
(Rones and Hoagwood, 2000)	Yes	Yes	Yes	Yes	Yes	Yes	No descriptive/narrative review	**
(Schachter *et al.*, 2008)	Yes	Yes	No, included pre-post test or post test	Yes	No, most studies classified as poor	Yes	No	*
(Scheckner *et al.*, 2002)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Shucksmith *et al.*, 2007)	Yes	Yes	Yes	Yes	Yes		Yes	***
(Sklad *et al.*, 2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Stage and Quiroz, 1997)	Yes	Yes	No used the interrupted time series	Yes	Yes	Yes	Yes	**
(Tennant *et al.*, 2007)	Yes	Yes	No, review of reviews, looking at systematic reviews	Yes	Yes	Yes	No (for one study only)	**
(Tilford *et al.*, 1997)	Yes	No	No, used wide range of designs	Yes	No	No	No, narrative review	*
(Vreeman and Carroll, 2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Waddell *et al.*, 2007)	No	Yes	Yes	Yes	Yes	Yes	No (for one study only)	**
(Wells *et al.*, 2004)	Yes	Yes	Yes	Yes	Yes	Yes	No, narrative synthesis	***
(Wilson *et al.*, 2003)	Yes	Yes	No, included pre-post test design	Yes	Yes	Yes	Yes	***
(Wilson and Lipsey, 2006a)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Wilson and Lipsey, 2006b)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	***
(Wilson and Lipsey, 2007)	Yes	Yes	No, included pre-post test	Yes	Yes	Yes	Yes	***

[1]Key for assessment for quality.
***, high quality 6 or 7 of the criteria met, including no interventions in clinical settings included (coloumn 2).
**, medium quality, 5 criteria met.
*, low quality <4 criteria met.

Table 2: Focus and results of reviews

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Adi *et al*., 2007a)	31 studies, 15 RCTs and 16 CCTs describing 30 interventions in primary schools that take a universal approach to promoting mental wellbeing but not primarily focused on violence or bullying	Broad range, including: emotional wellbeing (including happiness and confidence, and the opposite of depression/anxiety); psychological wellbeing (including resilience, mastery, confidence, autonomy, attentiveness/involvement and the capacity to manage conflict and problem solve) social wellbeing/good relationships with others	Overall effect sizes were calculated for only 4 of the 31 studies, one good quality RCT: 0.15 and 0.30; two moderate quality RCTs: 0.37 and 0.25 and one moderate quality CCT: 0.27 and 0.18, All suggesting small to medium effects of interventions on mental health. Good evidence to support multi-component programmes, covering classroom curricula and the school environment, which include significant teacher training and development and support and training for parenting. Typically long-term involving children for between 1 and 3 years. Some evidence that short-term stress and coping programmes delivered by psychologists are effective in the short term. Effectiveness may be enhanced by addition of a programme for parents. More evidence is needed on sustainability and effectiveness of psychologists versus teachers in providing such interventions Reasonable quality evidence that short-term conflict resolution programmes delivered by teachers and involving peer mediation are effective in the short term. Reasonable quality evidence that long-term programmes covering social problem solving, social awareness and emotional literacy, in which teachers reinforce the classroom curriculum in all interactions with children are effective in the long term even when delivered alone Some evidence to support further trials of programmes in which retired volunteers are recruited to help in schools Insufficient evidence to make recommendations relating to the optimum balance of universal and targeted approaches, but there was some evidence that the combination may be effective There are no trials identified in this systematic review to show differential effects according to age, gender, ethnic or social groups	Clear positive impact of multi-component/whole school approaches Need more research on the content and process of delivery of interventions (including the content and approach to teacher training and parenting support, barriers and facilitators to implementation) and the most effective combination of targeted and universal approaches Need more research on promising programmes to develop coping skills and reduce stress and anxiety and other short-term class-based programmes, e.g. conflict resolution, to assess long-term effectiveness, and cross cultural adaptability Good quality CCTs of programmes adopting a health promoting school approach to mental health promotion should be undertaken using a range of robust outcome measures, positive as well as negative, and measuring long-term impact Secondary research is needed to update reviews of measures of child mental health and primary research to develop measures which fill gaps in availability

(Adi *et al.*, 2007b)	17 studies reported in 23 papers—11 RCTs and 6 CCTs in primary schools that take a universal approach to promoting mental wellbeing primarily focused on violence or bullying	Focused only on measures of violence and proxy measures of aggression, e.g. antisocial behaviour or social skills, in interventions Most common outcomes measured—teacher, peer or self-reported measures of behaviour problems or social competence Some trials used observations of children's behaviour, by teachers and/or independent observers Some trials used child reports of self-victimization or victimization of peers, or children's knowledge of bullying A few studies reported event-based data such as exclusions or expulsions from school due to violence, or visits to the school nurse for injury Two studies with long-term follow-up reported on arrests and court appearances for delinquency	6/17 trials showed a clearly positive impact, and 8/17 trials showed a possibly positive impact. The most common violence-related outcomes measured were teacher-, peer- or self-reported measures of behaviour—either behaviour problems or social competence Only 2 of the 17 contained effects sizes. One showed a standardized mean difference of 0.41 with effects maintained in seven studies reporting 12 months follow-up, the other effect sizes were found of the order of 0.1 for universal interventions and 0.3 for targeted or indicated populations There is evidence from three out of four 'moderate' quality RCTs, and two out of two good quality CCTs of the effectiveness of multi-component programmes, which typically combine social skills development curriculum, teacher training in management of behaviour and parenting education Moderate to good evidence that a multi-component programme which aims to change school ethos (PeaceBuilders) was effective, including at 2 year follow-up in improving outcomes related to violence and mental health, measured by teacher reports of social competence and aggression The evidence relating to curriculum only programmes (e.g. second step) suggests short, but not longer term effectiveness There is some evidence that the Good Behaviour Game was effective in the short term, not evident at 2 and 6 years follow-up for all children but some evidence it reduced violence in the most aggressive boys. This programme may be useful in combination with others There was some evidence of short-term effectiveness of the Olweus Anti Bullying programme after a year, but not evident at 2 year follow-up Widespread evidence that programmes have more effect on boys than girls, white than black children, high- than low-risk children	Clear positive impact of multi-component/whole school approaches Promising evidence for approaches which attempt to change the school culture and ethos, changing values, attitudes and behaviours relating to the way both staff and students treat each other. Such whole school programmes could have enduring impact on the school culture, so the 'intervention' would not normally have an endpoint. Long-term evaluation would need to track these children through into secondary schools. Whole school interventions that do not change school ethos and values are unlikely to show sustainable changes Higher impact on high-risk children may be the 'ceiling effect' Main impact is on boys. Need to develop programme which take the violent behaviour demonstrated by girls into account
(Bayer *et al.*, 2009)	50 RCTS from which 6 programmes were identified that showed effectiveness and could be translated into an Australian context	Emotional and behavioural problems	Most programmes targeted children's behavioural problems, and a few targeted emotional problems. At school age, the Good Behaviour Game class programme showed evidence of effectiveness. Interventions exist primarily for behaviour and, to a lesser extent, emotional problems, and could be disseminated from research to mainstream in Australia, ensuring fidelity to original programmes	Future research should develop programmes targeting emotional problems, and replicate effective programmes for behaviour problems in quality population translation trials. Randomized trial methods in staged roll-outs can determine population cost benefits for children's mental health without delaying dissemination
(Beelman *et al.*, 1994)	49 studies of interventions that teach social competence to children	Measures of social competence, e.g. social-cognitive skills and social adjustment	Social competence training showed moderate effect sizes. However, effect sizes were lower than in previous studies. Two main problems were identified: First, significant effect sizes were found only when direct goal criteria (e.g. social-cognitive skills) were evaluated, whereas there were few effects on broader constructs (e.g. social adjustment). Second, long-term effects were weak	Further primary studies are needed on the generalization and maintenance of change

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Beelman and Losel, 2006)	84 research reports with 127 treatment-control comparisons on social skills training to prevent anti-social behaviour and promote social competence	Measures of (1) Anti-social behaviour, e.g. aggression, delinquency, disruption and/or (2) Social competence, e.g. social interaction skills, pro-social behaviour, self-control or social problem solving Broad range of data used, e.g. reports, observations, official records, but had to be reported in sufficient detail to permit reliable effect size computation	A small but significant overall positive effect of $d = 0.39$ at post-intervention and $d = 0.28$ at 3 months follow-up Effect sizes where somewhat greater for outcome measures of social competence than for measures of anti-social behaviour, particularly when delinquency was assessed Slight tendency for more intensive treatments to be more effective, e.g. at follow-up most intensive treatments were the only ones to impact on anti-social behaviour ($d = 0.30$) Cognitive-behavioural programmes were the only ones that impacted significantly on anti-social behaviour ($d = 0.50$) and generally had the best results in terms of generalization over time and on outcome criteria, compared with cognitive or behavioural only Authors, trainers and supervised students had more effect than teachers ($d = 0.47$ versus $d = 0.33$) Indicated approaches had higher effect sizes than universal approaches	A small but significant overall positive effect of from interventions Because most studies dealt with small sample sizes, non-official outcome data and measurements after <1 year the results should be treated with caution. Further high-quality studies with long-term outcomes are needed, particularly outside the USA
(Berkowitz and Bier, 2007)	33 effective programmes were identified reported by 64 empirical studies, plus 5 meta-analyses and literature reviews Examined to identify the most common effects and the most common shared practices of character education programmes	Sociomoral cognition Sexual behaviour Prosocial behaviours and attitudes Problem-solving skills Knowledge about risk Drug use Relationships Violence/aggression School behaviour Knowledge/attitudes about risk Emotional competency Academic achievement Attachment to school Personal morality Character knowledge Communicative competence Attitudes towards teachers	The most commonly reported effects of character education were socio-moral cognition, pro-social behaviours and attitudes, problem-solving skills, reduced drug use, reduced violence/aggression, school behaviour, knowledge and attitudes about risk, emotional competency, academic achievement, attachment to school and decreased general misbehaviour The percentage of tests of that variable that were significantly positive were, in order, sexual behaviour (91%), character knowledge (87%) socio-moral cognition (74%), problem-solving skills (64%), emotional competency (64%) relationships (62%), attachment to school (61%), academic achievement (59%)and communicative competency (50%) For those 10 programmes that assessed fidelity, there was a clear trend for complete and accurate implementation to result in more outcome effectiveness than incomplete or inaccurate implementation	Character education can work when implemented with fidelity and broadly, and has a very robust impact. Effective character education tends to include: professional development; student interactive pedagogical strategies; an explicit focus on character/ethics; direct training of social and emotional competencies; modelling of character; aligned classroom/behaviour management strategies and community service and/or service learning

(Blank *et al.*, 2009)	37 studies which aim to promote emotional and social wellbeing by modifying behaviour among children in secondary education (aged 11–18), taking a universal approach 30 on negative and 7 on positive behaviour	Self-reported attitude/behaviour: (28 of which 3 +ve, 25 −ve) Teacher behaviour/attitude rating (2 −ve) Parent behaviour/attitude rating (1 +ve) Academic achievement (2 ve) Routine data (6 −ve) Effectiveness of programme (1 +ve, 2 −ve) Observed school wide changes (2 +ve)	5 studies calculated effect sizes. An RCT study of an aggression violence intervention showed that a programme with which included parental and community involvement was more effective than a programme of social development curriculum, with effect sizes 0.41 and 0.31, respectively An RCT study of a 'trans-theoretical based bullying curriculum' delivered by the internet showed that the intervention group were four times more likely not to participate in bullying (effect size 0.42). An RCT study of a violence prevention curriculum showed very small difference in violence scale ratings (effect size 0.1) A CBA study of a programme to reduce aggression and violence showed effect sizes of 0.5–0.73 in measures of endorsement of social exclusion and tolerance of physical and verbal aggression A CBA study of a behavioural management programme to reduce aggression and violence which measured self-reported aggression and found an effect size of 0.02 The effect sizes demonstrated are therefore highly variable which is unsurprising given the heterogeneity of included interventions and outcome measures On balance, in 8 out of 11 well-conducted studies, there was evidence of the effectiveness of good quality universal interventions to support curriculum approaches to whole school interventions, which aim to promote positive behaviours, however three well-conducted studies did not support this The evidence on the effectiveness of the role of teachers, and external agencies in delivering interventions, and on involving parents, was equivocal On balance there was reasonable evidence to support involving young people as peer educators/mediators in interventions	The lack of well-conducted studies for this age group in the school setting make it hard to draw firm conclusions The results of this review broadly support the theoretical literature on wellbeing in secondary schools including the differentiation between interventions which aim to promote positive behaviour and interventions which aim to prevent negative behaviour The literature to support whole school/ multi-component interventions in general is not well developed, especially in terms of good quality effectiveness studies. The vast majority of interventions identified in the review are based in the classroom and take a curriculum approach. More research is needed on whole school/ multi-component approaches at secondary level

Continued

Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Browne *et al.*, 2004)	23 reviews of effective and efficient mental health (focusing on mental health problems) non-clinical programmes for school aged children	Reviews discussed efforts to reduce deficiencies related to depression, anxiety, externalizing/internalizing or other psychological/social problems, reductions in risky behaviours, increase competence and resilience through various protective strategies	1 study calculated effects sizes. At post-test from 0.41 to 1.70 (small to large). At follow-up from 0.60 to 1.69 (medium to large) Otherwise commented on the characteristics of more effective programmes: universal rather than targeted; multi-modal, i.e. multiple, integrated elements involving family, school and community; for younger children (but programmes for older children also effective); specific aim rather than broad and unfocussed; theoretically based; interactive rather than information only/didactic, involved families; positive rather than fear based; long term with follow-up rather than short term/ intensive; adults as supports and mentors; peer mentoring Effect sizes decreased over time for knowledge and skills acquisition and behaviour reduction suggesting the need for periodic follow-up and reinforcement	Best practices include: early, long-term intervention including reinforcement; follow-up and an ecological focus with family and community sector involvement; consistent adult staffing and interactive, non-didactic programming adapted to gender, age and cultural needs Need to encourage interagency co-operation, ensure services reach appropriate segments of the population; replicate of best practices and publicise information about benefits and cost savings
(Catalano *et al.*, 2002)	25 effective and robustly evaluated programmes to promote positive youth development	Not explicitly stated, but programmes selected for match with goals of positive youth development, i.e. Bonding Social Emotional Cognitive Behavioural and moral competence Self-determination Spirituality Self-efficacy Clear and positive identity Belief in the future Recognition for positive behaviour Opportunities for prosocial involvement Prosocial norms (healthy standards for behaviour)	19 of the effective programmes showed positive changes in youth behaviour, including significant improvements in interpersonal skills, quality of peer and adult relationships, self-control, problem solving, cognitive competencies, self-efficacy, commitment to schooling and academic achievement 24 of the effective programmes showed significant improvements in problem behaviours, including drug and alcohol use, school misbehaviour, aggressive behaviour, violence, truancy, high-risk sexual behaviour and smoking Although one-third of the effective programmes operated in only a single setting, for the other two-thirds, combining the resources of the family, the community, and the community's schools were the other ingredients of success Effective programmes shared common themes and principles. All sought to strengthen social, emotional, cognitive and/or behavioural competencies, self-efficacy, and family and community standards for healthy social and personal behaviour. Seventy per cent also targeted healthy bonds between youth and adults, increased opportunities and recognition for youth participation in positive social activities. Ninety-six per cent used training manuals or other forms of structured curricula. Eighty per cent lasted 9 months or more	Although a broad range of strategies produced these results, the themes common to success involved methods to: strengthen social, emotional, behavioural, cognitive and moral competencies; build self-efficacy; shape messages from family and community about standards for positive youth behaviour; increase healthy bonding with adults, peers and younger children; expand opportunities and recognition for youth who engage in positive behaviour and activities; provide structure and consistency in programme delivery and intervene with youth for at least 9 months or more

(Clayton *et al.*, 2001)		Very wide range Pro-social behaviour, e.g. aggression, violence Improved skills e.g. social decision making, resilience Pro-social attitudes, e.g. friendliness, empathy Positive self-concept	Qua[illegible] analysis. Concluded there are many effective pr[illegible]mmes aimed at anti-violence, conflict resolution and peace which is encouraging However, all used different methods and tools of evaluation	Need more RCTs and long-term evaluations using multiple data sources Violence prevention should be founded on sound theory, e.g. child development, should teach skills as well as social norms, find ways to work effectively with children without acute problems, be tailored to specific populations, include adequate teacher training and strengthen self-worth
(Diekstra, 2008a)	19 reviews of interventions that take a universal approach social and emotional learning	Wide range of outcomes, reflecting the broad nature of the field Changes in social and emotional skills, attitudes to self and others, externalizing and behavioural problems and disorders, antisocial/criminal behaviour, drug use/abuse, internalizing or emotional problems and disorders—stress, anxiety, depression, suicidal tendencies, attitudes towards school including truancy and absence, school test scores and grades	Very strong and significant impact of many programmes on social and emotional skills and attitudes to self and others Strong and widespread impact on externalizing problems, less so on internalizing problems, but still a significant impact (e.g. 10% reduction in depression) Strong impact on attitudes to school and test scores and grades Few studies had follow-up evaluations—those that do showed good stability over time Much variability in effects, probably due to differences in implementation Short-term programmes much less effective than long term. Programmes showed most dramatic impact on high-risk children, but impacted on all children, on all ages and both genders Teachers as effective as other professionals in delivering programmes, although need training. Only when school staff conduct the intervention does student academic performance improve significantly—possibly because school staff are involved in both aspects of school, and SEL/SFL impacts on wider school culture where school staff involved in delivery	SEL/SFL programmes work and meet a wide variety of goals Strong support for universal approach across all age ranges The most effective programmes are theoretically consistent, highly interactive, use a variety of didactic forms, are implemented in small groups, cover both specific and general life skills and are cast within supporting communities and environmental strategies To be effective programmes have to run for at least 3/6 months with at least weekly sessions, ideally with boosters later More research needed on what the people who deliver programmes need to be successful, e.g. characteristics, training, support.

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Diekstra, 2008b)	76 studies of universal school-based programmes 17 of these conducted outside of the USA	Social skills Anti-social behaviour Substance abuse Positive self-image Academic achievement Mental disorders/health Pro-social behaviour	Universal school-based SEL/SFL programmes generally have positive effects on a number of desirable outcomes. In the short term, the largest effects are on social-emotional skills, attitudes towards self, pro-social behaviour, academic achievement and reduction in anti-social behaviour. These effects decrease in the long term but remain significant. Some effects increase, e.g. the reduction in mental disorders Overall effect size of USA and non-US studies similar for the only outcome on which comparison possible, social–emotional skills	SEL/SLF works and is beneficial to children around the globe
(Durlak and Wells, 1997)	177 primary prevention programmes designed to prevent behavioural and social problems in children and adolescents	60 outcome measures used, summarized as: Problems/symptoms Externalizing Internalizing Academic achievement Sociometric status Cognitive processes Physiological measures	Most categories of programmes produced outcomes similar to or higher in magnitude than those obtained by many other established preventive and treatment interventions in the social sciences and medicine Programmes modifying the school environment, individually focused mental health promotion efforts, and attempts to help children negotiate stressful transitions yield significant mean effects ranging from 0.24 to 0.93. In practical terms, the average participant in a primary prevention programme surpasses the performance of between 59 and 82% of those in a control group, and outcomes reflect an 8–46% difference in success rates favouring prevention groups Most categories of programmes had the dual benefit of significantly reducing problems and significantly increasing competencies	Priorities for future research include clearer specification of intervention procedures and programme goals, assessment of programme implementation, more follow-up studies and determining how characteristics of the intervention and participants relate to different outcomes
(Durlak *et al.*, 2007)	526 universal competence-promotion outcome studies of positive youth development programmes exploring effects on schools, families and communities	Effects of interventions on schools, families and communities, or a combination	64% of the positive youth development interventions attempted some type of microsystemic or mesosystemic change involving schools, families or community-based organizations in an attempt to foster developmental competencies in children and adolescents. Only 24% of the reports provided quantitative data on the change that occurred in targeted systems. However, 6 of the 7 post-mean effect sizes were statistically significant and ranged in magnitude from 0.34 (for family environment) to 0.78 (for classroom level change), ranging from modest to large in magnitude. The only non-significant (and negative) post-mean effect of −0.26 (youths' bonding to community adults) was based on only two interventions	Attempts to change social systems—schools, families and communities affecting children and adolescents can be successful Future work should measure more thoroughly the extent to which the systemic changes that are targeted through intervention are achieved, and investigate how such changes contribute to the development and sustainability of desirable outcomes

(Durlak and Weissberg, 2007)	73 after-school programmes that attempted to promote personal and social skills	Feelings and attitudes—child self-perceptions, e.g. self-esteem, self-concept, self-efficacy) and bonding to school (e.g. positive feelings about school and teachers) Behavioural adjustment—positive social behaviours (e.g. expression of feelings, positive interactions, assertiveness), problem behaviours (e.g. aggression and rebelliousness) and drug use, legal and illegal School performance—on achievement tests, grades and school attendance	Youth who participate in after-school programmes improve significantly in feelings and attitudes, indicators of behavioural adjustment and school performance. Overall average effect size was 0.22. After-school programmes succeeded in improving youths' feelings of self-confidence and self-esteem (0.34), school bonding (positive feelings and attitudes towards school, 0.14), positive social behaviours (0.19), reduction in problem behaviours such as aggression, non-compliance and conduct problems (0.18) achievement test scores (0.18), school grades (0.11) and school attendance (0.10). Programmes that used evidence-based skill training approaches, and were sequenced, active, focused and explicit were consistently successful in producing multiple benefits for youth (mean effect sizes ranged from 0.24 to 0.35) while those that did not use such procedures were not successful in any outcome area	After school programmes can produce multiple benefits that pertain to youths' personal, social and academic life To be effective they need to use evidence—approaches—be sequenced, active, focused and explicit
(Durlak *et al.*, 2011)	207 studies of universal social and emotional learning programmes	Social-emotional skills Attitudes towards self and others Positive social behaviours Conduct problems Emotional distress Academic performance	11% improvement in achievement tests; 25% improvement in social and emotional skills; 10% decrease in classroom misbehaviour, anxiety and depression. These effects held during follow-up periods of at least 6 months School staff can effectively deliver social and emotional learning The grand study-level mean for all 207 interventions was 0.28 (CI = 0.25–0.29) Effect sizes: SEL skills 0.60, Academic performance 0.28, emotional distress 0.25, positive social behaviours 0.24, attitudes 0.23, conduct problems 0.20 Effective for all grades and ages Student academic performance significantly improved only when school personnel conducted the intervention. Programmes that encountered implementation problems were less effective than interventions without any apparent implementation problems Programmes that were sequenced, active, focused explicit (SAFE) and well implemented were consistently successful, those that did not were not No clear evidence that multi-component better than single—possibly because they were less often SAFE and well implemented	Current findings offer strong support for the value of classroom and school-based SEL interventions when SAFE and well implemented More research needed on key features of implementation
(Ekeland *et al.*, 2004)	23 trials with children and young people of exercise programmes that measured the impact on self esteem	Self-esteem, variously measured	Generally, the trials were small, and only one was assessed to have a low risk of bias. 13 trials compared exercise alone with no intervention. 8 were included in the meta-analysis, and overall the results were heteregeneous. One study with a low risk of bias showed a standardised mean difference (SMD) of 1.33 (95% CI 0.43 to 2.23), while the SMD's for the three studies with a moderate risk of bias and the four studies with a high risk of bias was 0.21 (95% CI −0.17 to 0.59) and 0.57 (95% CI 0.11 to 1.04), respectively. 12 trials compared exercise as part of a comprehensive programme with no intervention. Only 4 provided data sufficient to calculate overall effects, and the results indicate a moderate short-term difference in self-esteem in favour of the intervention [SMD 0.51 (95% CI 0.15 to 0.88)].	The results indicate that exercise has positive short-term effects on self-esteem in children and young people. Since there are no known negative effects of exercise and many positive effects on physical health, exercise may be an important measure in improving children's self-esteem. These conclusions are based on several small low-quality trials.

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Farrington and Ttofi, 2009)	89 reports describing 53 different programme evaluations on preventing bullying and victimization	Bullying or victimization had to be included as outcome measures. Bullying and victimization could be measured using self-report questionnaires, peer ratings, teacher ratings or observational data	School-based anti-bullying programmes are effective in reducing bullying and victimization (being bullied). On average, bullying decreased by 20–23% and victimization decreased by 17–20%. The effects were generally highest in the age-cohort designs and lowest in the randomized experiments. Firmer disciplinary methods, parent training/meetings, video, co-operative group work and longer and more intense programmes were significantly associated with a decrease in victimization. Work with peers was associated with an increase in victimization	Results obtained so far in evaluations of anti-bullying programmes are encouraging New anti-bullying programmes should be designed and tested based on the key programme elements and evaluation components that found to be most effective
(Gansle, 2005)	26 studies of school-based programmes that focused on anger or included anger as a dependent variable	Externalizing behaviour and anger Internalizing and anger, e.g. depression, shyness, anxiety Social skills, e.g. peer relations, social competence, self-control Beliefs and attitudes, e.g. self-efficacy, self-esteem, locus of control, intent to use non-violent behaviours Academic, e.g. measured achievement, grades, academic engagement and attendance	Across outcomes, the weighted mean effect size of the interventions post-treatment was 0.31, which is modest but significant and similar to other behavioural approaches in related fields. The largest effects were found for anger and externalizing behaviours, internalizing and social skills, with mean effect sizes of 0.54, 0.43 and 0.34, respectively. Longer interventions, focused on behavioural activities more effective Socially focused interventions (e.g. generating responses, making eye contact) worked better than self-focused interventions (e.g. recognizing and labelling emotions) No differences for group comparisons by school setting, special education status, entrance criteria or treatment agents	Anger management compares well with other social and emotional education interventions Interventions that are more methodologically rigorous, are longer, are more socially focused and include more behavioural components are more likely to benefit students
(Garrard and Lipsey, 2007)	36 studies on children and young people of conflict resolution education (CRE)	General construct of CRE used and studies selected that fell within it Targets anti-social behaviour promotes cooperation, empathy and respect Sometimes has secondary goals of emotional and social growth and wellbeing, critical thinking and improving school climate	Small amount of research and of uneven coverage Mean effect size of 0.25 for the 36 studies was statistically significant and represents improvements in problem behaviours that is of practical significance Positive effect observed for different types of intervention, e.g. explicit direct skills instruction, or embedded in curriculum, or peer mediation Relatively small effect on younger students, 9 and under, and greater effect on older Majority of beneficial effects shown for shorter programmes, 2 h a week for 15 h on average	CRE should be taken seriously as a tool for treating school-based anti-social behaviour Particularly indicated for older school students 9+ and especially in adolescence Shorter programmes can be effective Need to focus on what aspects of implementation make programmes more effective
(Green *et al.*, 2005)	8 reviews of interventions to improve the social and emotional wellbeing of primary school-aged children	Problem-solving skills Alternative thinking strategies and the promotion of self-esteem reduction in aggressive behaviour Bullying and violence prevention Teaching children to cope with stressful experiences and with educational transitions	Intervention characteristics associated with more effective outcomes: promoting positive mental health rather than the prevention of mental illness; continuous and long term; whole school approach, focusing on school climate and environment rather than on individual change; opportunities for practice in range of contexts, addressed self-concept, self-esteem and coping skills; combining universal and targeted programmes	Schools have a role in mental health promotion. Conclusions limited by short duration of studies, lack of detail of interventions, identified outcomes and socio-demographic data and the relationship between processes and outcomes

(Greenberg *et al.*, 2001)	34 studies of prevention programmes preventing mental health disorders in school-aged children	Universal: violence prevention, social/cognitive skillbuilding programmes, changing the school ecology, multi-component Externalizing behaviour: anger, aggression, conduct disorder Internalizing: depression, anxiety, suicide, stress	Important and meaningful progress has been made in prevention research with children, families and schools during the last two decades. There have been advances in the theory, design and evaluation of programmes, and there are a growing number of programmes with documented efficacy of beneficial impact on the reduction on psychiatric symptomology Multi-year programmes more likely to foster enduring benefits More effective programmes start in the preschool and early elementary years Preventive interventions are best directed at risk and protective factors rather than at problem behaviours. Feasible and cost-effective to target multiple negative outcomes Interventions should be aimed at multiple domains, changing institutions and environments as well as individuals Prevention programmes that focus independently on the child's behaviour are not as effective as those that also 'educate' the child and focus on teacher and family, home and school, and the needs of schools and neighbourhood	There is no single programme component that can prevent multiple high-risk behaviours. A package of coordinated, collaborative strategies and programmes is required in each community School ecology should be a central focus of intervention To link to other community care systems and create sustainability, prevention programmes will need to be integrated with systems of treatment
(Hahn, 2007)	53 studies of the effects of universal school-based programmes to prevent violent and aggressive behaviour	Reported or observed aggression or violence Conduct disorder Measures of externalizing behaviour Acting out (aggressive, impulsive, or delinquency, school records of suspensions or disciplinary referrals)	For all grades combined, the median effect was a 15.0% relative reduction in violent behaviour among students who received the programme. Effects found at all school levels, Effects diminished slightly over time at the end of the intervention All school programme intervention strategies (e.g. informational, cognitive/affective and social skills building) and programme foci (e.g. disruptive or antisocial behaviour, bullying, dating violence) similarly were associated with reduced violent behaviour No clear association for frequency or duration of programme	The number of studies in this systematic review overall and the number of studies at each grade level, of adequate quality, consistency of effect, and effect size, provide strong evidence that universal school-based programmes are associated with decreases in violence-related outcomes. Beneficial results were found at all school levels examined, from pre-kindergarten through high school

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Haney and Durlak, 1998)	102 studies covering 120 programmes, which indicated significant improvement in children's and adolescents' self-esteem and self-concept, and behavioural, personality and academic functioning	Self-esteem and self-concept Internalizing problems, externalizing problems, mixed problems Using measures of overt behaviour (using behavioural observations or rating scales), personality functioning (e.g. self-reports of anxiety or depression)	The weighted mean ES for all 120 interventions was 0.27, suggesting a modest overall impact Interventions specifically focused on changing self-esteem and self-concept were significantly more effective (mean effect size = 0.57) than programmes focused on another target, such as behaviour or social skills (0.10) Treatment programmes were also more effective (0.47) than primary prevention programmes (0.09) in changing self-esteem Four variables emerged as significant predictors of self-esteem outcomes: two methodological features (type of design and control group), the use of a theoretical or empirical rationale and the type of programme (treatment or prevention)	Programmes can influence self-esteem and self-concept Need to focus on self-esteem and self-concept specifically, and not hope other focused interventions will impact indirectly Future research needs to examine the causal connection between changes occurring in self-esteem and other areas of adjustment, assess intervention success for different ethnic groups and for children of different ages and sex, and determine the long-term impact of interventions
(Harden *et al*., 2001)	345 studies concerned with mental health and young people screened and mapped: 7 rigorous ones subjected to systematic review 30 fairly rigorous ones subjected to in-depth review	Very varied. Mental health, with specific focus on prevention of suicide and self-harm, and associated depression, and the promotion of self-esteem and coping strategies	Mapping exercise: most (72%) studies in schools, vast majority in USA. About half on prevention: most common focus prevention of suicide, self-harm or behaviour problems. About half on promoting positive mental health, e.g. self-esteem, self-concept or coping skills. Half universal, rest focused on 'at risk'. Barriers—major focus on psychological/individual rather than social/environmental factor. Quality of the studies was very variable: half judged 'potentially sound' 7 systematic reviews and 30 in-depth studies had mixed positive/negative on the evidence of mental health promotion. Interventions to promote positive self-esteem limited effect, but more effective if self-esteem is the main focus. Evidence on prevention of suicide and self-harm limited, some evidence that discussing suicide may be harmful 12 studies of young people's views: YP do not relate to the term 'mental health', have sophisticated understandings of coping strategies, a wide range of social and environmental concerns and find traditional health promotion irrelevant	Proceed with caution as the evidence for mental health promotion is mixed Involve and listen to young people If trying to develop self-esteem, then focus on it specifically Avoid universal suicide prevention education
(Hoagwood and Erwin, 1997)	16 studies of effectiveness of school-based mental health services for children	Depression Locus of control Peer acceptance Aggression Behavioural problems	Three types of interventions found to have empirical support for their effectiveness. Cognitive-behavioural therapy especially for depression has strong evidence. Social skills training has reasonable evidence. Teacher consultation (i.e. educating teachers and examining the effects on pre-referral practices and problem behaviours) has promising evidence based on one intervention	Need to: investigate effectiveness of with wider range of psychiatric disorders; broaden the range of outcomes; examine the combined effectiveness of these interventions; link with home-based interventions

(Horowitz and Garber, 2006)	30 studies of programmes aimed at preventing depression in children and adolescents	Measures of depression and anxiety	Wide range in degree of success of programmes Weighted overall mean effect size post-intervention was 0.16, and at follow-up was 0.11, i.e. small but significant Mean effect size for selective prevention programmes was 0.30, greater than effect size of universal prevention programmes (mean effect size 0.12). Probably because baseline depression in universal approach not high Effects of indicated and selective programmes were not significantly different. No clear effect of gender or age Studies were in practice treatment (i.e. improvement in symptoms of the intervention group) rather than prevention (increase in symptoms in the control group but not in intervention.)—possibly due to most not having long follow-ups	Need long-term evaluations Premature to abandon universal programmes, but should focus on selected and targeted
(Kraag *et al.*, 2006)	19 studies of school programmes targeting stress management or coping skills in school children	Various measures of stress and mental health outcomes Categorized into four groups: symptoms of stress; social behaviour, coping/social skills; self-efficacy/self-esteem	Overall effect size for the programmes was −1.51 [95% confidence interval (CI) −2.29, −0.73], indicating a positive effect. However, heterogeneity was significant (pb.001). Sensitivity analyses showed that study quality and type of intervention were sources of heterogeneity influencing the overall result (p valuesb.001). The heterogeneity in quality may be associated with methodological diversity and differences in outcome assessments, rather than variety in treatment effect. Effect was calculated per intervention type, and positive effects were found for stress symptoms with a pooled effect size of −0.865 (95% CI: −1.229, −0.502) and for coping with a pooled effect size of −3.493 (95% CI: −6.711, −0.275)	It is tentatively concluded that school programmes targeting stress management or coping skills are effective in reducing stress symptoms and enhancing coping skills Future research should use clear quality criteria and strive for less diversity in methodology and outcome assessment
(Maxwell *et al.*, 2008)	20 studies of mental health and emotional wellbeing in children and young people	Not stated Primary studies covered wide range of outcomes involving mental health and emotional wellbeing	In schools, sustained broad-based mental health promotion programmes combined with more targeted behavioural and cognitive-behavioural therapy (CBT) for those children with identifiable emotional wellbeing and mental health needs, offer evidence of a demonstrably effective approach. There is a reasonably strong evidence base to support targeted work with both parents and children	While systematic reviews are often seen as offering the only reliable basis on which programmatic decisions should be made, the case has been made here that broadening the evidence base may be beneficial in providing evidence of practically based promising studies integrating evaluation findings from recent local programmes, rather than relying too extensively on research conducted in other contexts

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(McCarthy and Carr, 2002)	4 studies of bullying in schools	Bully/victim problems, e.g. as, exposure to various physical, verbal, indirect, racial or sexual forms of bullying/harassment, various forms of bullying other students, pro-bully and pro-victim attitudes, and the extent to those in the social environment are informed about and react to the bullying	4 studies, between 1989 and 1997, 2 from Norway, 1 UK, 1 Canada. All were whole school 2 programmes were effective, 2 not. Programmes that were implemented completely, consistently in accordance with the guidelines and with external training, consultancy and support were effective. Those that were not, were not	Whole school bullying prevention programmes can effectively reduce both reports of bulling and reports of being bullied both in the short and longer term. Their effectiveness is determined by the degree to which programme integrity is maintained and support, training and consultancy provided
(Merry *et al.*, 2004)	21 studies eligible for inclusion, 13 of which of sufficient quality for meta-analysis, of programmes that aim to prevent depression in the young	Primary outcomes Prevention of depression indicated by reduction in depressive symptoms on pre-post-assessment (early intervention) or reduction in onset of depressive symptoms or disorder measured by depression scores on a rating scales Secondary outcomes (1) General adjustment (2) Academic/work function (3) Social adjustment (4) Cognitive style (5) Suicidal ideation/attempts (6)	Psychological interventions (skills based) were effective compared with non-intervention immediately after the programmes were delivered with a significant reduction in scores on depression rating scales for targeted [standardized mean difference (SMD) of −0.26 and a 95% confidence interval (CI) of −0.40 to −0.13]. Some studies showed a decrease in depressive illness over a year Small but statistically significant changes in depression scores following psychologically based interventions such as stress-management or problem-solving skills ($d = -0.26$, 95% CI: −0.40 to −0.13). The results also showed slightly better levels of effectiveness for targeted (RD = −0.26, CI: −0.40 to 0.13) than for universal programmes ($d = -0.21$) While small effect sizes were reported, these were nevertheless associated with a significant reduction in depressive episodes There was only one knowledge-based intervention and no evidence for its effectiveness Reports of effectiveness for boys and girls were contradictory The quality of many studies was poor, and only two studies made allocation concealment explicit	The results from s[illegible]ed interventions are promising. Knowledge-based approaches do not appear to work It is likely that girls and boys will respond differently to interventions and a more definitive delineation of gender specific responses to interventions would be helpful

(Mytton *et al.*, 2002)	44 studies of school-based violence prevention programmes for children identified as at risk for aggressive behaviour	Violent injuries, observed or reported aggressive or violent behaviours, and school or agency responses to aggressive behaviours	For the 28 trials that assessed aggressive behaviours, the pooled difference between study groups was −0.36 (95% confidence interval, −0.54 to −0.19) in favour of a reduction in aggression with intervention. For the nine trials that reported data on school or agency responses to aggression, the pooled difference was −0.59 (95% confidence interval, −1.18 to 0.01). Subgroup analyses suggested greater effectiveness in older students and when administered to mixed-sex groups rather than to boys alone	Programmes modestly reduced both aggressive behaviours and school or agency actions in response. Effects were similar regardless of whether the programmes focused on training in skills of non-response (e.g. conflict resolution or anger control) or on training in social skills or social context changes. School-based violence prevention programmes may produce reductions in aggressive and violent behaviours in children who already exhibit such behaviour. These results, however, need to be confirmed in large, high-q[illegible]rials
(Neil and Christensen, 2007)	24 trials of 9 Australian school-based prevention and early intervention programmes for anxiety and depression	Programmes that addressed symptoms of anxiety or depression in a school context, or increased student resilience through the development of positive coping skills	Most programmes were based on cognitive behaviour therapy, interpersonal therapy or psycho-education. Six were universal interventions, two were indicated programmes and one was a treatment programme. Most were associated with short-term improvements or symptom reduction at follow-up	A numbe[illegible]ools programmes produce positive outcomes. However, even well established programmes require[illegible] evaluation
(O'Mara *et al.*, 2006)	145 studies of the effectiveness of interventions to enhance various aspects of self-concept	Programmes were included if they contained a measure of self-concept or another related self-concept construct (e.g. self-esteem, self-efficacy), which could be either a global measure (e.g. self-esteem) or a specific domain (e.g. academic self-concept)	Overall, interventions on various aspects of self concept were significantly effective ($d = 0.51$, 460 effect sizes). These effects do not systematically diminish over time The largest mean effect size of all the moderator categories was for interventions aimed at enhancing a specific self-concept facet and that also measured that specific self-concept domain($d = 1.16$) Intervention effects were substantially larger for facets of self-concept that were logically related to the intervention than for unrelated facets of self-concept	Self-conc[illegible]t uni-dimensional, it is multi-dimensional Interventions are more effective than previously thought if we use a multi-dimensional model of self concept

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Park-Higgerson, 2008)	26 studies of violence prevention in schools	Externalizing, aggressive or violent behaviour (i.e. scores of aggression, use of violence/violent or externalizing behaviour), empathy, impulse control, anger management	Overall, the intervention groups did not have significant effects in reducing aggression and violence when compared with the control groups (ES = −0.09, 95% CI = −0.23 to 0.05, with heterogeneity $p < 0.00001$) Comparing programmes with different features, there was no significant difference between interventions, although programmes that used non-theory-based interventions, focused on at-risk and older children, and employed intervention specialists had slightly stronger effects in reducing aggression and violence. Interventions using a single approach had a mild positive effect on decreasing aggressive and violent behaviour (effect size = −0.15, 95% CI = −0.29 to −0.02, $p = 0.03$)	This meta-analysis did not find any differential effects for 4 of the 5 programme characteristics. This was contrary to expectation, exemplifying the complexity of identifying effective programme strategies Small effect sizes, missing pretests, differences in outcome focus, small sample sizes and heterogeneity among the included studies may have contributed to the lack of significant findings for several of the programme characteristics
(Payton *et al.*, 2008)	80 studies of indicated social and emotional learning (SEL) programmes, i.e. that identify and work with students displaying early signs of behavioural or emotional problems	SEL skills, attitudes towards self and others, positive social behaviour, conduct problems, emotional distress, academic performance	Significant mean effect sizes ranging from 0.38 for improved attitudes towards self, school and others to 0.77 for improved social and emotional skills were achieved in all six outcome categories studied. Participants in these indicated SEL programmes received significantly greater benefits across outcome categories than did participants in the control groups. Although the magnitude of these effects was generally lower at follow-up, they were still significant in five out of the six categories (all except academic performance)	SEL intervention programmes for students exhibiting adjustment or learning problems worked for a wide range of presenting problems were effective when delivered by either school or non-school personnel, and had significant outcomes whether they included only one or multiple programme components. Such programmes should be recommended as potentially successful options for promoting youth wellbeing and adjustment both during and after school hours

(Reddy *et al.*, 2009)	29 studies of school-based prevention and intervention programmes for children and adolescents at-risk of and with emotional disturbance (ED)	Externalizing behaviour problems in the home or school Internalizing behaviour problems in the home or school Social skills in the home or school Adaptive functioning at school Active engagement with task	The prevention and intervention programmes produced mean weighted ESs of 1.00 at post-test (unweighted ES of 1.49) and 1.35 at follow-up (unweighted ES of 2.25). The intervention programmes were most effective in improving externalizing behaviour problems in the home (weighted ES of 2.46) and at school (weighted ES of 1.27), social skills at school (weighted ES of 2.39), general academic skills (weighted ES of 1.78) and internalizing behaviour problems in the home (weighted ES of 1.59)	Results offer initial support for the idea that prevention and intervention programmes implemented in schools are generally effective in alleviating the early onset of emotional and behavioural symptoms and reducing persistent symptoms found among children and adolescents with ED
(Rones and Hoagwood, 2000)	47 studies of school-based mental health programmes	Emotional and behavioural problems Depression Conduct problems Stress management Substance use	There are a robust group of school-based mental health programmes with evidence of an impact across a variety of emotional and behavioural problems in children Key features of successful programme implementation include (i) consistent implementation; (ii) inclusion of parents, teachers or peers; (iii) use of multiple modalities—(e.g. the combination of informational presentations with cognitive and behavioural skill training); (iv) integration of programme content into general classroom curriculum and (v) developmentally appropriate programme components Strategies that facilitated implementation included the communication of programme goals, rationale and components to school staff; the provision of feedback on programme effects; the development of plans to overcome barriers to implementation and the specification of individual responsibilities and multi-component programmes that targeted the ecology of the child Successful interventions included teacher training in classroom management techniques, parent training in child management and child cognitive–social skills training	There a[illegible]ng set of universal programmes, but we need more targeted approaches, and more programmes for older students We know something about the factors that make for successful implementation, but need to know more Need more work on school-based outcomes, e.g. attendance, and school-related behaviour (as measured by disciplinary referrals, suspensions and retention)
(Schachter *et al.*, 2008)	40 evaluation studies of the effects of school-based interventions on mental health stigma	Mental health stigma, mainly around depression and schizophrenia	Five limitations within the evidence base constituted barriers to drawing conclusive inferences about the effectiveness and harms of school-based interventions: poor reporting quality, a dearth of randomized controlled trial evidence, poor methods quality for all research designs, considerable clinical heterogeneity and inconsistent or null results	There exists enough suggestive evidence to inform a future research direction, which takes behavioural change as its primary outcome. Gold standard research designs and methods are required
(Scheckner *et al.*, 2002)	16 studies of interventions to address conflict, anger and aggression	Pro-social behaviour and skills, conflict resolution, anger management and resolution, reducing aggression	4 studies had strong effects sizes: Peacebuilders (1.49), SMART (students managing anger resolution together) (0.96), a bibliotherapy programme in Israel based on reading and media (0.84) and first step to success (85). 4 others had moderate effect sizes, a further bibliotherapy programme (0.69), a CBT programme with aggressive boys (0.53), 2 programmes focusing on violence-free relationships (0.45) and a social cognitive group intervention (0.39)	Programm[illegible]ct significantly affected by the use of cognitive-behavioural strategies, multi-setting atmosphere (2 of the 4 strong effect programmes), primary (elementary school) prevention, a qualified programme leader and longer length of programme

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Shucksmith *et al*., 2007)	32 studies of targeted/ indicated activities aimed at promoting the mental wellbeing of children in primary education	Emotional wellbeing (including happiness and confidence, and the opposite of depression) Psychological wellbeing (including autonomy, problem solving, resilience, attentiveness/ involvement) Social wellbeing (good relationships with others, and the opposite of conduct disorder, delinquency, interpersonal violence and bullying)	CBT-based programmes for anxiety transferred successfully between countries Brief targeted interventions for anxiety successful in groups Parent training+child group CBT adds benefits Children of divorce and anxious school refusers benefitted from CBT-based skills training. Depressive symptoms can be prevented by CBT plus social problem-solving Peer mentoring of aggressive with non-aggressive children helps develop prosocial skills and social standing Gains from multi-component programmes are modest, given their cost. Social problem solving and the development of positive peer relations have strongest programme effects Two studies showed improved academic achievement as significant outcomes of multi-component interventions Complex longitudinal multi-component studies support the case for early intervention with aggressive disruptive children and for providing booster interventions Recruitment and retention of parents is a major challenge Parents may prefer targeted children to be treated at school rather than home	Shifts in quality and focus across the time period. 1990s saw proliferation of small-scale studies. Longer and larger studies and evaluations are more recent and long-term evidence thus still lacking The majority of the included studies were US based. This may limit the applicability of to other settings Early studies used experimental designs and clinical staff to deliver small-scale interventions to small samples of children. Their applicability to real-life classroom settings is therefore suspect Later studies (almost exclusively in the USA) show massive sums of money in large multi component longitudinal trials. The results are very useful and are showing the way towards the design of more effective interventions, yet there must be serious doubts as to the availability of such resources within normal education budgets
		Social-emotional skills and attitudes (direct outcomes): Social-emotional skills (e.g. social competence, conflict resolution skills):		

(Sklad *et al.*, 2010)	75 studies of universal interventions with school children that included elements of socio-emotional learning	(1) Positive self-image (e.g. self-efficacy, self-esteem) (2) Behavioural adjustment (second order effects): (3) Anti-social behaviour (e.g. aggressive behaviour, disruptive behaviour) (4) Pro-social behaviour (e.g. altruistic behaviour, helping others) (5) Substance abuse (e.g. tobacco, alcohol and marijuana use) (6) Mental health disorders (e.g. internalizing symptoms, anxiety, depression or suicidality) (7) Academic achievement on core subjects, such as reading and math	Programmes had significant beneficial short-term effects academic achievement: 0.50, antisocial behaviour −0.48, mental disorder −0.16, positive self-image 0.69, prosocial behaviour 0.59, social skills 0.74, substance abuse -0.11 Weak, but statistically significant immediate effects on mental disorders and substance abuse Long-term effects were significant for most outcomes, with the exception of positive self-perception. Academic achievement: 0.25 antisocial behaviour −0.17, mental disorder −0.37, positive self-image 0.08, prosocial behaviour 0.13, social skills 0.50 substance abuse −0.20 The long-term largest beneficial effect was found for mental disorders, for which the effect was moderate in size and larger than the immediate effect size—a 'sleeper effect': All other long-term effect sizes, with the exception of the effect size for positive self-image, were also statistically significant, yet their sizes were small. Positive self-image was the only outcome parameter that showed no statistically significant effect of programmes at the follow-up Effect sizes at the follow-up were statistically significantly heterogeneous for all outcome categories except academic achievement, pro-social behaviour and social skills. The heterogeneity of effect sizes for the remaining four categories (antisocial behaviour, mental disorders, positive self-image and substance abuse) was high: 76–93%	Universal school-based SEL programmes generally have positive effects on reduction or prevention of mental problems and disorders, and a number of other desirable outcomes. These outcomes include enhancement of social and emotional skills; positive attitudes towards self and others, promotion of academic achievement and prevention of antisocial behaviour The heterogeneity of the effect sizes suggests that there are important factors or moderators that affect the effectiveness of programmes on analysed outcome categories Earlier research shows that programmes show stronger effects on direct outcomes than on incidental or indirect outcomes Therefore, to establish an unbiased general estimate of the effectiveness of SEL programmes on any particular outcome, more studies should be carried out on multipurpose programmes. In addition, authors reporting the results of targeted SEL programmes should be encouraged to measure and report a wide spectrum of outcomes rather than focusing on a few target outcomes

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Stage and Quiroz, 1997)	99 studies that used interventions to decrease disruptive classroom behaviour in public education settings	Conduct disorder Externalizing behaviours	A total of 223 effect sizes yielded a mean effect size of −0.78 Studies using teacher rating scales were less likely to evidence reductions in disruptive classroom behaviours compared to studies using behavioural observation methodologies Students treated in self-contained classrooms were more likely to evidence a reduction in disruptive classroom behaviour. With the exclusion of studies using teacher rating scales, comparison of treatment interventions showed no statistically reliable differences due to the large variability in the relative effectiveness for students treated	Results indicate that interventions to reduce disruptive classroom behaviour yield comparable results to other meta-analytic studies investigating the effectiveness of psychotherapy for children and adolescents
(Tennant *et al.*, 2007)	20 interventions to promote mental health and prevent mental illness in children which included schools (plus 7 on parenting)	Parenting skills Anxiety and depression prevention Self-esteem Violence and aggression prevention	Included studies targeted a range of risk and protective factors, and a range of populations (including both parents and children). While, many lacked methodological rigour, overall, the evidence is strongly suggestive of the effectiveness of a range of interventions in promoting positive mental wellbeing, and reducing key risk factors for mental illness in children	A variety of programmes have been shown to be effective in promoting children's mental health, albeit with modest effect sizes. Based on this evidence, arguments are advanced for the preferential provision of early preventive programmes
(Tilford *et al.*, 1997)	Mental health of children and young people. Numbers not stated	Not stated	There is evidence for the effectiveness of classroom programmes on self-esteem, self-concept and coping skills of children and adolescents and for children coping with divorce Children who have particular difficulties may benefit from targeted interventions Separate self-concept activities may have a value with minority groups rather than more general life skills approaches	All children ne[illegible]s to a health educa[illegible] curriculum. Try structured programmes on self-concept and coping skills for children and young people Identify the needs of children experiencing stressful life events: their needs should be met through the co-ordinated activities of education, health and social care professionals More evaluation and dissemination of findings outside the USA More research on multi-component approaches More long-term projects and more follow-up needed

(Vreeman and Carroll, 2007)	26 studies of school-based interventions to decrease bullying	Bullying (bullying, victimization, aggressive behaviour and school responses to violence) Outcomes indirectly related to bullying (school achievement, perceived school safety, self-esteem and knowledge or attitudes toward bullying)	The types of interventions could be categorized as curriculum (10 studies), multidisciplinary or 'whole-school' interventions (10 studies), social skills groups (4 studies), mentoring (1 study) and social worker support (1 study) Only 4 of the 10 curriculum studies showed decreased bullying, but 3 of those 4 also showed no improvement in some populations Of the 10 studies evaluating the whole-school approach, 7 revealed decreased bullying, with younger children having fewer positive effects Three of the social skills training studies showed no clear bullying reduction The mentoring study found decreased bullying for mentored children The study of increased school social workers found decreased bullying, truancy, theft and drug use	Many school-based interventions directly reduce bullying, with better results for interventions that involve multiple disciplines/whole school interventions. Curricular changes less often affect bullying behaviours Outcomes indirectly related to bullying are not consistently improved by these interventions
(Waddell *et al*., 2007)	15 RCTs on programmes to prevent conduct disorder, anxiety and depression	Preventing conduct disorder (9 studies of 8 programmes) Preventing depression (4 studies) Anxiety (1 study) All three (1 study)	Ten RCTs demonstrated significant reductions in child symptom and/or diagnostic measures at follow-up. The most noteworthy programmes, for conduct disorder targeted at-risk children in the early years using parent training or child social skills training for anxiety, employed universal CBT training in school-age children; and for depression, targeted at-risk school-age children, also using CBT Effect sizes for noteworthy programmes were modest but consequential Few Canadian studies and few that evaluated costs	Prevention programmes are promising but replication RCTs are needed to determine effectiveness and cost-effectiveness in Canadian settings Four programme types should be priorities for replication: targeted parent training and child social skills training for preventing conduct disorder in children's early years; and universal and targeted CBT for preventing anxiety and depression in children's school-age years Conducting RCTs through research-policy partnerships would enable implementation in realistic settings while ensuring rigorous evaluation

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Wells *et al.*, 2003)	17 studies of 16 interventions to promote mental health in schools	9 measured negative aspects of mental health—aggression, conduct problems or antisocial behaviour (5), depression or suicidal tendencies (4) 6 measured personal and interpersonal behaviours that underpin mental health—problem-solving (4) conflict resolution (1) emotional awareness (1) 4 measured aspects of positive mental health and these all focused on self-concept or self-esteem	Most of the included studies were relatively small for investigations of school health promotion interventions, involving <500 children in between one and six schools. Even among the most robust studies methodological flaws were common. Only three studies took account of cluster design methodology in the analysis The most positive evidence of effectiveness was obtained for programmes that adopted a whole-school approach, were implemented continuously for more than a year, and were aimed at the promotion of mental health as opposed to the prevention of mental illness. Those that aimed to improve children's behaviour and were limited to the classroom were less likely to be effective. The results of some studies were, however, at variance with these generalizations, suggesting that other unidentified factors may also be important in determining success	Universal school mental health promotion programmes can be effective and long-term interventions that aim to promote the positive mental health of all pupils and involve changes to the school climate likely to be more successful than brief class-based mental illness prevention programmes Optimum approach might be a combination of universal and targeted approaches Methodological flaws in some of the studies indicate the need for further research and there is also a need for robust studies of these programmes outside the USA
(Wilson *et al.*, 2003)	172 studies of experimental and quasi-experimental studies of school-based programmes with outcomes representing aggressive and/or disruptive behaviour	The review included studies of any school-based programme for which aggressive behaviour was measured as an outcome variable	Effect sizes were 0.1 for universal interventions and 0.3 for targeted or indicated populations Most studies were conducted on demonstration programmes; the few studies of routine practice programmes showed much smaller effects Programme effects did not vary greatly with the age, gender or ethnic mix of the research samples Interventions were generally more effective when they were implemented well and relatively intense, used one-on-one formats, and were administered by teachers Behavioural approaches and counselling showed the largest effects, followed by academic programmes and separate schools/ classroom, social competence training with and without cognitive-behavioural components followed close behind and multimodal and peer mediation programmes Higher risk youth showed greater reductions in aggressive behaviour, and poorly implemented programmes produced smaller effects, and different types of programmes were generally similar in their effectiveness, other things equal	Though not representative of routine practice, the demonstration programmes yielded encouraging evidence about what practice programmes might achieve under favourable circumstances A range of strategies work, so long as they are well implemented Programmes are most effective in contexts where the base rates of aggressive behaviour are high enough for meaningful reduction to be possible

(Wilson and Lipsey, 2006a)	73 research studies described in 89 reports of universal school based social information processing interventions on aggressive behaviour	Violence, aggression, fighting, person crimes, disruptive behaviour problems, acting out, conduct disorder, externalizing problems	Students who participated in social information processing showed less aggressive and disruptive behaviour after treatment then students who did not receive the programme. The overall weighted mean effect size was 0.21 which was statistically significant, though not large. Nearly 80% of the effect size values were positive Children from low socioeconomic status families or from schools with a large proportion of low income students achieved greater benefit than students from higher socioeconomic status communities. Studies with higher quality methods (e.g. those with random assignment or low attrition) did not produce better (or worse) outcomes than studies using less rigorous methods. More intensely delivered programmes more effective Research and demonstration programmes and those that had no obvious implementation difficulties produced the largest effects. Programs delivered under routine circumstances were the least effective, independent of implementation quality, maybe because they tended to be less intense	The overall mean effect size of 0.21 indicates that universal social information processing programs are effective for reducing aggressive and disruptive behaviour
(Wilson and Lipsey, 2006b)	68 reports of 47 studies of universal school-based social information processing interventions on aggressive behaviour	Aggressive behaviour, i.e. violence, aggression, fighting, person crimes, disruptive behaviour, acting out, conduct disorder, externalizing problems	Clear positive programme effect. At-risk and behaviour problem students who participated in social information processing programs showed less aggressive and disruptive behaviour after treatment than students who did not receive a programme. The overall weighted mean effect size was 0.26, which was statistically significant. Over 60% of the effect size values were positive Studies with greater amounts of attrition tended to show smaller programme impact than those with little attrition. There were no significant differences between experimental and quasi-experimental studies Generally greater reductions in aggressive behaviour were found for higher risk students. However, programmes for special education students were significantly less effective than those for regular education students—they may have had problems that were too serious to respond to relatively short interventions	The overall mean effect size of 0.26 indicates that targeted and indicated social information processing programmes are effective for reducing aggressive and disruptive behaviour in at risk and problem students

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Table 2: *Continued*

Author (year)	Number and focus of included studies	Mental health outcomes measured	Authors' results	Authors' conclusions
(Wilson and Lipsey, 2007)	249 experimental and quasi-experimental studies of school-based programmes with outcomes representing aggressive and/or disruptive behaviours	The review included studies of any school-based programme for which aggressive or disruptive behaviour was measured as an outcome variable	The programmes were effective. Positive overall intervention effects were found on aggressive and disruptive behaviour and other relevant outcomes (0.20–0.35) The most common and most effective approaches were universal programmes (0.21) and targeted programmes (0.29) for selected/indicated children. Multi-component/comprehensive programmes did not show significant effects (0.05, not statistically significant) which is surprising and counter-intuitive. It may be that their broad scope is associated with some dilution of the intensity and focus of the programmes so that students have less engagement with them than with the programmes in the universal and selected/indicated categories, and that as proportionately fewer of the programmes in this category involved the cognitively oriented treatment modalities that were the most widely represented ones among the universal and selected/indicated programmes Effects for special schools or classrooms were modest but statistically significant (0.11)—not clear whether relatively low impact is because all is being done already that can be, or that problems are so severe that these programmes cannot reach them Routine programmes delivered by teachers did not have significantly worse effect sizes to those delivered by professionals Different treatment modalities (e.g. behavioural, cognitive, social skills) produced largely similar effects. Effects were larger for programmes that reported few implementation problems (0.32), with more frequent sessions (0.40 over a longer period of time (0.34), and those involving students at higher risk for aggressive behaviour 0.21). For the universal programmes, the greatest benefits appeared for younger students (027) and students from economically disadvantaged backgrounds (0.21). For the selected/indicated programmes, it was students already exhibiting problematic behaviour who showed the largest effects (0.21)	The mean effect sizes for these types of programmes represent a decrease in aggressive/disruptive behaviour that is likely to be of practical significance to schools Schools seeking prevention programmes may choose from a range of effective programmes with some confidence that whatever they pick will be effective. Without the researcher involvement that characterizes the great majority of programmes in this meta-analysis, schools might be well-advised to give priority to those that will be easiest to implement well in their settings

non-school work in clinical contexts (8 reviews), which automatically meant a review was graded as being of no more than moderate quality. All 52 reviews used a stated and appropriate and comprehensive search strategy; 51 provided a meta-analysis or narrative data synthesis; 47 assessed the quality of studies and used their assessment to guide results and 46 asked a clearly focused question.

Geographical location of the reviews

Just over half (27) of the reviews were carried out by researchers based in the USA, the rest were from the UK (13), the Netherlands (3) Germany (2), Canada (2), Australia (2), New Zealand (1), Norway (1) and the Netherlands and Belgium combined (1).

Transferability

Several reviews considered whether interventions that are generally USA based might be transferable to a different context or country (A few trials had taken place in European contexts of evidence-based interventions that originated elsewhere, and some trials in other countries (Diekstra, 2008b***). Such conclusions as could be drawn from the small evidence base were positive. Bayer *et al.* identified some evidence-based programmes (Bayer *et al.*, 2009)** that were potentially transferable to Australia. Diekstra found the overall effect size of USA and non-USA studies similar for the only outcome on which comparison was possible, social and emotional skills (Diekstra, 2008b)***, while Shucksmith *et al.* found that CBT-based interventions targeted at reducing anxiety disorders had been transferred successfully between several countries (Shucksmith *et al.*, 2007)***.

Impact and effectiveness of interventions

Fifty of the 52 reviews came to a positive assessment of the evidence they reviewed, concluding that one or more of the interventions had at least small effects and/or were in some way 'effective'. The remaining two reviews were inconclusive rather than negative, and cited methodological weaknesses as the reason why they could not come to firm conclusions. (Park-Higgerson *et al.*, 2008*** on violence prevention interventions and Schachter *et al.*, 2008* on mental health stigma interventions.)

Only four minor examples of apparent adverse effects were reported across hundreds of interventions reviewed. All were small effects and two were concerned with apparent increases in bullying after interventions, which largely appeared to be connected with the use of peer groups for children who bullied (Adi *et al.*, 2007b***; Shucksmith *et al.*, 2007***; Blank *et al.*, 2009***).

Overall effects

Interventions reviewed had wide-ranging beneficial effects on individual children and young people, on classrooms, families and communities and on an array of mental health, social, emotional and educational outcomes.

'Internalizing' mental health problems

Nineteen reviews included 'internalizing' mental health problems and disorders such as depression and anxiety among the outcomes they examined. All concluded that the overall impact of work was positive. Where reviews used numbers to summarize effects, the impact appeared on the whole to be small to modest. Focusing only on the 9 reviews that were concerned only with work in schools (10 others included interventions in clinical contexts) 3 showed ES of 0.10–0.50 (Payton *et al.*, 2008***; Reddy *et al.*, 2009***; Sklad *et al.*, 2010***), and one (Browne *et al.*, 2004***) suggested modest to large impacts with ES of 0.41–1.70. Evidence from moderate quality reviews, most of which included work in clinical as well as school contexts, was consistent with these positive results, with the four reviews that enumerated results showing effect sizes that varied from small to large, between 0.16 and 0.93 (Durlak and Wells, 1997**; Haney and Durlak, 1998**; Merry *et al.*, 2004**; Horowitz and Garber, 2006**)The other 11 reviews that did not provide a numerical set of results also claimed that the impact of interventions on internalizing mental health problems was positive.

The impact on higher risk children was generally consistently shown to be higher than that on children with milder problems, and quite strong, with average ES of ~1.00, rising to 2.46 for some specific selective interventions and measures (Horowitz and Garber, 2006**;

Browne *et al.*, 2004***; Reddy *et al.*, 2009***; Payton *et al.*, 2008***).

Positive mental health and wellbeing and social and emotional learning (SEL)

The impact on positive mental, emotional and social health and wellbeing in general showed positive and small to moderate effects of interventions, with ES of 0.15–0.37 (Adi *et al.*, 2007a)***. Durlak and Weissberg (Durlak and Weissberg, 2007)*** and Durlak *et al.* (Durlak *et al.*, 2011)*** both found that well-implemented SEL interventions had mean ES of 0.24–0.35, and Durlak *et al.* calculated a grand study-level mean ES of 0.28 for 207 SEL interventions (Durlak *et al.*, 2011)***. Three other reviews showed impacts on social and emotional skills and competences to be positive, and moderate to strong effects (ES 0.5–1.49) (Catalano *et al.*, 2002***; Scheckner *et al.*, 2002***; Berkowitz and Bier, 2007***). Impacts on self-esteem and self-confidence were consistently shown to be moderate across a range of high-quality reviews, with ES of 0. 34–0.69 across five reviews (Haney and Durlak, 1998**; Ekeland *et al.*, 2004***; O'Mara *et al.*, 2006***; Durlak and Weissberg, 2007***; Sklad *et al.*, 2010***).

'Externalizing' problems: violence, bullying, conflict and anger

Fifteen reviews addressed were of interventions which aimed to reduce and prevent violence, bullying, conflict and anger, using various overlapping terminologies. Ten focused predominantly on aggression, violence and conflict resolution, four focused predominantly on bullying, one focused on anger and one focused on disruptive classroom behaviour.

Again, the impact on universal populations was positive and small (ES 0.1 on average) but generally markedly stronger for high-risk children (ES 0.21–0.35 on average) (Catalano *et al.*, 2002***; Mytton *et al.*, 2002***; Scheckner *et al.*, 2002***; Wilson *et al.*, 2003***; Wilson and Lipsey, 2006a***; Adi *et al.*, 2007b***; Garrard and Lipsey, 2007***; Hanh *et al.*, 2007**; Blank *et al.*, 2009***; Farrington and Ttofi, 2009***). Impact was generally stronger for older students than younger (Farrington and Ttofi, 2009***). Cognitive–behavioural interventions also consistently showed a larger effect than average with an ES of 0.5 (Beelman and Losel, 2006**; Shucksmith, *et al.*, 2007***). Targeting children who have violent or bullying behaviour, and especially carrying out peer-based work with them, in which difficult children work together, generally had an adverse effect, with more bullying and victimization resulting (Shucksmith *et al.*, 2007***; Farrington and Ttofi, 2009***).

Attitudes to school and academic achievements

Four studies assessed the impact of various interventions on aspects of children's behaviour and attitudes towards school and reported. ES relating to commitment to schooling that were small to moderate (ES 0.14–0.6) (Catalano *et al.*, 2002***; Berkowitz and Bier, 2007***; Durlak and Weissberg, 2007***; Sklad *et al.*, 2010***) and of a similar magnitude for achievement in test scores and school grades (ES 0.11–0.5) (Durlak and Weissberg, 2007***; Sklad *et al.*, 2010***; Durlak *et al.*, 2011***).

Classrooms and families

One study (Durlak and Weissberg, 2007)*** addressed the impact of various SEL interventions on surrounding environments, and found positive results (ES 0.34 for family environments; 0.78 for classroom environments).

Emergent themes across reviews, including the characteristics of more effective interventions

Although the reviews were very heterogeneous, covering many different interventions, issues, topics and populations, undertaken across a 20-year period and of varied quality, there was in practice a considerable overlap between them, with some key interventions cropping up time again. However, the apparent impact of most interventions was variable, leading to the conclusion that the effectiveness of any intervention cannot be relied upon. Most interventions only worked sometimes, some did not work at all, and some were considerably more effective than average in some circumstances. There is clearly more to being effective than simply carrying out an intervention, even if well designed. The more recent reviews, particularly, recognized this problem and most of them included an analysis of the characteristics of interventions that appeared to be linked with effectiveness. It is therefore possible to make

some tentative data synthesis of the key themes that emerged, many of which are concerned with the features of effective interventions.

The balance between targeted and universal approaches

Most of the reviews (48) were of universal approaches and the 46 that were able to come to conclusive results concluded that universal approaches they reviewed had a positive impact. Fourteen reviews looked at both targeted and universal approaches, and nine of them were able to come to comparative conclusions. As we have already suggested, interventions across the whole range of outcomes assessed were consistently shown to have a more dramatic effect on higher risk children (Haney and Durlak, 1998**; Wilson *et al.*, 2003***; Beelman and Losel, 2006**; Wilson and Lipsey, 2006b***; Adi *et al.*, 2007b***; Waddell *et al.*, 2007**; Diekstra, 2008b***; Horowitz and Garber, 2006**; Park-Higgerson *et al.*, 2008***). Two reviews hypothesized that this was due to the 'ceiling effect' with populations without overt problems not having the same scope for improvement. (Horowitz and Garber, 2006**; Adi *et al.*, 2007b***).

Two reviews concluded that some redressing of the balance was needed, with a greater emphasis needing to be placed on targeted (Rones and Hoagwood, 2000**; Beelman and Losel, 2006**). However, three reviews concluded that universal approaches provided a more effective context for working with students with problems than targeted or indicated alone (Wells *et al.*, 2003***; Browne *et al.*, 2004***; Diekstra, 2008a*).

Adi *et al.* addressed this issue specifically and concluded that both universal and targeted approaches have their place, and appear to be stronger in combination found insufficient evidence to make recommendations relating to the optimum balance of universal and targeted approaches (Adi *et al.*, 2007a)***.

Several reviews addressed the question of differential impact but many of the findings were inconclusive, or not replicated in other studies, and no substantial or clear results emerged: Adi *et al.*, in a large and recent review of the whole field, found no trials to show differential effects according to age, gender, ethnic or social groups (Adi *et al.*, 2007a)***.

Develop skills and competences

Improvements in skills were an outcome explored in 10 reviews across a wide range of issues and there was consensus among them that teaching skills and developing competence is a central part of any comprehensive and effective intervention (Catalano *et al.*, 2002***; Berkowitz and Bier, 2007***; Durlak and Weissberg, 2007***; Shucksmith *et al.*, 2007***) in a recent review of targeted approaches to mental health and wellbeing in primary schools, which took a broad view of the field concluded that the more complex and effective interventions, despite their different branding, offered a very similar mix of CBT and social skills training for children, training of parents and teachers in appropriate reinforcement and better methods of discipline, and that this mix was very similar whatever the problem or diagnosis, for internalizing problems, such as depression and anxiety, as well as for externalizing behaviours, such as conduct disorders. Looking at several of wide range of issues explored by the various good quality reviews, the acquisition of social and emotional skills and competences was associated with a wide range of specific outcomes including positive youth development (Catalano *et al.*, 2002***; Durlak and Weissberg, 2007***) character education (Berkowitz and Bier, 2007)*** a reduction in depression and anxiety (Shucksmith *et al.*, 2007***; Waddell *et al.*, 2007**; Blank *et al.*, 2009***), conduct disorders (Shucksmith *et al.*, 2007***; Waddell *et al.*, 2007**) violence (Mytton *et al.*, 2002)***, bullying (Farrington and Ttofi, 2009***) conflict (Garrard and Lipsey, 2007***; Waddell *et al.*, 2007**) and anger (Gansle, 2005***).

Three reviews concluded that the teaching of skills had more, and longer term, impact when mental health issues were integrated into the general classroom curriculum than when the skills were focused on in isolation and that interventions covering social problem solving, social awareness and emotional literacy, in which teachers reinforce the classroom curriculum in all interactions with children, were particularly effective (Rones and Hoagwood, 2000**; Adi *et al.*, 2007a***; Berkowitz and Bier, 2007***).

Six reviews nominated CBT as a particularly effective approach, suggesting that it impacted on anti-social behaviour (Beelman and Losel, 2006**), violence and aggression (Wilson *et al.*,

2003***), conduct disorder (Waddell *et al.*, 2007**), pro-social behaviour and skills, conflict resolution, anger management and resolution, and reduced aggression (Scheckner *et al.*, 2002, 2007***) and anxiety and depression (Neil and Christensen, 2007**; Shucksmith *et al.*, 2007***; Waddell *et al.*, 2007**).

Teaching methodologies

Only one review (Hahn, 2007**) concluded that the teaching methodologies employed by interventions made no difference: the balance of the evidence suggested that the choice of teaching strategies and methods was highly influential over interventions' effectiveness.

Five reviews suggested the need for a positive and holistic approach. Greenberg *et al.* (Greenberg *et al.*, 2001)** and Wells *et al.* (Wells *et al.*, 2003)*** concluded that behavioural strategies on their own were unlikely to be effective, and Merry *et al.* (Merry *et al.*, 2004)** came to a similar conclusion about the ineffectiveness of information only strategies. These three reviews concluded that interventions need also to 'educate' the child through impacting on attitudes, values, feelings and behaviour. Three reviews concluded that interventions were more effective if they were positive rather than fear or problem based (Wells *et al.*, 2003***; Browne *et al.*, 2004***; Green *et al.*, 2005*) while Browne *et al.* (Browne *et al.*, 2004)*** felt that interventions were more effective if they addressed the needs of the whole child, rather than just seeing them as a 'problem'.

Six reviews looked at the issues of teaching methods. Five concluded that more effective interventions used active rather than didactic teaching methods, employing interactive methods such as games, simulations and small group work (Browne *et al.*, 2004***, Berkowitz and Bier, 2007***; Durlak and Weissberg, 2007***; Diekstra, 2008a*; Durlak *et al.*, 2011***). Two reviews suggested that using multiple modalities (a range of integrated and coordinated methods, groups, levels of intervention, one-to-one and whole-class work) was more effective than using just one or two approaches (Rones and Hoagwood, 2000**; Browne *et al.*, 2004***).

Whole-school/multi-component approaches

Five reviews, across a wide topic range, concluded that it is necessary for effectiveness to move beyond an individual, classroom and curriculum focus alone, and embed such work within a whole-school, complex, multi-component approach involving a wide range of people, agencies, methods and levels of intervention, and mobilizing the whole school as an organization (Catalano *et al.*, 2002***; Wells *et al.*, 2003***; Adi *et al.*, 2007a***,b***). Vreeman and Carroll found only 4 of the 10 curriculum and social skills based studies they reviewed showed decreased bullying, and 3 of those 4 also showed no improvement in some populations, while of 10 studies evaluating the whole-school approach, 7 revealed decreased bullying across the board (Vreeman and Carroll, 2007)***. Catalano *et al.* found that, in developing pro-social behaviour and social competence, the more components an intervention covered the better. However, two recent reviews have come to different conclusions (Catalano *et al.*, 2002)***. Wilson and Lipsey reviewing interventions to prevent violence (Wilson and Lipsey, 2007)*** and Durlak *et al.* reviewing interventions to develop SEL, both found that multi-component interventions did not show significant effects compared with interventions which only involved one aspect of school life, a finding which the reviewers found counter-intuitive and contrary to their expectations from previous evidence (Durlak *et al.*, 2011)***. Both hypothesized that it may be that the broad scope of some of the more recent multi-component interventions is associated with some dilution of the intensity and focus and with weaker implementation, so that students have less engagement with these interventions. The importance of the quality of the implementation is an issue we will return to later.

School ethos and culture

Six reviews discussed the importance of school 'environments' and efforts to change them to promote mental health (Durlak and Wells, 1997**; Greenberg *et al.*, 2001**; Catalano *et al.*, 2002**; Wilson *et al.*, 2003***). Some reviews explored this issue in more detail, formulating the concept of school 'ethos' and culture to describe the underlying values and

attitudes that the school represents, particularly in relation to the way staff and students treat one another, the development of bonds between youth and adults, and increased opportunities and recognition for youth participation in positive social activities. Two reviews of primary schools attempt to promote mental health and wellbeing, both in general (Adi *et al.*, 2007a***) and in relation to the prevention of violence (Adi *et al.*, 2007b***) found the results of interventions to influence and change school ethos and culture were positive and very promising for future research. One review (Greenberg *et al.*, 2001**), discussing evidence on preventing mental disorder, concluded that school ecology should in future be a central focus of intervention.

Agents of transmission

The interventions analysed in the various reviews were transmitted by many different agents. Eleven reviews explored the issue of effective leadership and which agents were more effective.

Scheckner *et al.*, looking at interventions that promote pro-social behaviour and skills, found that intervention impact was significantly affected by having a qualified intervention leader (Scheckner *et al.*, 2002)***, while several reviews (e.g. Adi *et al.*, 2007a***,b***; Berkowitz and Bier, 2007***; Diekstra, 2008a*) commented on the need for extensive and intensive training for those involved in leadership.

Many of the early interventions used clinical staff to deliver small-scale demonstration programmes using experimental designs and involving small samples of children, usually focused on specific issues and with short-term evaluation. This approach has remained common for targeted interventions. Shucksmith *et al.* (Shucksmith *et al.*, 2007)*** concluded that it was particularly appropriate when the interventions are starting out. Adi *et al.* suggested using specialist staff was effective in short-term stress and coping interventions (Adi *et al.*, 2007a)***, while Blank *et al.* suggested it was useful for interventions to address for anxiety and depression (Blank *et al.*, 2009)***. However, Shucksmith *et al.* (Shucksmith *et al.*, 2007)*** concluded that this use of specialist staff was unsustainable in the longer term and for larger-scale and universal interventions. So, more recently there has been a shift away from specialist staff, both across and, over time, within interventions to implement interventions in real-life circumstances, using those routinely involved in the life of the school, such as teachers, parents and sometimes peers.

There was contradictory evidence on the absolute effectiveness of teachers compared with specialist staff. Three reviews suggested that teachers are not as effective as specialist staff (Wilson *et al.*, 2003***; Beelman and Losel, 2006**; Wilson and Lipsey, 2006a***) and hypothesized that this was because interventions delivered under routine circumstances were less intense. However, three other reviews concluded that teachers can be as effective as specialists (Adi *et al.*, 2007a***; Wilson and Lipsey, 2007***; Diekstra 2008a*). Wilson and Lipsey (Wilson and Lipsey, 2007)***, Durlak *et al.* (Durlak *et al.*, 2011)*** and Diekstra (Diekstra, 2008a)*concluded that it is particularly important that teachers are involved if interventions are to get to the heart of the school process. Durlak *et al.* (Durlak *et al.*, 2011)*** and Diekstra (Diekstra 2008a) concluded that only when school staff conduct the intervention does student academic performance improve significantly and mental health start to impact on school culture—possibly because school staff are involved in both aspects of school life and can bring it all together.

Some reviews included interventions which involved peer work. The evidence on its effectiveness was mixed. Six reviews found that peers can be an effective and significant part of some types of mental health interventions. Rones and Hoagwood (Rones and Hoagwood, 2000)**, Adi *et al.* (Adi *et al.*, 2007a)*** and Garrard and Lipsey (Garrard and Lipsey, 2007)*** all reported reasonable evidence that peer mediation in conflict resolution is effective in the short term, and Blank *et al.* found it to be effective in the longer term (Blank *et al.*, 2009)***. Browne (Browne *et al.*, 2004)*** and Shucksmith *et al.* (Shucksmith *et al.*, 2007)*** found some evidence that peer norming (putting children with problems with those without) has at least short-term modest impacts on the mental health of children with problems. However, Farrington and Ttofi (Farrington and Ttofi, 2009)*** and Shucksmith *et al.*, (Shucksmith *et al.*, 2007)*** found that peer work which is only carried out with children who bully increased their subsequent bullying

and victimization of other children, with bullying children reinforcing one another's attitudes and behaviours.

Family and community involvement

Durlak *et al.* found 64% of the positive youth development interventions attempted some type of microsystemic or mesosystemic change involving schools, families or community-based organizations (Durlak and Weissberg, 2007)***. Four reviews all looking at broad issues such as positive youth development and mental health (Greenberg *et al.*, 2001**; Catalano *et al.*, 2002***; Browne *et al.*, 2004***; Diekstra, 2008a*) concluded that such engagement with and support from families and communities is helpful, with Greenberg (Greenberg *et al.*, 2001)** suggesting that it is more effective than prevention programmes which focus only and independently on the child's behaviour. Both Browne (Browne *et al.*, 2004)*** and Greenberg (Greenberg *et al.*, 2001)** commented on the importance of embedding interventions within multi-disciplinary teams and communities to provide support.

The involvement of parents was nominated by 10 reviews as a key component of effective multi-component interventions. Parental involvement was reported as increasing, effectiveness for pro-social youth development (Catalano *et al.*, 2002***; Durlak *et al.*, 2007***), universal interventions to promote mental health (Wells *et al.*, 2003***; Adi *et al.*, 2007a***), stress and coping interventions (Adi *et al.*, 2007a***), interventions to reduce violence and bullying (Adi *et al.*, 2007b***; Blank *et al.*, 2009***; Farrington and Ttofi, 2009***) targeted approaches to prevent mental disorders (Greenberg *et al.*, 2001**; Shucksmith *et al.*, 2007***) and conduct disorder (Waddell *et al.*, 2007**). Shucksmith *et al.* suggested that this is because, when involved, parents can support and reinforce at home the messages children are learning at school (Shucksmith *et al.*, 2007)***.

Durlak and Weissberg suggested that the effect is two-way: looking at positive youth development interventions that attempted to change schools, families and community-based organizations they found some statistically significant changes in families and communities as a result of school-based interventions, ranging from modest to large effects (Durlak and Weissberg, 2007)***.

Age and stage

Eleven reviews explored the issue of age in relation to the impact of interventions. Five concluded that it is generally important to start interventions early, with younger children (Durlak and Wells, 1997**; Greenberg *et al.*, 2001**; Browne *et al.*, 2004**; Shucksmith *et al.*, 2007***; Waddell *et al.*, 2007**), although two suggested that the age of introduction may not be crucial (Adi *et al.*, 2007a***; Durlak *et al.*, 2011***) with reviews of interventions to prevent bullying, conflict and violence, targeting older students particularly suggesting that working with older students is more effective (Mytton *et al.*, 2002***; Garrard and Lipsey, 2007***; Farrington and Ttofi, 2009***).*****

However, Blank *et al.* (Blank *et al.*, 2009)*** commented that there is little work for on which to base comparisons. In their rare review of work for students over 11 years, they found few studies with older children, and that those few were one-off interventions in local contexts, focused on improving behaviour, reducing violence and bullying and developing pro-social behaviour and skills, without involvement of parents or the wider school.

The balance of evidence pointed to starting early, with well designed and implemented interventions and then continuing with older students. Three reviews concluded that there was evidence both for intensive interventions in the early years and for supportive 'booster' sessions later. (Browne *et al.*, 2004***; Shucksmith *et al.*, 2007***; Diekstra, 2008a*).

Length and intensity of interventions and of their evaluations

Fifteen reviews produced results that related to how long interventions should last and how intensive they should be to be effective. Some of the evidence on the associations between impact and duration was inconclusive (Hahn, 2007**; Blank *et al.*, 2009***), but overall some clear patterns emerged.

None of the reviews concluded that single brief interventions have any worthwhile role. Three reviews produced some evidence in support of short-term interventions (8–10 weeks) for specific and mild problems for conflict resolution (Garrard and Lipsey, 2007***; Adi *et al.*, 2007a***) and minor anxiety and

emotional disorders (Shucksmith *et al.*, 2007***).

However, the majority of reviews found interventions of at least 9 months to a year to be more effective, especially in broad areas and/or in response to more severe problems. Longer and more intense interventions appeared to be more effective than brief ones for positive mental health (Wells *et al.*, 2003***; Green *et al.*, 2005*), positive youth behaviour (Catalano *et al.*, 2002)*** preventing violence and bullying (Scheckner *et al.*, 2002***; Adi *et al.*, 2007b***; Farrington and Ttofi, 2009***), anger (Scheckner *et al.*, 2002***; Gansle, 2005***) and preventing mental disorders (Greenberg *et al.*, 2001**).

Most of the evaluations of the included studies took place immediately after the intervention and as we have seen there was reasonable evidence of at least small to moderate short-term impact. But with recent larger studies, some long-term effects were emerging. Generally, effects gradually decreased in the long-term but remained significant (Horowitz and Garber, 2006**; Diekstra, 2008b***).

High-quality implementation

Eleven reviews commented on the issue of the impact of intervention quality on effectiveness, with all concluding that it was an important determinant. Wilson *et al.* (Wilson *et al.*, 2003)***, Wilson and Lipsey (Wilson and Lipsey, 2006a)*** and Durlak *et al.* (Durlak *et al.*, 2011)*** found that interventions that had no obvious implementation difficulties produced the larger effects than those with difficulties. Wilson and Lipsey (Wilson and Lipsey, 2006a***) concluded that schools seeking prevention interventions might be well-advised to give priority to those that will be easiest to implement well in their settings. Similarly Berkowitz and Bier (Berkowitz and Bier, 2007)***, reviewing range of interventions on character education, concluded that there was a clear trend for complete and accurate implementation to result in more outcome effectiveness than incomplete or inaccurate implementation. Two concluded that implementation was of overriding importance. Durlak and Weissberg (Durlak and Weissberg, 2007)*** and Durlak *et al.* (Durlak *et al.*, 2011) concluded that interventions were not effective at all if they were based only on loose guidelines and broad principles, but also needed high levels of intensity, consistency, clarity and programme fidelity.

Some of the key interrelated features of high-quality implementation identified by high-quality implementation were:

- a sound theoretical base (Browne *et al.*, 2004)*** explicitness—specific, well-defined goals and rationale, communicated effectively to staff and leaders through thorough training and linked explicitly with the intervention components (McCarthy and Carr, 2002**; Rones and Hoagwood, 2000**; Browne *et al.*, 2004***; Sklad *et al.*, 2010***);
- a direct, intense and explicit focus on the desired outcome rather than using a different focus and hoping for indirect effects (Harden *et al.*, 2001**; O'Mara *et al.*, 2006***; Durlak and Weissberg, 2007***; Durlak *et al.*, 2011***);
- explicit guidelines, possibly manualized (McCarthy and Carr, 2002**; Durlak and Weissberg, 2007***; Durlak *et al.*, 2011***) thorough training and quality control consistent staffing and the specification of individual responsibilities (Browne *et al.*, 2004***);
- complete and accurate implementation. (Berkowitz and Bier, 2007; McCarthy and Carr, 2002**; Catalano *et al.*, 2002; Durlak and Weissberg, 2007***; Durlak *et al.*, 2011)***.

DISCUSSION

The impact of work on mental health in schools

This review endorses the importance of work to promote mental health and prevent mental health problems in schools. It confirms the findings of earlier reviews and recent overviews (e.g. Jenkins and Barry, 2007) that over the last 25 years a strong group of school mental health programmes have emerged with clear and repeated evidence of positive impact. There were very few examples of adverse effects, which is reassuring in the face of some concerns that have been expressed about the 'dangers' of work in this area (e.g. Ecclestone and Hayes, 2009). The cumulative evidence is of impact that is small to moderate in statistical terms and stronger in the short than long term. In terms of specific impacts, there was a small to moderate impact of universal interventions on positive

mental health, mental health problems and disorders, violence and bullying and pro-social behaviour. In all these areas, the effects of interventions was dramatically higher, and quite strong, when targeted at higher risk children, and markedly stronger than average for some specific interventions and on some measures. The impact of interventions on social and emotional skills and competences was moderate to strong. Impacts on commitment to schooling and academic achievements were small to moderate, and on family and classroom environments, moderate.

The effects may be 'small to moderate' in statistical terms but they represent effects that in the real-world are important and relatively large. As two reviewers, Durlak and Wells (Durlak and Wells, 1997)*** and Stage and Quiroz (Stage and Quiroz, 1997)** commented, these are outcomes similar to, or higher in, magnitude than those obtained by many other established preventive and treatment interventions in the social sciences and medicine. Durlak and Wells estimated that in practical terms, the average participant in the primary prevention interventions they reviewed surpassed the performance of between 59 and 82% of those in a control group, and outcomes reflect an 8–46% difference in success rates favouring prevention groups (Durlak and Wells, 1997)***. Durlak *et al.* calculated that the effect sizes from the 207 SEL interventions they reviewed averaged out to an 11% improvement in achievement tests, a 25% improvement in social and emotional skills and a 10% decrease in classroom misbehaviour, anxiety and depression, effects which held up for at least 6 months after the intervention (Durlak *et al.*, 2011)***. It is therefore important that work on mental health promotion and problem prevention in schools be endorsed, continued and expanded.

The characteristics of effective interventions

Reviews showed considerable variation of effects. It is clear that many types of interventions can be effective, sometimes strikingly so, but that their effectiveness cannot be relied on. Since information about the variability of effects became clear, the discussion has moved away from simple impact to focus more on the sometimes subtle characteristics of effective interventions. The findings about effective characteristics that emerge from more recent reviews over the last 10 years contain some important key messages, which may involve redressing some imbalances in policy and practice.

Linking with academic learning

Several studies showed generally positive impacts of various interventions on aspects of children's learning, behaviour and attitudes towards school, such as achievement in test scores and school grades, commitment to school and school attendance. They also showed greater and longer term impact of interventions when mental health issues were integrated into the general classroom curriculum than focused on in isolation. It is increasingly accepted by those keen to promote mental health in schools that linking this activity with the goals of schooling is vital, both to improve the impact of interventions and to ensure that hard pressed schools are to justify a concern with mental health to sceptical staff, parents, governors and funding bodies (Zins *et al.*, 2004). Those involved school mental health at every level need to ensure they work closely education and demonstrate how work to improve the mental health of students can benefit what schools see as their core business: academic learning and achievement, school attendance and behaviour for learning.

Balancing universal and targeted interventions

Within mental health promotion and problem prevention generally the emphasis has long been on a positive approach to mental health in schools, and universal approaches that target everyone. This review generally endorses this focus on the universal, but with some important caveats. It was clear that universal approaches on their own were not as effective as those that added in a robust targeted component, and that interventions had a more dramatic effect on higher risk children. It would appear from current evidence that the best informed approach is to include both universal and targeted approaches, which appear to be stronger in combination, although the exact balance has yet to be determined. It may well be that mental health promotion in schools needs to redress the balance somewhat in favour of more work on targeted approaches, while continuing to embed and integrate them within a robust universal approach.

Starting early and continuing with older students

Evidence from this review suggests that it is best to start early and intervene with the youngest children, particularly in broader areas that develop generic social and emotional skills. However, interventions also need to be long term, including over several years, and new work on specific problems, such as violence and bullying, with older students is effective too, especially if it builds on a generic skills base. Once an effective intervention has run, regular booster sessions with older students appear to be helpful to overcome the recurrent problem of diminution of effects of intervention in the longer term, which in many cases is as little as 6 months.

Using leaders appropriately

The reviews found that many different types of leaders had a role to play within interventions. All need extensive and intensive training. Specialist, often clinically trained staff proved to be effective at the start the process of intervention development and dissemination. However, for interventions to be sustainable, and embedded in the life of the school, and in order to start to affect academic achievement, routine staff, and in particular teachers, need to take over. Peers can be effective, for example in mediation, although care has to be taken to avoid putting together students with difficulties, particularly of the aggressive type, as they can reinforce on another. Families and communities can add strength and depth to work in schools if appropriately involved, and can help to support and reinforce the messages children are learning at school.

Putting skills at the centre

The centrality of skills, and, in particular, work using CBT approaches to any effective mental health intervention, was strongly supported by several reviews in this study. The use of holistic, educative and empowering theories and interactive pedagogical methods was endorsed by many of the reviews which found that behavioural and information-based approaches and didactic methodologies were not nearly as effective. In terms of the theories that underpin skills acquisition, European theory tends to be holistic, emphasizing not just behaviour change and knowledge acquisition, but also changes in attitudes, beliefs and values, while European health education has long pioneered active classroom methodologies, involving experiential learning, classroom interaction, games, simulations and groupwork of various kinds (Weare, 2000).

Using a whole-school approach

Most of the reviews reported here that discussed the issue suggested that skills work alone is not enough, and that for optimal impact, skills work needs to be embedded within a whole-school, multi-modal approach which typically includes changes to school ethos, teacher education, liaison with parents, parenting education, community involvement and coordinated work with outside agencies. The whole-school approach, well implemented, has long been seen as more effective in terms of outcome than a skills focused, curriculum based, approach alone.

Taking a whole-school approach is in line with a great deal of international policy and practice. Within Europe, and in other parts of the world such as Australia, programme development by agencies such as the WHO, EC, and various national governments has been highly influenced by the settings approach of the WHO, with its focus on creating healthy environments. This has given rise within Europe to large-scale, agency-led, whole-school programmes such as Health Promoting Schools (Schools for Health in Europe, 2010), Healthy Schools (Healthy Schools, 2011), Social and Emotional Aspects of Learning (DES, 2010) and the Good and Healthy School (Paulus, 2009). Australia has the state-led Mindmatters (Mindmatters, 2009) programme and the government-led Kidsmatters (Kidsmatter, 2009) framework.

The need for rigorous implementation of whole-school approaches

All of these whole-school programmes are popular, widespread and well thought of by practitioners and policy-makers. However, it is notable that the evidence generated by them has been weak in terms of hard outcomes and has not resulted in evaluations that are robust enough to feature in systematic reviews. It is of

concern that none of these high-profile programmes was therefore able to meet the evaluation requirements of this review and be included here as examples of evidence-based interventions.

It is, however, clearly possible for whole-school approaches to result in hard outcomes and appear in a systematic review. So what is going wrong with many agency-led European and Australian whole-school approaches in terms of failure to produce outcomes which lead to their inclusion in a systematic review? A set of findings from this study may cast light on this problem.

Some recent reviews identified here suggest that some whole-school approaches, including in the USA, are failing to show impact (Wilson and Lipsey, 2007; Durlak *et al.*, 2011). Authors attribute this to a lack of consistent, rigorous and faithful implementation which is causing these approaches to become too diluted and lack impact. The necessary characteristics they identify for effective implementation include having specific, well-defined goals and rationale, a direct and explicit focus on desired outcomes, explicit guidelines, possibly manualized, thorough training and quality control and complete and accurate implementation.

The European and Australian style and the type of whole-school approaches it generates tend to promote 'bottom up' principles such as empowerment, autonomy, democracy and local adaptability and ownership (WHO, 1997). All the agency-led whole-school programmes named above have produced a wealth of well-planned materials, guidelines and advice, but are also deliberately non-prescriptive and principles based. This flexible and non-prescriptive style is echoed in wider approaches to across Europe and Australia, mental health, which emphasize the need for end-user involvement and the lay voice. This approach contrasts with the US style of more top-down, manualized approaches, with scripts, prescriptive training and a strict requirement for programme fidelity.

There are strong reasons to retain the democratic European and Australian approach for large-scale programmes for mental health. It is generally seen as providing essential supportive structures, positive climates, empowered communities and end-user involvement, which leads to well-rooted and long-lasting changes of attitudes and policies that are necessary to support sustainable changes in mental health. However, it is clear that, on its own this style of approach also makes it challenging to achieve hard outcomes and measurable changes. There may need to be a balancing of this style with some more focused, and more prescriptive elements, as has been achieved already in some of the more demonstrably effective whole-school programmes. Those involved in approaches to mental health in schools right across the globe, including in Europe should consider having the conviction to build on what is now known, consolidate and formalize their guidance and procedures and provide a greater level of clarity and direction for future developments to ensure consistent implementation of clear, evidence based, interventions. Unless mental health interventions are delivered with clarity and fidelity, approaches which would work well if implemented consistently, are likely to continue to be too diluted and vague to show real impact.

Meanwhile, on a practical level, advice on implementation offered by such as Wilson that schools only undertake interventions that fit their context and which they can easily implement with fidelity and rigour, seems wise. Larger, multi-faceted interventions would also do well to ensure that meet the implementation criteria for clarity and fidelity outlined above, and give concrete advice on such issues as where to start, how to set measurable goals and evaluate them, and the need to prioritize, to phase in changes slowly and ensure that they are properly embedded before going on to the next.

Strengths and limitations of the evidence

This review of 52 reviews of mental health in schools is the largest so far undertaken. It includes 32 studies not included in a set of four substantial and good quality reviews of the field conducted for NICE in 2007 and 2009 (National Institute of Clinical Excellence, UK) (Adi *et al.*, 2007a,b; Shucksmith *et al.*, 2007; Blank *et al.*, 2009). Seventeen of the additional reviews were published more recently and 15 were newly included, probably due to the wider search terms used in this review. This suggests that the conclusions of this review are based on the most recent and the broadest evidence trawl to date.

Systematic reviews are generally acknowledged as powerful tools in the evaluation of evidence of effectiveness, providing quantitative estimates of the average impact of interventions

and reducing bias through their exhaustive strategies. Reviews of reviews take this further and, with a large number of studies to analyse, as in this case, here, can produce some robust and reliable evidence.

However, it is important to note what this design can miss. As a review of reviews this review could not, by definition, identify new studies of primary approaches that may be promising. It is also restricted to work that passes the quality criteria of systematic review. This means that this review only includes what has been evaluated through controlled trials and which may miss promising interventions which have been evaluated in other ways, through before and after studies or qualitative approaches, for example.

Nearly all authors of the reviews commented on the lack of methodological rigour in many of the studies they analysed that made coming to firm conclusions difficult. The problems encountered included: lack of control groups; lack of randomization; small numbers; short duration; poor reporting quality and, in particular, inadequate description of methodological procedures; lack of assessment of intervention implementation; missing data; and failure to report all outcomes. However, the methodological weaknesses may not greatly affect the validity and reliability of the conclusions. Wilson and Lipsey (Wilson and Lipsey, 2006a), reviewing universal school-based social information processing interventions on aggressive behaviour, found that studies with higher quality methods (e.g. those with random assignment or low attrition) did not produce better (or worse) outcomes than studies using less rigorous methods. The same authors also found that there were no significant differences in terms of outcome between experimental and quasi-experimental studies (Wilson and Lipsey, 2006b). The lack of difference made by methodological rigour lends support to the idea that the findings of this review may be applicable across a broad range of work, including that which falls outside the strict parameters of this review.

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** = review included in the analysis
*** = intervention to be found in Europe

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Psychosocial interventions in workplace mental health promotion: an overview

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SUMMARY

A review based on the DataPrev final report concerning workplace mental health promotion is presented. Out of 4865 studies identified in a comprehensive bibliographical data search, 315 were selected for abstract screening and 79 were included in the final review. The studies were categorized in terms of their aims/expected outcomes and evaluated for quality on the grounds of their design and type of analysis. The most frequent aims were stress reduction and better coping, followed by increased job satisfaction and effectiveness, mental health enhancement and reduction in mental health-related absenteeism. In the 79 intervention studies, 99 outcome variables were measured using 163 instruments, mostly developed for the study purposes. Different intervention categories turned out to be used to attain the same aim, with skills training being the most popular (other approaches included improvement of occupational qualifications and working conditions, physical exercise, relaxation and multicomponent interventions). Among the few intervention programs that were implemented and evaluated in two or more studies, the Stress Inoculation Training (Cecil and Forman, in Effects of stress inoculation training and co-worker support groups on teachers' stress. Journal of School Psychology, ***28****, 105, 1990) based on the model by Meichenbaum (Meichenbaum, in* Stress Inoculation Training*. Pergamon Press, New York, 1985) seemed to be the most promising. Its effectiveness, evidenced in a majority of the measures, was evaluated in studies using the randomized controlled design. This paper is illustrated by high-quality intervention studies. In high and moderate quality studies, positive effects were reported in about a half of the examined outcome variables. However, conclusive evidence of intervention programs effectiveness would require further research—repetition of studies using treatments equivalent to the experimental ones, and outcome evaluation taking into account other criteria, e.g. behavioural.*

Key words: mental health promotion; workplace

INTRODUCTION

Occupational stress and work-related mental health problems have a number of major socio-economic consequences such as absenteeism, labor turnover, loss of productivity and disability pension costs (Palmer and Dryden, 1994). Personal costs include lower self-esteem, somatic conditions (e.g. heart disease) and negative impact on family life (Goodspeed and DeLucia, 1990). Therefore, workplace is considered to be one of the most important settings for mental health promotion.

Interventions aimed at employees' mental health protection include—at the organizational level—working conditions improvement and work schedule changes. At the individual level, stress management and skills training programs

may provide the participants with resources helping them to cope with the detrimental impact of work-related problems.

Workplace programs implemented in various countries have been reviewed by many authors [e.g. (Van der Klink *et al*., 2001; Edwards and Burnard, 2003; Ruotsalainen *et al*., 2006)]. However, a majority of reviews are focused either on a specific intervention type (stress management being the most popular) or on interventions designed for a specific occupational group (e.g. mental health professionals). The aims of the Work Package 4 DataPrev Project were to identify and document evidence-based programs that promote mental health and prevent mental and behavioral disorders at workplace. This included identification of programs currently implemented, appraising the evidence they provided, and identifying best practice programs. In this paper, based on the WP4 DataPrev Project final report (Czabała and Charzyńska, 2010), an attempt was made at a comprehensive review of mental health promotion interventions applied in the workplace, to provide evidence-based knowledge about effective approaches in this area.

METHODS

Inclusion and exclusion criteria

The review included interventions provided in work settings that addressed a mental health outcome and targeted people in paid employment regardless of their age, hours worked, function and type of contract—permanent or temporary (also the self-employed). The study design included a control condition. The reviewed studies were conducted in the years 1988–2009 and had to be published in English. No studies concerning pharmacological interventions and populations on a long-term sick leave or returning to work from unemployment were taken into account; neither were dissertations.

Inclusion of interventions designed for different professionals of different ages and performing may influence generalization of the results. Some evidence suggests that the effects of specific interventions may be limited to particular groups of workers and not necessarily applicable to others.

Search strategy

The comprehensive strategy comprised search of nine electronic bibliographic databases: *PsycInfo, Embase, Medline, CINHAL, ERIC, Social Services Abstracts, Sociological Abstracts, Cochrane Occupational Health Field database and Cochrane Database of Systematic Reviews.* Moreover, websites of the following institutions were searched to identify relevant publications: the (British Occupational Health Research Foundation) (http://www.bohrf.org.uk), the Finnish Institute of Occupational Health (http://www.ttl.fi/internet/english), the National Institute of Occupational Safety and Health (NIOSH, USA) (http://www.cdc.gov/niosh), NICE (http://www.nice.org.uk), ProMenPol website (http://www.mentalhealthpromotion.net) and WHO (http://www.who.int/en). Reference lists from published meta-analyses and book chapters were also scrutinized. Finally, references provided by researchers working in the field were included.

Keywords used in the search strategy focused on work settings (e.g. worksite, workplace, occupation, work-related, job), intervention (e.g. program, training course, counsel, manage), study design (e.g. randomized controlled trial, random allocation and clinical trial), problems addressed (e.g. stress-related, distress, depression, anxiety and burnout) and outcome (e.g. well-being, quality of life, social skills, self-efficacy, happiness, motivation and empowerment).

Selection process and search results

Titles and abstracts identified during the search were examined for relevance, then full text of such publications was retrieved and verified in terms of the inclusion criteria. The selection process was carried out independently by a second researcher on a randomly selected sample of abstracts.

Out of 4865 studies identified during the searches, 315 publications were selected after the abstract screening. Further 236 text studies were subsequently discarded as not meeting one or more of the inclusion criteria. Full texts were retrieved for 79 studies finally included in the review [(for references, see (Czabała and Charzyńska, 2010)]. Table 1 presents a summary of the included papers; for a list of

Table 1: Summary of the 79 studies included in the review

Author (year), country	Study type	Intervention approach	Population	Instruments/indicators	Intervention outcome
1. Deahl M *et al*. (2000), UK	CCT	Group Psychological Debriefing	Male soldiers	HADS, PTSS-10, IES, SCL-90	Reductions in HADS and SCL-90 scores at various sampling points
2. Eklöf and Hagberg (2006), Sweden	RCT	Feedback intervention	VDU workers	Mood adjective checklist, self-developed questionnaire	Positive effect on social support measured as a group characteristic
3. Eriksen *et al*. (2002), Norway	RCT	Physical exercise, SMT Integrated Health Program	Post office workers	Cooper job stress questionnaire, SHC,	No effects on subjective health complaints or job stress
4. Roger and Hudson (1995), study 2., UK	CCT	Stress Management	Police officers	Mean absenteeism figures	Effective reduction in absenteeism rates
5. Roger and Hudson (1995), study 3., UK	CCT	Stress Management Training	Constables	CSQ, Self-report of absenteeism	Trainees equipped to manage change more effectively
6. Arnetz (1996), Sweden	CCT	Relaxation	Police officers	Self-developed questionnaire measuring stressors	Reduction in biological indicators of stress levels
7. Payne and Manning (1990), Greece	CCT	*Stress Inoculation Training*	Teachers	Survey of Feelings about Teaching (SFAT)	Reduction in anxiety and stress related to teaching
8. Bond and Bunce (2001), UK	CCT	*Participative Action Research (PAR)*	Administr. employees	OSl, Job Content Questionnaire	Improvement in mental health, and self-rated performance
9. Sjogren *et al*. (2006), Finland	RCT	The physical exercise intervention	office workers	Measurements on visual rating scales	Increase in subjective physical well-being. No effect on mental stress
10. Pryce *et al*. (2006), Denmark	CCT	*Open-rota system.* The participatory approach	Psychiatric nurses	Copenhagen Psychosocial Question. self-rated health	Increases in work-life balance, job satisfaction, social support
11. Zołnierczyk-Zreda (2004), Poland	CCT	*Stress management workshop*	Teachers	Psychosocial Working Conditions Questionnaire, MBI, the Widerszal-Bazyl questionnaire	Decrease in emotional exhaustion, workload and somatic complaint. Increase in behavioral job control
12. Zołnierczyk-Zreda (2002), PL	RCT	*Stress management intervention*	Bank workers	CISS, the Bradburn questionnaire	Significant increase in positive coping style levels
13. Innstrand *et al*. (2004), Norway	CCT	*Improving working schedule & physical exercises*	Health staff	GBQ, job satisfaction scale, stress measures	Reduction in stress and exhaustion, a strong significant rise in job satisfaction
14. De Jong and Emmelkamp (2000), Holland	RCT	*Multicomponent Stress Management Training*	Various workers	STAI-T, PCQ, GHQ, SRLE, SSI, SIB, UCL, OSQ	Improvement with regard to trait anxiety, psychological distress, unassertiveness
15. Dupuis and Struthers (2007), 1, Canada	RCT	*Social Motivational Training (SMT)*	Working students	Cognitive and affective variables, Weiner's model	Increase in perceived prosocial cognitions and behavioral intentions
16. Dupuis and Struthers (2007), 2, CA	RCT	*Social Motivational Training (SMT*)	Working students	Cognitive and affective variables, Weiner's model	More perceived prosocial cognitions, affect and behavioral intentions
17. Dupuis and Struthers (2007), 3, CA	RCT	*Social Motivational Training (SMT*)	Working adults	Number of participants who took a flyer	Workers more likely to take a brochure on conflict management workshop
18. Dupuis and Struthers (2007), 4, CA	RCT	*Social Motivational Training (SMT*).	Working students	Cognitive and affective variables, Weiner's model	Participants exhibited a more prosocial coworker profile in some dimensions
19. Gardner *et al*. (2005), UK	RCT	*A cognitively based stress management training*	Clinical staff	GHQ-12, MHPSS, EPQ-R, WOC	Reduction in symptom ratings in those who had clinically significant GHQ scores
20. Frayne *et al*. (2000), USA	CCT	*Self-management training*	Sales people	Measures developed for this study	Behavior, self-efficacy and outcome expectancy measures improved
21. Galinsky *et al*. (2000), USA	RCT	*Rest break schedules*	Data-entry operators	Questionnaires developed for this study	Discomfort in several areas of the body were significantly lower

22. Gardiner *et al*. (2004), Australia	CCT	*Cognitive behavioural stress management training*	GPs	QPASS, GHQ	Decrease in general psychological distress
23. Nielsen *et al*. (2006), Denmark	CCT	*A participative approach*	Canteen workers	COPSOQ, cognitive stress reactions scale, SF-36	Improvements in working conditions and well-being in one experimental and one control group
24. Van Weert *et al*. (2005), Holland	CCT	*Snoezelen*-new 24-h care model	Nursing assistants	VBBA, NSPP-DC-NIVEL , NSPP-SB-NIVEL, GHQ, MAS-GZ, MBI	Improvement in quality of life, decrease in time pressure, fewer stress reactions and less emotional exhaustion
25. Larsson *et al*. (1990), Sweden	CCT	*Stress control program*	Teachers	Stress Profile, Faces scale, Hassles and Uplifts Scale	Fewer perceived stressors, positive reappraisal, seeking social support
26. Rebergen *et al*. (2007, 2009), Holland	RCT	GBC (guideline based care) for occup. psysicians	Police workers	Return to work, health care costs	No effect of earlier return to work or productivity loss costs. Lower health care costs
27. Mikkelsen *et al*. (2000), Norway	RCT	*Short-term participatory intervention*	Health workers	Cooper's Job Stress Question., UHI, Job Content Question., Work Apgar Question. LCQ	A limited effect on work-related stress, job characteristics and learning climate
28. Mikkelsen and Gundersen (2003), Norway	CCT	*Participatory Organizational Intervention*	Postal workers		A positive effect on the learning climate, job stress and health complaints
29. Zołnierczyk-Zreda (2004), Poland	RCT	*Mindfulness-based cognitive intervention*	Managers	OSI-2-Occupational Stress Indicator	A significant decrease in perceived job stressors
30. Martin and Sanders (2003), Australia	RCT	*Work Place Triple P Group (WPTP)*	University staff	ECBI, DASS21, PSBC, PS-Parenting Scale, SSS	Lower levels of dysfunctional parenting practices, higher levels of self-efficacy
31. Razavi *et al*. (1993), Belgium	RCT	*Psychological training program*	Oncology nurses	SDQ, NSS-nursing stress scale	Reduced level of occupational stress related to an inadequate preparation
32. Razavi *et al*. (1988, 1991), BE	CCT	*Psychological training*	Medical staff	SDQ-Semantic differential questionnaire	When the subjects are considered globally, there are no concepts changes
33. Polacsek *et al*. (2006), USA	CCT	*Move & improve, a worksite wellness program*	Various worksites	Lifestyle factors (developed survey)	Substantial improvements in lifestyle factors
34. Waite and Richardson (2004)	RCT	*Personal resilience and resilient relationships training*	Government employees	Spirit Core Scale, Purpose in Life Test	Positive change in resilience, self-esteem, locus of control, interpersonal relations
35. Schrijnemaekers *et al*. (2003), Holland	RCT	*Emotion-oriented care*	Caregivers for elderly	Maastricht Work Satisfac. Scale, MBI	Modest positive effects on some aspects of job satisfaction and burnout
36. Smoot and Gonzales (1993), USA	CCT	*Interpersonal communication skills training*	Psychiatric staff	MBI, Ward Atmosphere Scale	Staff members felt the training improved their way of responding to patients
37. Slaski and Cartwright (2003), UK	CCT	*A developmental EI training program*	Managers	Bar-On, GHQ-28,	Increase in emotional intelligence, no impact on performance
38. Holt and Mar (2006), Australia	RCT	Educational, mailed intervention	GPs	GHQ-12	Effective in reducing psychological morbidity
39. Grime (2004), UK	RCT	Interactive, computerized CBT program	Health employees	HADS, Attribution Style Questionnaire	Lower depression and negative attributional style scores at post test, not signif. at 3 months
40. Van der Klink *et al* (2003), Holland	RCT	Three-stage model resembling stress inoculation training	Postal employees	4DSQ, SCL-90, duration of sickness leave	Reduction in the negative consequences of the occupational dysfunctioning
41. Melchior *et al*. (1996), Holland	CCT	An innovation in nursing care delivery	Psychiatric nurses	Maslach Burnout Inventory	Primary nursing had an influence on the burnout level among psychiatric nurses
42. Ewers *et al*. (2002), UK	RCT	Psychosocial intervention training	Forensic nurses	Measures developed by the first author, Maslach Burnout Inventory	Nurses more positive in their attitudes towards the clients, experience less neg. stress effects

Continued

Table 1: *Continued*

Author (year), country	Study type	Intervention approach	Population	Instruments/indicators	Intervention outcome
43. Delvaux *et al* (2004), Belgium	RCT	The psychological training program	Oncology nurses	NSS, SDQ, EORTC CLQ-C3, SIAQ	Stress reduction, attitudes towards oneself and patients moved towards a positive pole
44. Bittman *et al* (2003), USA	RCT	*Recreational Music—Making*	Community employees	Maslach Burnout Inventory	Reduction in burnout and mood dimensions, as well as Total Mood Disturbance
45. Anderson *et al* (1999), USA	RCT	*Meditation*	Teachers	Teacher Stress Inventory—TSI, STAIA, Maslach Burnout Inventory	Reduction in teachers' perception of stress, state & trait anxiety and burnout levels
46. Ayres and Malouff (2007), Australia	RCT	Multistep problem-solving model	Flight attendants	PANAS, MFFJSS, SWLS	Increase in problem-solving skills and problem-solving self-efficacy
47. Cecil and Forman (1990)	RCT	*Stress Inoculation Training*	Teachers	TSI, TAOS, Job Stress in the School Setting	Reduction in teachers' self-reported stress and enhancement of coping skills
48. Teri *et al*. (2005)	RCT	dementia-specific training program for direct care staff	Assisted living employee	GDS, CAS, RMBPC, ABID, NPI, SSCQ	Training was successful in reducing the level of resident affective and behavioral distress
49. Rowe (1999), USA	RCT	*Stress management/adaptive coping training*	Health care employees	STAI, SAI, GSS, Psychological Well-Being Scale, MBI	After training less burnout experienced, no effect after 6 months
50. Park *et al*. (2004), USA	CCT	*An employee problem-solving team 'ACTion Team'*	Stores employees	SF-36, adapted scales	Positive effects on job stress and health status
51. Maes *et al*. (1992, 1998), Holland	CCT	*Working conditions and lifestyles changes*	Manufacture Workers	Wellness at Work Interview, SCL-90, biomedical measure, EMPLOS	Positive change in health risk, absenteeism reduction, no change in stress reactions
52. Cohen-Katz *et al*. (2004, 2005a), USA	RCT	*Mindfulness-based stress reduction*	Nurses	MBI, BSI, MAAS, Evaluation Questionnaire	Reduction in burnout level
53. Rahe *et al*. (2002), USA	RCT	*A Novel Stress And Coping Workplace Program*	Manufacture workers	SCI, STAI), Trait Form, Y-2, QHRQ	Improvement on the stress, anxiety and coping measures
54. Mueser *et al*. (2005), USA	RCT	*Skills training*	Services workers	Workplace Fundamentals Knowledge Test	No improvement on work outcomes for clients who were receiving supported employment
55. Maddi *et al*. (1998), USA	RCT	*The hardiness training, the relaxation/meditation training*	Managers	Personal Views Survey, Hopkins Symptom Checklist	Hardiness training effectively increasing hardiness, job satisfaction, social support
56. Macan (1996), USA	CCT	*The time-management training*	Social serv. employees	TMB, job-induced tension scale, somatic tension scale	No increase in more frequent time-management behaviors
57. Iwi *et al*. (1998), UK	CCT	Cognitive analytic therapy counseling	Estate office staff	GHQ-12, Occupational Stress Indicator (OSI)	No evidence of treatment effects on symptomatology
58. Hatinen *et al*. (2007), Finland	CCT	*The traditional and participatory intervention*	White-collar staff	MBI-GS, Job Diagnostic Survey	Both intervention improved workplace climate. Par. intervention more effective for burnout reduction
59. Bunce and West (1996), UK	CCT	*Stress Management And Innovation Promotion Program*	Health care staff	GHQ, JIT, Propensity to Innovate scale, SEQ	Traditional interventions improved general psychological strain and job satisfaction; Innovative: work-related stress
60. Lucini *et al*. (2007), Italy	CCT	*Stress Management And Sham Program*	White-collar staff	Self-developed question. measuring stress, autonomic evaluation	Both stress-related symptoms and signs of autonomic deregulation were reduced
61. Logan and Ganster (2005), UK	RCT	*Control intervention to alleviate job-related stress*	Trucking comp. staff	Somatic Complaints Scale, Job Diagnostic Survey	The intervention had no main effects on either control or stress-related outcomes
62. Heron *et al*. (1999), UK	CCT	*Stress management workshop*	Pharmaceutical staff	GHQ-30, CSS, OSI, MSS, a modif. life-events question (LES)	Better understanding of the principles of the management of stress and coping strategies

63. Gerzina and Drummond (2000), Australia	RCT	Cognitive skills training, relaxation	Police officers	State-Trait Anger Expression Inventory, MAI, the belief scale	Reduced scores on a majority of the anger measures, decrease in general anxiety
64. Rose *et al*. (1998), UK	RCT	*Stress management program*	Direct care staff	Adaptive Behavior Scale, Thoughts and Feelings Index	Reduced levels of anxiety and depression can have a positive impact on work performance
65. Bourbonnais *et al*. (2006), Canada	CCT	*Participative Intervention*	Clinical care staff	JCQ, PSI, Copenhagen Burnout Inventory, NHP	Improvement in the means of all psychosocial factors except decision latitude
66. Carson *et al*. (1999), UK	RCT	*The social support intervention*	Psychiatric nurses	DCL Scale, GHQ-28, MBI, Rosenberg Self-Esteem Scale	No significant reduction in stress and burnout in mental health nurses
67. Freedy and Hobfoll (1994), USA	CCT	*Dual Resource Intervention*	Acute care nurses	SSQ, Mastery Scale, CES-D, Emotional Exhaustion Scale, MBI	Enhancements in social support and mastery compared with no intervention group
68. Freedy and Hobfoll (1994), USA	CCT	*Single Resource Intervention*	Acute care nurses	SSQ, Mastery Scale, CES-D, Emotional Exhaustion Scale, MBI	A slight enhancement in mastery compared with the no intervention group
69. Kerr and Vos (1993)	CCT	*Employee Fitness Program*	White-collar staff	General Well-being Questionnaire, Cox and Gotts 1988)	Decrease in absenteeism. No significant differences in self-confidence
70. Kawakami *et al*. (2006), Japan	RCT	*Web-based supervisor training*	Sales service staff	Brief Job Stress Questionnaire (BJSQ)	No reduction in job stressors, improvement in friendliness of the worksite atmosphere
71. Landsbergis and Vaughan (1995), USA	CCT	*Participatory action research*	Clerks, managers	JCQ, Job Diagnostic Survey, Work Environment Scale	Limited evidence that improvements in job satisfaction crucial for better group functioning
72. Leonard and Alison (1999), UK	CCT	*Critical Incident Stress Debriefing*	Police officers	Coping Scale of Carver, the State-Trait Anger Expression Inventory	A significant reduction in anger levels and greater use of adaptive coping strategies
73. Lindquist and Cooper (1999), UK	RCT	*Stress management Program*	Taxation office staff	OSI, lifestyle measures, systolic and diastolic blood pressure levels	No improvement in stress and health indicators at post-program
74. Mino *et al*. (2006), Japan	RCT	*Stress-Management Program*	Manufacture workers	Uehata Stress Questionnaire, GHQ-30, CES-D	Improvement in depressive symptoms was observed
75. Murphy and Sorenson (1988), USA	CCT	*Biofeedback, Muscle relaxation*	Blue collar workers	Annual absenteeism, employee performance evaluations	Lower absenteeism and higher attendance ratings in those attending relaxation only
76. Nhiwatiwa (2003), UK	RCT	Booklet on trauma and coping mechanisms	Nurses	Impact of Events Scale, GHQ-28	A significant difference in distress scores, with education group showing greater distress levels
77. Pelletier *et al*. (1999), USA	RCT	*Stanford Training Regarding Effective Stress Solutions*	Bank employees	Stanford Job Strain Survey, Brief Symptom Inventory (BSI)	No change in wellness or stress level, improvement on anxiety scale
78. Peters and Carlson (1999), USA	RCT	*Strategy for health behavior change*	Maintenance staff	Health risk appraisal, MHLC, STPI, HABS	Improvement in physical, behavioral, psychological/attitudinal, emotional aspects
79. Shimazu *et al*. (2006), Japan	CCT	*Stress Management Program*	Engineers	BSCP, Brief Job Stress Questionnaire (BJSQ)	Better knowledge and improved coping skills. Adverse intervention effect on psych, distress

full references to these papers see the Supplementary material online.

Review procedure

For each study, a data extraction form provided by the Dataprev project was used, with the following categories: intervention characteristics (objectives/goals, intervention level, provider, frequency and duration, settings), study design (population, number of experimental and control groups, variables measured, measurement methods and statistical analysis), results (outcomes and conclusions).

No attempt at a meta-analysis was made due to heterogeneity of the reviewed studies in terms of populations targeted, outcome variables and measures used. Instead, workplace mental health promotion interventions were first, systematically described at a general level, and secondly, rated as having a 'high', 'moderate' or 'low' quality, and described in more detail. At both these levels, mental health promotion interventions categorized in terms of their aims/expected outcomes were analyzed separately.

RESULTS

General description of intervention studies

The analyzed interventions were implemented at three different levels: individual, organizational or both. The majority of interventions (52 studies) were implemented at the individual level, 19 at both levels and 8 studies dealt with the organizational level only.

Intervention aims

Interventions differed with regard to the number of their goals. The majority of interventions aimed at either one or two goals (28 and 24 studies, respectively), while only three aimed at five or more objectives. Due to the multiplicity and ambiguity of aims, on the grounds of intervention content only one primary goal per study, the one most related to mental health, was taken into account in further analyses, even if the authors had proposed more aims.

Intervention studies were categorized by their aims and allocated to appropriate thematic groups. The following five groups were distinguished and the percentage of studies in which particular aims were the desired outcome is given in the brackets:

(1) stress reduction or better coping with stress (37% of studies);
(2) mental health improvement, maintenance, enhancement (16%);
(3) increased job satisfaction: prevention of work overload and burnout, improvement of job attitudes and reduction in co-worker conflicts (18%);
(4) job effectiveness improvement (23%);
(5) reduction of absenteeism, sick leave and turnover rates (6%).

While the first three groups of aims are directly related to mental health, the last two categories (job effectiveness and reduction in absenteeism related to mental health problems) are associated rather with occupational activities and can be regarded only as an indirect outcome of effective mental health promotion.

A qualitative analysis of intervention programs shows that the same aim can be achieved using various intervention approaches. For example, the aim of stress reduction was set forth in 25 different intervention programs such as stress awareness heightening, or general health enhancement.

Only few interventions were used in two or more studies: the *Stress Inoculation Training* (Meichenbaum, 1985) was used as the theoretical and practical basis of three different interventions: *cognitive self-instructions* (Payne and Manning, 1990), *stress inoculation training* (Cecil and Forman, 1990) both implemented among teachers and *dual* or *single resource intervention* (Freedy and Hobfoll, 1994) addressed to nurses. Three other interventions were used twice: *The Basic Stress Management Course* implemented by Roger and Hudson (1995) in two different groups among constables and police officers , and a *Short-term Participatory Organizational Intervention* applied in two studies by Mikkelsen *et al.* (Mikkelsen *et al.*, 2000; Mikkelsen and Gundersen) to health care professionals and employees of a postal service sorting terminal. The final example is the *Psychological Training Program (PTP)*, described by Razavi *et al.* (Razavi *et al.*, 1988, 1991, 1993), who in one study implemented the intervention among medical or paramedical staff, and in another among oncology nurses.

Intervention categories

Using content analysis, workplace interventions were categorized into the following six groups:

(1) Skills training—broadly defined knowledge about stress and coping, training of mostly social skills such as stress and occupational stress management, problem-solving, communication and cognitive skills;
(2) Improvement of occupational qualifications—job-specific knowledge and skills;
(3) Working conditions improvement—modification of external workplace characteristics such as working time, work organization, schedule and strategies or employee—employer relationships;
(4) Relaxation—physiological aspects of occupational functioning and coping with stress, e.g. progressive muscle relaxation;
(5) Physical exercise—health and physical fitness enhancement by various sports disciplines, e.g. swimming, walking, aerobic;
(6) Multicomponent intervention—a number of different interventions implemented within one program.

Table 2 presents the detailed techniques/methods used in implementation of each of the intervention categories.

A qualitative analysis shows that the same techniques, e.g. education or group work, were used in various interventions (Table 2).

The most frequent and comprehensive intervention category was skills training implemented by means of cognitive, communication and daily life skills development, job stress management and problem-solving. Cognitive and cognitive-behavioral theories provided the main rationale for intervention programs. Regrettably, not too many programs were theory-driven.

Intervention characteristics: duration, frequency, providers, population targeted

In Table 3, the majority of interventions were provided no longer than 16 weeks, with the most popular session frequency once a week.

Qualifications of intervention providers usually described as psychologists, psychotherapists or trainers were not specified. The study author(s) conducted some interventions, which suggests the implementers' very high qualifications, but is a methodological drawback to the quality evaluation.

Participants in the interventions were predominantly white-collar workers, mental health professionals and health care providers—perhaps the latter are regarded as a group at the highest risk for mental health problems.

Study design

In a majority of the analyzed intervention studies randomized controlled trials were reported. The most common research design was a comparison of an experimental group submitted to an intervention with a single no- or delayed-intervention control group (59 studies). Twelve studies included 2 experimental groups and 1 control group.

At baseline the investigated variables were assessed in all the reviewed studies, with a single post-intervention measurement in the

Table 2: Methods and techniques of the interventions

Intervention category	*n*	Techniques
Skills training	35	Lectures, books, discussion, role playing, compiling a list of problems or stress factors, problem mapping, problem-solving, goal setting, feedback
Improvement of occupational qualifications	13	Lectures, discussion, role playing, problem identification, problem-solving, improvement of knowledge and skills
Working conditions improvement	6	Change in duration and frequency of breaks, implementation of friendly working conditions, analysing and increasing awareness of worksite and occupational stress factors, work strategy reorganization
Relaxation	6	Group exercises, lectures, progressive muscle relaxation, autogenic training, playing music
Physical exercise	2	Group physical exercises, e.g. aerobic, information about well-being
Multi-component intervention	17	Several components of the intervention program: information about health, stress, worksite and cognitive coping skills, physical exercise, body relaxation, specific communication skills

Table 3: Basic characteristics of the interventions

Session frequency	Number of interventions	Session duration	Number of interventions
More than weekly	8	≤2 h	17
Weekly	24	>2 h	16
Once a fortnight or less	1	Not specified	47
Single session	4		
Irregularly	4		
Not specified/not clear	38		
Occupation of intervention recipients	**Number of interventions**	**Intervention providers**	**Number of interventions**
Mental health professionals	10	Physiotherapists	3
Healthcare professionals	15	Psychologist(s), psychotherapist(s),	15
Teachers	7	Trainer(s)	8
Other white-collar workers	20	Intervention author(s)	13
Blue-collar workers	2	Stress management instructor(s)	1
Armed forces	6	Others: experienced personnel, etc.	16
Various employees (different worksites, different occupations)	14	Not specified	23
Not specified	5		

majority of cases (52). Moreover, in 27 studies one or more follow-ups were carried out besides the assessment directly after the intervention.

Variables and measures

In 79 studies included in the DataPrev overview 99 different variables were measured using 169 instruments. Among the most often studied outcome variables were stress reactions (23 studies), subjective mental health (19), coping strategies and styles (15), anxiety (9), job satisfaction (9), burnout (8) and stressors (7).

Different measurement methods were used, including self-report questionnaires, rating scales or psychometric instruments, life data and physiologic measures. Only 19 of the measures were used in more than one study. In that number the most popular were: *Maslach Burnout Inventory* (MBI) (13), the *General Health Questionnaire* (GHQ) (12 studies), the *Mean Absenteeism Figures* (10 studies) and the *State-Trait Anxiety Inventory* (STAI) (5 studies). Except for the first instrument, the remaining three scales have a satisfactory validity and high reliability, with the Cronbach's α 0.76–0.90 for the MBI, 0.82–0.86 for GHQ and 0.86 for STAI. Many scales and inventories were used for a particular study's purposes, and their psychometric characteristics were not reported.

Global quality assessment of intervention studies

Methodological quality of studies included in the review was evaluated on a 3-point rating scale (from 0 to 2) using two criteria, namely, whether the study controlled for the interaction between:

(1) intervention (program implementation) and time;
(2) intervention and independent variables other than time, e.g. demographic variables, research settings characteristics, etc. (covariates).

Ad (1). High quality—the highest score (two points) was allotted to publications in which the intervention × time interaction was directly controlled for in the study design, i.e. the experimental and control groups were compared not in terms of raw scores, but differences between their PRE and POST scores; or multivariate analyses of variance (ANOVA/MANOVA) were used where the time variable was introduced into the model as a qualitative factor; or multivariate analyses of covariance (ANCOVA/MANCOVA) were performed, where the baseline PRE scores were assumed as covariant variables of the POST scores.

Moderate quality (1 point)—was assigned to studies in which the intervention × time interaction effect was not measured directly, i.e.

differences between the experimental and control groups' PRE and POST scores were assessed using simple unidimensional tests (e.g. Student's *t*-test for independent samples, univariate ANOVA etc.).

Low quality rating (0 points)—if the intervention × time interaction effect was not controlled, i.e. not even simple tests were performed to account for the time factor.

Ad (2). The same scoring procedure using a 3-point rating scale (from 0 to 2) was applied to assess the degree of accounting for the interaction effect between the intervention (program implementation) and covariates other than time.

Summarizing, the aggregate rating scale for both criteria ranged from four points (high quality, i.e. the highest score on both criteria), through three (moderate quality), two (low quality) to one point (very low quality, with score 0 for the covariate criterion; Table 4) .

A total of 18 high quality intervention studies were identified. E.g. Galinksy *et al.* (2000) found that supplementary rest breaks when compared with a conventional breaks schedule improved data-entry operators' comfort of work, also in terms of mood states . In the study by Iwi *et al.* (1998) counseling sessions provided to employees facing organizational change had no significant effect on their GHQ symptomatology and occupational stress indicator, but were rated as most helpful Maes *et al.* (1998) in their 'Healthier Work in Brabantia' project combined interventions aiming at healthier lifestyles and changes in working conditions—the program brought stable enhancement of employees' health, some aspects of wellness and a reduction in absenteeism Van Weert *et al.* (2005) implemented a new care model (snoezelen, or multisensory stimulation, MSS), for nursing home residents with dementia. The program improved the quality of working life for dementia caregivers (nurses) reducing their emotional exhaustion and job stress and increasing overall job satisfaction. Zołnierczyk-Zreda (Zołnierczyk-Zreda, 2002) in her worksite stress management intervention attained a significant improvement of white-collar bank workers' coping styles: and increment in problem-oriented coping and seeking social contacts, but a reduction in negative emotion-oriented coping only in those with high negative affectivity levels.

High and moderate quality studies were taken into account in the assessment of intervention efficacy. The efficacy ratio was calculated as the proportion of significantly improved dependent variables to the total number of variables measured in a particular study.

As can be seen in Table 5, the highest efficacy ratios (over 0.70) were attained in studies aiming to reduce stress and absenteeism levels, while intervention efficacy was definitely lower regarding job satisfaction improvement and mental health enhancement (both ratios below 0.50). Stress reduction (coping improvement) interventions seem to be better known, more evident, and easier to implement than those aimed at increasing employees' job satisfaction.

Examples of effective interventions

The original aim of the review was to determine the most effective approach. However, due to the heterogeneity of the studies as well as their methodological limitations, the results of our analyses are inconclusive. In consequence, only exemplification of promising studies in particular categories is presented.

Among the high quality studies one study reporting significant intervention effects, and showing the highest proportion of significantly improved dependent variables to the total number of variables measured was identified in

Table 4: Distribution (number and percentage) of intervention studies by their quality rating and aims/outcome type

Intervention study aims/outcome type	Quality category			
	High *n* (%)	Moderate *n* (%)	Low & very low *n* (%)	Missing data *n* (%)
Stress reduction/better coping ($n = 29$)	2 (7)	7 (24)	16 (55)	4 (14)
Mental health enhancement ($n = 13$)	7 (54)	1 (8)	5 (38)	—
Job satisfaction improvement ($n = 14$)	3 (21)	5 (36)	6 (43)	—
Job effectiveness improvement ($n = 18$)	4 (22)	9 (50)	5 (38)	—
Absenteeism reduction ($n = 5$)	2 (40)	2 (40)	—	1 (20)

Table 5: Ratio of variables indicating significant post-intervention positive improvement to all dependent variables in high and moderate quality studies by outcome type (intervention study aims)

High quality intervention studies ($n = 18$) by their aims/outcome type	Dependent variables under study (n)	Dependent variables showing significant effect of intervention (n)	Ratio of the significantly improved to all dependent variables
Stress reduction/better coping ($n = 2$)	11	8	0.73
Mental health enhancement ($n = 7$)	43	17	0.40
Job satisfaction improvement ($n = 3$)	35	6	0.17
Job effectiveness improvement ($n = 4$)	51	30	0.58
Absenteeism reduction ($n = 2$)	11	8	0.73

each of the five groups of aims. As a result, five most effective interventions were indicated (within each of the five groups). Their content, measures used and findings are briefly described below.

Stress reduction

In the study by Nielsen *et al.* (2006) concerning participatory approach the intervention aim was to change the attitudes of the participants (canteen staff in hospitals or care homes for the elderly) so as to make them confident about undertaking health-promoting initiatives and taking responsibility for competencies shared both by the individual and worksite. To identify specific issues, a thorough assessment of mental health risks was conducted. Subsequently, working groups were established to develop initiatives based on the risk assessment results. While the main aims of the initiatives were the same in both groups, their translation into interventions differed.

Two experimental groups and two control groups participated in the study. The following outcome variables were analyzed: stress symptoms, social support, job satisfaction, opportunities for personal development and vitality. The intervention was successful in one of the experimental groups, where all the variables but one (social support) improved significantly, while in the other group significant improvement was attained only in stress and vitality symptoms. However, organizational structure of the latter workplace turned out not to allow for more changes, and besides, major conflicts among employees at the time of the study might have affected the participants' commitment and in consequence—the intervention outcome.

Implementation of this intervention suggests that the workplace organizational structure may significantly facilitate or hinder proposed modifications (a ceiling effect is possible; at a certain level organizations may benefit less from interventions). Moreover, the study design should account for contextual factors, e.g. a directive consultancy style that proved appropriate for these participants, might be unacceptable for employees more experienced in organizational development.

Mental health improvement

In the *Worksite health promotion program* implemented by Peters and Carlson (1999) , the participants (primarily minority blue-collar employees) received a multimodal intervention: stress management training, educational workshops and counseling and self-directed behavior change. Stress management techniques included relaxation and meditation. Group intervention sessions had the following format: (i) discussion of previous goals; review of behavioral contracts; group feedback/reinforcement; (ii) relaxation exercises; (iii) a review of educational presentations; (iv) discussion and questions; (v) revised goal setting and behavioral contracting.

The process of self-directed behavior change consisted of educating and training individuals in self-modification techniques. The sessions focused on self-regulation techniques such as selecting target behaviors for change, making a plan for change (contracting), observing and monitoring behavior, evaluating and modifying plans and maintaining positive behavior changes. Such techniques as encouraging self-

disclosure, providing positive feedback and enhancing self-efficacy beliefs were also utilized.

A number of measures were analyzed, but positive intervention effects were found in about a half of the variables, including health risk, health self-efficacy, curiosity, depression, lack of social support, positive environment, intention to make changes, access to health care and health behavior. Further favorable outcomes were that most employees at the worksite were interested in the program participation; it was very favorably evaluated at the project completion and would be recommended to other workers. This suggests that the authors' sensitivity to and efforts to account for these workers' ethnic and socioeconomic status in the program were effective.

Increased job satisfaction

The *Social Motivational Training* (SMT) by (Dupuis and Struthers, 2007) is rooted in social cognitive theoretical frameworks. Its first component is concerned with increasing participants' awareness of people's tendency to make spontaneous attributions: an example of the spontaneous attribution phenomenon is provided, and the participants (working senior undergraduate university students) are asked to think about and elaborate on a situation in which they had behaved similarly. The second component is meta-cognition: participants are instructed to think about how one makes attributions and about the influence of these attributions on one's judgments, affect and behaviors. In the third SMT component, the participants are asked to apply mental simulation: they were to imagine themselves in a scenario where a coworker commits a transgression, generate possible causes of the transgression and then consider their effect.

Cognitive, affective and behavioral responses to an imaginary character were measured. The intervention impact was positive for all outcome variables: expectation, responsibility, intentionality, anger, sympathy, readiness to cooperate, recommend to coworkers, warn others and report to a supervisor. The most important finding of this study was the change in the participants' social motivation, i.e. an increase in their prosocial and decrease in antisocial evaluations of and interaction with the perceived transgressor. The cognition, affect and behavior changes show that the intervention was pervasive and successful in bringing the participants closer to a prosocial co-worker profile.

Job effectiveness improvement

In the program of employee problem-solving teams (ACTion Team) implemented by Park *et al*. (2004) an assumption was made that to improve employees' health and well-being as well as their job effectiveness a mutual relationship should be created between the store employees (majority and minority groups) and the management The teams were to develop, implement and evaluate a tailored action plan addressing the identified worksite problems. The ACTion team plans were developed using a five-step problem-solving process: familiarization, skill building, prioritization, action and reaction.

In the reaction phase, the ACTion team reviewed the plan, monitored progress and communicated with each other and the rest of the store's employees concerning what steps were being taken to refine and adjust the overall action plan. The teams also focused on improvements related to coworker support and recognition.

The following measures were analyzed: organizational climate, co-worker and organizational support, communication, safety and health climate, well-being, job stress and health status. Except for safety and health climate all the organizational climate and well-being variables were positively affected by the intervention. The intervention effects were greater for the ethnic minority than for the majority groups. The findings suggest that interventions fostering communication, shared goals and active problem-solving can be useful in attaining workforce diverse goals.

The results also suggest that organizational climate may play a mediating role in producing these effects. It is worth noting that the positive intervention effects were not limited to employees who had directly participated in the process.

Absenteeism reduction

The Stress Management Training implemented by Murphy and Sorenson (1988) in a municipal highway maintenance department included two types of methods.

Biofeedback: Forehead muscle activity and hand temperature were recorded at the start and end

of each session using a microprocessor-based recording system. Subjective reports of mental health, somatic complaints, sleep disturbances, alcohol and cigarette use and tension levels were also obtained. Workers in the biofeedback group received continuous audio feedback of forehead electromyographic activity.

Muscle relaxation: Workers in the muscle relaxation group listened to a series of cassette tapes containing muscle tension and relaxation exercises.

Three months after the last training session, each worker returned to the training room for one session. They were instructed to become as relaxed as possible, using skills they had learned previously. Psychophysiological and subjective measures (mental health, somatic complaints, sleep disturbances, alcohol and cigarette use and tension levels) were taken during training. Data on absenteeism were also collected.

Workers who received muscle relaxation (but not biofeedback) training had significantly lower absenteeism and higher attendance ratings in the year immediately following training relative to non-volunteers. Beyond the first post-training year, these differences were not evident.

As a primary strategy to reduce employee stress at work, stress management has significant limitations since no attempt is made to alter the sources of work stress.

Summarizing, findings of the five most effective intervention studies seem interesting. It should be noted that regardless of the intervention level (individual or organizational) the role of the organization and its structure in facilitating changes was emphasized by four out of the five authors. Murphy and Sorenson (1988) even conclude that stress management may be only an adjunct to organizational changes as it is crucial to remove the source of stress in the first place. An organizational change was the intervention goal in only one of these successful studies, and a positive outcome was achieved in only one of the two study groups. This illustrates how difficult it is to successfully influence working conditions.

CONCLUDING REMARKS

Although the five groups of intervention aims identified in this review (stress reduction/better coping; mental health improvement, increased job satisfaction, job effectiveness improvement and absenteeism reduction) differ considerably from each other, the same intervention approach could be used to attain various goals: e.g. skills training was the most common intervention category used for stress reduction, increasing job satisfaction and improving mental health. In turn, many different intervention approaches were implemented to achieve the same goal (e.g. stress reduction was the aim of 22 various interventions).

Only few programs were implemented and evaluated in two or more studies, including the *Stress Inoculation Training* developed by Meichenbaum (1985) and used by Cecil and Forman (1990), *Dual Cognitive Self-Instructional Procedure* (Payne and Manning, 1990), *Resource Intervention* and *Single Resource Intervention* (Freedy and Hobfoll, 1994), *The Basic Stress Management Course* (Roger and Hudson, 1995), *Short-term Participatory Intervention* (Mikkelsen *et al.*, 2000; Mikkelsen and Gundersen, 2003) and *Psychological Training Program* (Razavi *et al.*, 1988, 1991, 1993). Less than a half of the reviewed interventions were theory-driven.

In 79 studies included in the DataPrev review, 99 different outcome variables were investigated using 169 measures, while only 19 were used in more than one study. Among the most popular were the *Mean Absenteeism Figures*, the *Maslach Burnout Inventory*, the GHQ and the STAI. A majority of the variables were measured with many different methods, i.e. rating scales, life data and physiologic measures—mostly without psychometric standardization.

Methodological limitations of the studies are another source of difficulty in comparing interventions. The number of participants varied significantly across studies, ranging from as few as 20 to 2207 participants. In approximately 20% of the reviewed studies, the samples were small (<50 participants). In cases where the reported differences only approached the significance level, this lack of statistical significance might be due to a small sample size. Similarly, the duration of particular interventions was diverse, with workshops taking less than a day and multicomponent trainings scheduled from 3 to over 12 months. In almost a half of the studies (32) either the follow-up period was very short (<12 weeks) or only a directly post-intervention

assessment was made, while an at least 3-month follow-up period is recommended.

In high or moderate quality studies interventions had a positive effect on about a half of the outcome variables regarding better coping with stress, increased job satisfaction and burnout reduction, with the best results achieved in absenteeism reduction, while the least positive effect was obtained on co-worker and/or supervisor support measured in 16 studies, but found to be enhanced only in 4.

The most promising program seems to be the *Stress Inoculation Training* (Cecil and Forman, 1990) based on Meichenbaum's model and adapted to stress management training with teachers. The following major topics were covered in each session: discussion of definitions and sources of stress, relaxation, introduction to rational restructuring based on the Ellis model of emotions, application of coping skills and development of additional stress scripts.

Contextual factors seem important for the intervention success. Target group characteristics (e.g. socio-economic status or a minority group membership) should be carefully analyzed and intervention activities tailored to the participants' needs and possibilities.

Regardless of the intervention level (individual or organizational) the role of the organization and its structure as a primary source of stress was emphasized by most authors. However, it turned out to be difficult to influence working conditions: organizational changes were seldom the intervention goal, and a positive outcome was seldom reported. An impressive exception was the Brabantia Project (Maes *et al*. 1998), a 3-year wellness-health intervention targeted to blue-collar workers, which included lifestyle counseling sessions and work analyses as well as considerable organizational changes implemented with the workers' participation. A significant stable enhancement of the workers' autonomy and control feelings was accompanied by a significant reduction in absenteeism (which seems to be a valid indirect measure of good mental health). However, no significant post-intervention change was found using the SCL-90 scale screening for psychopathological symptoms. The study suggests that the traditional instruments assessing ill mental health (such as SCL-90 or GHQ) may not be sensitive enough to measure workplace mental health improvement and that perhaps other dimensions should be developed and evaluated.

This may partially explain why our review of mental health promotion programs provided no conclusive evidence of their effectiveness. There is a need for the development of indicators and appropriate measures of positive mental health. To identify effective interventions, besides better methodological standards, new programs and new evaluation dimensions should be developed and implemented.

SUPPLEMENTARY MATERIAL

Supplementary material is available online at Neuro-Oncology (http://neuro-oncology.oxfordjournals.org/).

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Psychosocial interventions for the promotion of mental health and the prevention of depression among older adults

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SUMMARY

The aim of this review was to assess the effectiveness of psychosocial interventions for the promotion of mental health and prevention of depression among older people. A systematic review of prospective controlled trials was conducted including 69 studies. The studies were divided into physical exercise, skill training, reminiscence, social activities, group support and multicomponent interventions. Data from 44 trials contributed to a meta-analysis of effectiveness. Overall, psychosocial interventions had a positive effect on quality of life and positive mental health. The pooled interventions also had a statistically significant effect on reduction in depressive symptoms. Social activities significantly improved positive mental health, life satisfaction and quality of life and reduced depressive symptoms. Based on the results of this study, duration of interventions is of importance, since interventions lasting for >3 months exhibited more positive effects compared with shorter interventions. Meaningful social activities, tailored to the older individual's abilities and preferences should be considered in aiming to improve mental health among older people.

Key words: mental health; older people; psychosocial interventions; systematic review

INTRODUCTION

The interdisciplinary concept of mental health promotion can be viewed from different perspectives (Cattan and Tilford, 2006; Barry and Jenkins, 2007). On one hand, it can be exclusively regarded as the promotion of positive mental health aiming to achieve positive mental health by improving the social, physical and economic environments that determine mental health. On the other hand, it is seen as primary, secondary or tertiary prevention of mental ill-health with the main focus to decrease the occurrence, prevalence and re-occurrence of mental disorders (World Health Organization, 2004). In this case, it primarily targets risk factors for mental ill-health. Finally, the mental health promotion concept can be defined as encompassing both positive mental health promotion and disorder prevention (Jané-Llopis *et al*., 2010), and this definition is used as the theoretical framework in this review.

Demographic changes in the EU (Giannakouris, 2008) imply that good mental

health among older people is increasingly important, enabling older adults to stay active for longer (Jané-Llopis and Gabilondo, 2008). Mental disorders are highly prevalent among older people, with depressive disorders being among the most prevalent (de Beurs *et al.*, 2005; Luijendijk *et al.*, 2008; World Health Organization, 2008). It is estimated that ~12% of adults aged 65 or older are currently affected by depressive disorders in Europe (Copeland *et al.*, 1999, 2004). Therefore, in accordance with the theoretical framework in this review prevention of depression among older adults can be viewed as an important part of the mental health promotion concept.

Individual psychological resources, such as self-esteem (Bisschop *et al.*, 2004) and mastery (de Beurs *et al.*, 2005; Steunenberg *et al.*, 2006), are important mental health resources in old age that can prevent the onset of mental ill-health such as depressive symptoms. Another significant mental health promoting factor among older adults is the individuals' social network and perceived sense of social support and trust, which can be gathered under the umbrella term social capital (Baron *et al.*, 2000). Social capital of older adults is an essential mental health resource, but low levels of social capital should also be regarded as a risk factor for depressive disorders in older people (Van Der Horst and McLaren, 2005; Nyqvist *et al.*, 2006). Restricted social support (Lynch *et al.*, 1999; Jongenelis *et al.*, 2004), a limited social network (Steunenberg *et al.*, 2006) and loneliness are associated with depressive symptoms and depression (Bisschop *et al.*, 2004; Jongenelis *et al.*, 2004).

Previous reviews have studied the effects of interventions addressing social isolation and loneliness (Findlay, 2003; Cattan *et al.*, 2005; Masi *et al.*, 2010), and have shown reduced loneliness among intervention participants. However, these reviews included all age groups (Masi *et al.*, 2010) or encompassed younger old people (Findlay, 2003; Cattan *et al.*, 2005) than the current review. A meta-analysis including both controlled and uncontrolled trials (Masi *et al.*, 2010) showed significant effects on loneliness with social cognitive training interventions displaying the largest effect. Another review and meta-analysis of controlled trials (randomized and non-randomized), which looked at intervention programs aiming to reduce depression, addressed all age groups (Jané-Llopis *et al.*, 2003). This meta-analysis found social support interventions to be the most-effective among older adults.

One review (Windle *et al.*, 2007) assessed public health interventions (including both non-randomized and uncontrolled trials) that promoted mental well-being among adults aged 65 or over. This review evidenced positive effects of some types of psychosocial interventions such as exercise interventions, group-based health promotion and various psychological interventions. Like Windle *et al.*'s review (Windle *et al.*, 2007), our review looks at a variety of psychosocial interventions, but in contrast to Windle *et al* we exclude non-controlled trials due to the risk of bias inherent in non-controlled designs. To the authors' knowledge, no meta-analyses of controlled trials of psychosocial interventions aimed at promoting mental-health and preventing depression among older people have been performed, targeting specifically people aged 65 years or older not suffering from clinical depression or other mental disorders.

OBJECTIVES

The objective was to conduct a systematic review and meta-analysis assessing the effectiveness of psychosocial interventions for mental health promotion and depression prevention among older people.

METHOD

Inclusion criteria for the trials considered in the review

Types of studies

Only studies with a controlled design (randomized controlled or non-randomized controlled trials) were considered for the systematic review.

Types of participants

Older adults (population defined as people aged 65 and older) who did not meet diagnostic criteria for any mental disorder (e.g. dementia) at the time of trial enrolment were considered for the review. This included studies targeting the general population of older adults, studies with participants who might have been at risk

of a depressive disorder, or those who suffered from sub-clinical symptoms of a depressive disorder but who did not fulfil the diagnostic criteria for the disorder (according to The *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition or The *International Classification of Diseases*, 10th edition).

Studies were considered even if the participant age range began under 65, if the mean age of the participants was notably over 65 (i.e. 70 or over), or if outcome data were extractable separately for participants over the age of 65. There was no upper age limit. Studies that did not include a clear definition of participants or lacked adequate reporting of participant data at enrolment were excluded from the review.

Types of interventions

This review and meta-analysis includes psychosocial interventions for prevention of depression onset and promotion of mental health among older people. Interventions aiming at prevention of depression progression and treatment of depression were excluded.

Psychosocial interventions were defined as any intervention that emphasizes psychological or social factors rather than biological factors (Ruddy and House, 2005). This definition allows for the inclusion of psychological interventions and health education, as well as interventions with a focus on social aspects, such as social support. Interventions with a physiological component in addition to a psychosocial component (e.g. physical exercise groups) were also considered. The psychosocial interventions could appear in any format, e.g. in groups or individually, as long as they were described in the study and allowed for replication. Interventions with organization of care as the main focus were not considered for this review.

To be considered for this review, trials needed to report a general positive mental health indicator, depressive symptoms or depression as a measured outcome. Furthermore, to be eligible trials had to encompass a control condition: either care as usual, waiting list, no intervention or a comparison intervention control group. Intervention comparisons were eligible if the compared interventions were not too similar. The trial settings considered were both institutions and community settings.

Types of outcome measures

The outcome measures considered in the review were as follows:

(i) Functional level: e.g. various Activities of Daily Living measures and Barthel Index (Mahoney and Barthel, 1965).
(ii) Quality of life: e.g. Short Form-36 Health Survey (Hays *et al*., 1993).
(iii) Life satisfaction: e.g. Satisfaction with Life Scale (Diener *et al*., 1985), Life Satisfaction Index-A (Neugarten *et al*., 1961).
(iv) Cost-effectiveness of the interventions: e.g. financial cost comparisons.
(v) Acceptability of intervention: total attrition rates or attrition due to adverse effects.
(vi) Risk factors of depressive symptoms and depressive disorders and mental health promoting factors:
  (a) Positive mental health, e.g. the Philadelphia Geriatric Morale Scale (Lawton, 1975), including self-esteem, e.g. Rosenberg Self Esteem Scale (Rosenberg, 1965) and self-efficacy, measured by the General Self-efficacy Scale (Schwarzer and Jerusalem, 1995).
  (b) Social capital: social network, e.g. UCLA Loneliness Scale (Russell, 1996) and social support, e.g. Social Support Questionnaire (Sarason *et al*, 1983).
(vii) The occurrence of depressive symptoms, as measured by depression rating scales, such as the Geriatric Depression Scale (Brink *et al*., 1982) and Zung Self-Rating Depression Scale (Zung, 1965).
(viii) Incidence of major depression as defined by DSM-IV or ICD-10, or diagnostic cut-off points on depression rating scales.

The outcomes were recorded immediately after the intervention or at end of follow-up.

Searches

Eleven electronic databases were searched (AgeLine, ASSIA, CENTRAL, Cinahl, Embase, Medline, OpenSIGLE, Sociological Abstracts, Social Services Abstracts, PsycINFO, and Web of Science, see Supplementary data and Appendix for detailed search strategies) for eligible studies. No language or time-frame limitations were applied. With guidance from informatics experts, search strategies were

constructed for each of the electronic databases and applied in September 2010. Hand-searching of two journals (*the Gerontologist* and *Journal of the American Geriatrics Society*) that provided most articles during searches of electronic databases was conducted, covering issues published from 2006 to 2010.

Data abstraction and assessment of methodological quality

All abstracts of the publications retrieved from the databases were screened for inclusion by the first and second author independently. Full text versions of the publications were screened if needed. If there was disagreement between the reviewers, a third reviewer assessed the study and consensus was reached by discussion. Available data were extracted and coded independently by the first and the second author according to information on study design and origin, study participants, intervention content and outcomes measured.

The methodological quality of the included intervention studies was assessed and rated according to the Cochrane Collaboration Handbook. The studies were rated by taking six individual domains into consideration (sequence generation; allocation concealment; blinding of participants, personnel and outcome assessors; incomplete outcome data; selective outcome reporting; other sources of bias) and giving them a quality rating of 'low risk of bias', 'unclear' or 'high risk of bias'.

Calculation of effect sizes and statistical analyses

The effect sizes of the trials were calculated by Review Manager 5.0 software (Nordic Cochrane Centre, 2008) for the studied outcomes. Data from all the publications providing eligible post-test or follow-up data were entered into the Review Manager by the principal reviewer and duplicated by the second author separately. For binary efficacy outcomes (e.g. cases of depression), the Mantel-Haenszel random effects model for calculating odds ratio (OR) was applied. For continuously distributed outcomes, the weighted mean difference (WMD) or standardized mean difference (SMD) were calculated as appropriate using a random effects model. SMD was calculated when outcomes had been measured using different scoring systems. Where intention-to-treat (ITT) data were not available, endpoint continuous data for trial completers were used. If measures of variance of outcomes could not be found in the publications, through calculations or by contacting the authors, the outcome was excluded from the meta-analysis. Substantially skewed data (where the standard deviation was greater than double the mean value) were not entered in the meta-analysis.

The impact of statistical heterogeneity on the meta-analysis was assessed by quantifying inconsistency among the studies with the I^2 Index test (Higgins and Green, 2008). Between-group effect size heterogeneity in outcome measures was examined using the Q statistics of the meta-analytic analogue to analysis of variance (ANOVA) (Lipsey and Wilson, 2001). The power of all subgroup analyses was determined. Sample size and effect size data were entered into the G*Power 3.1.2 software (Faul *et al.*, 2007), where *post hoc* analyses of achieved power were calculated (Ellis, 2010). Underpowered comparisons (i.e. power below 0.80) were not performed.

Trials where one intervention was compared with another were only included in the meta-analysis if the control intervention fitted into one of the intervention categories considered.

Sensitivity analyses were conducted for randomized trials only.

RESULTS

Trial flow

The searches yielded 5023 hits (including duplicates from different databases). By screening the retrieved titles and abstracts according to the inclusion criteria, the number of publications was reduced to 949 and following a thorough examination, the final number of included studies was narrowed to 69 (Figure 1). The main reasons for exclusion of the retrieved publications were that trial participants already suffered from a mental disorder at baseline or that the participants' age did not meet the inclusion criteria. Forty-four trials contributed with data to efficacy estimates in the meta-analysis.

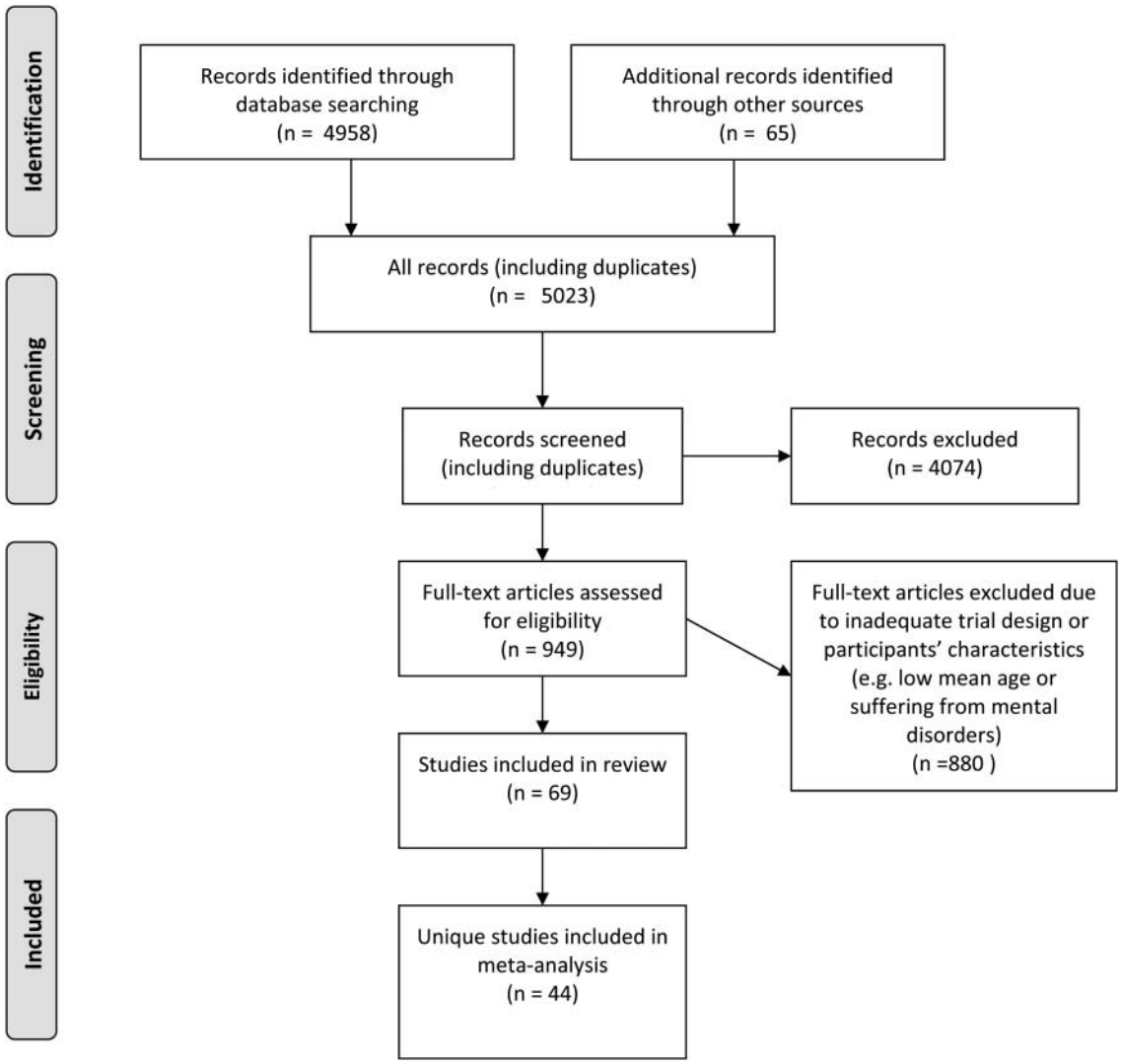

Fig. 1: PRISMA 2009 flow diagram. *Source*: Moher, Liberati, Tetzlaff, Altman, and The PRISMA Group (2009).

Study characteristics

The mean age of the pooled trial participants was 78 years. In studies reporting gender proportions the majority of participants were women. The participants of 15 trials lived in nursing homes or other institutions and 32 trials included older adults who lived independently, in senior communities or who received home health services. Twenty-two of the studies did not clearly state the living situation of the participants.

Out of the 69 included studies, 13 were non-randomized controlled studies. The other 56 studies had a randomized controlled design. Seventeen of the trials were implemented in Europe and the 52 remaining trials were non-European, the majority being studies from the USA.

Three types of intervention approaches (World Health Organization, 2004) were distinguished among the trials: mental health promotion or universal prevention (e.g. general health education) targeting healthy older adults and aiming to enhance mental health and active aging (34 trials); selective prevention, targeting older people in high-risk groups not suffering

from depression or other mental disorders (32 trials) and indicated prevention directed at people with sub-clinical symptoms of depression (3 trials).

With the exception of one trial (Yuen *et al*., 2008) all interventions were provided by health or social care professionals or other trained personnel. In Yuen *et al*'s 2008 study the intervention involved the older participants themselves participating in a volunteer activity (mentoring English conversational skills to English-as-a-second-language students). Besides this intervention study, none of the interventions was reportedly provided by lay people alone.

The interventions included were categorized into one of the following six groups (Table 1):

Physical exercise

The group of physical exercise interventions involved individual or group physical exercise of various kinds. Twenty-one of the trials were categorized into this group and nine out of these were included in the meta-analysis measuring the effect size of physical exercise compared with no-intervention controls. Six exercise interventions were compared with another intervention; three of these trials compared an exercise intervention to a skill training intervention and were included in the meta-analysis (Wolf *et al*., 1996; Stiggelbout *et al*., 2004; MacFarlane *et al*., 2005).

Skill training

The skill training category contained interventions with educational components or with the aim of developing cognitive skills or everyday life management strategies. This category consisted of 12 trials, out of which 10 were included in the meta-analysis, all comparing skill training with no intervention control conditions.

Group support

Social support in groups was considered within the group support category and only one trial was included in this category (Andersson, 1984). This trial compared the social support intervention to a no-intervention control group but no eligible data were available for other outcomes than attrition rate.

Table 1: Effect sizes (95% CI) for psychosocial interventions compared with no intervention

Type of intervention	Number of participants in comparison (depression/quality of life/functional level/positive mental health/life satisfaction)	Depression	Quality of life	Functional level	Positive mental health	Life satisfaction
Physical exercise	237/296/53/185/0	−0.10 (−0.36 to 0.16)	−0.33 (−0.83 to 0.17)	−2.40 (−8.16 to 3.36)	0.03 (−0.67 to 0.73)	Not estimable
Skill training	318/72/0/64/0	−0.12 (−0.56 to 0.32)	−0.28 (−0.76 to 0.20)	Not estimable	**−0.55 (−1.07 to −0.04)**	Not estimable
Reminiscence	145/18/35/44/126	−0.24 (−0.62 to 0.13)	−0.01 (−7.50 to 7.48)	0.03 (−5.35 to 5.41)	−0.47 (−1.34 to 0.40)	−1.08 (−2.70 to 0.53)
Social activities	167/178/0/141/26	**−0.41 (−0.72 to −0.10)**	**−6.40 (−10.38 to −2.42)**	Not estimable	**−1.02 (−2.02 to −0.02)**	**−5.30 (−10.34 to −0.26)**
Multicomponent	387/756/62/120/124	−0.16 (−0.41 to 0.10)	−0.09 (−0.24 to 0.06)	−1.30 (−2.86 to 0.26)	−0.12 (−0.75 to 0.51)	**−1.40 (−1.65 to −1.15)**
Heterogeneity (Q_b)		$Q_b = 5.50$, $p > 0.05$	$Q_b = 5.94$, $p > 0.05$	$Q_b = 0.89$, $p > 0.05$	$Q_b = 3.43$, $p > 0.05$	**$Q_b = 39.51$, $p < 0.001$**
Any type of psychosocial intervention	1254/1320/150/554/276	**−0.17 (−0.31 to −0.03)**	**−0.19 (−0.34 to −0.05)**	−0.26 (−0.60 to 0.07)	**−0.24 (−0.47 to −0.00)**	−0.64 (−1.52 to 0.23)

The effect sizes for social capital and cost outcomes were not estimable for most of the intervention categories and are therefore not presented in the table. A significant Q_b indicates that differences in effect between intervention categories are significant. Statistically significant estimates are marked in bold.

Reminiscence

Eight trials contained various forms of life reviewing and recalling past events and were classified as reminiscence interventions. Seven trials were included in the meta-analysis, all of which featured intervention versus no-intervention control category.

Social activities

Different types of social activities providing the participants with an active role were allocated to the group of social activity interventions. Out of six trials, four were included in the meta-analysis, all comparing social activities to no intervention.

Multicomponent interventions

Twenty-one of the trials contained components from several intervention categories and these were classified as multicomponent interventions. Ten of these studies were included in the meta-analysis for multicomponent interventions versus no-intervention comparisons.

Methodological quality of the intervention studies

In most cases, several domains of the trials' methodological quality were rated as unclear, due to scarce reporting. Eleven of the studies were rated as having low risk of bias in relation to the sequence generation domain. Fourteen studies had a low risk of bias in blinding. However, eight of the included trials evidenced clear cases of selective reporting. Thirty-six studies were rated as having a high risk of bias related to other domains.

Efficacy: psychosocial interventions compared with no-intervention controls

Compared with no-intervention controls, an overall small statistically significant improvement was found for quality of life (14 trials, SMD: −0.19, 95% CI: −0.34 to −0.05) (Figure 2) and the overall heterogeneity was at an acceptable level ($I^2 = 36\%$). Positive mental health also showed a small statistically significant improvement (nine trials, −0.24, 95% CI: −0.47 to −0.00) (Figure 3), and the overall inconsistency was at an acceptable level ($I^2 = 40\%$). In the pooled analysis comparing to no-intervention controls, psychosocial interventions had a weak but statistically significant effect on depressive symptoms (17 trials, SMD: −0.17, 95% CI: −0.31 to −0.03) (Figure 4). The overall heterogeneity for effects on depressive symptoms was low ($I^2 = 25\%$).

The pooled results for the dichotomous depression outcome indicated no statistically significant reduction in new depression cases (three trials, OR: 0.69, 95% CI: 0.41–1.17). The overall functional ability outcome showed no statistically significant improvement (three trials, SMD: −0.26, 95% CI: −0.60 to 0.07) and no statistically significant effect was found for the social capital outcome (two trials, SMD: −0.16, 95% CI: −1.00 to 0.68), the cost-effectiveness outcome (one trial, mean difference €532.00, 95% CI: −0.53 to 1064.53) or the life satisfaction outcome (five trials, SMD: −0.64, 95% CI: −1.52 to 0.23).

When analysing types of interventions separately, physical exercise interventions showed no statistically significant pooled effects on the depression outcome (three trials, SMD: −0.10, 95% CI: −0.36 to 0.16), quality of life (four trials, SMD: −0.33, 95% CI: −0.83 to 0.17) or functional level (one trial, mean difference: −2.40, 95% CI: −8.16 to 3.36). The achieved power in the positive mental health outcome analysis was inadequate (power = 0.09) for effect analysis. No eligible data were available for life satisfaction, costs and dichotomous depression outcomes. In a single trial, a statistically significant social capital benefit, i.e. improved social support network, was reported (one trial, mean difference: −0.22, 95% CI: −0.34 to −0.10). The intervention in this trial (Lee *et al.*, 2009) consisted of a 26-week Tai Chi program with 1-hour sessions three times a week.

Among the skill training interventions, a statistically significant effect could be found on the positive mental health outcome (two trials, SMD: −0.55, 95% CI: −1.07 to −0.04). One of these trials (Goldstein *et al.*, 1997) consisted of playing video games, five or more hours per week for 5 weeks. The other trial (Winocur *et al.*, 2007) reported improved locus of control in a 14-week cognitive rehabilitation program involving memory skills training, goal management training, psychosocial training and individual discussions. Skill training interventions had no statistically significant effect on quality of life (two trials, SMD: −0.28, 95% CI: −0.76 to 0.20) or depressive symptoms (four trials, SMD: −0.12,

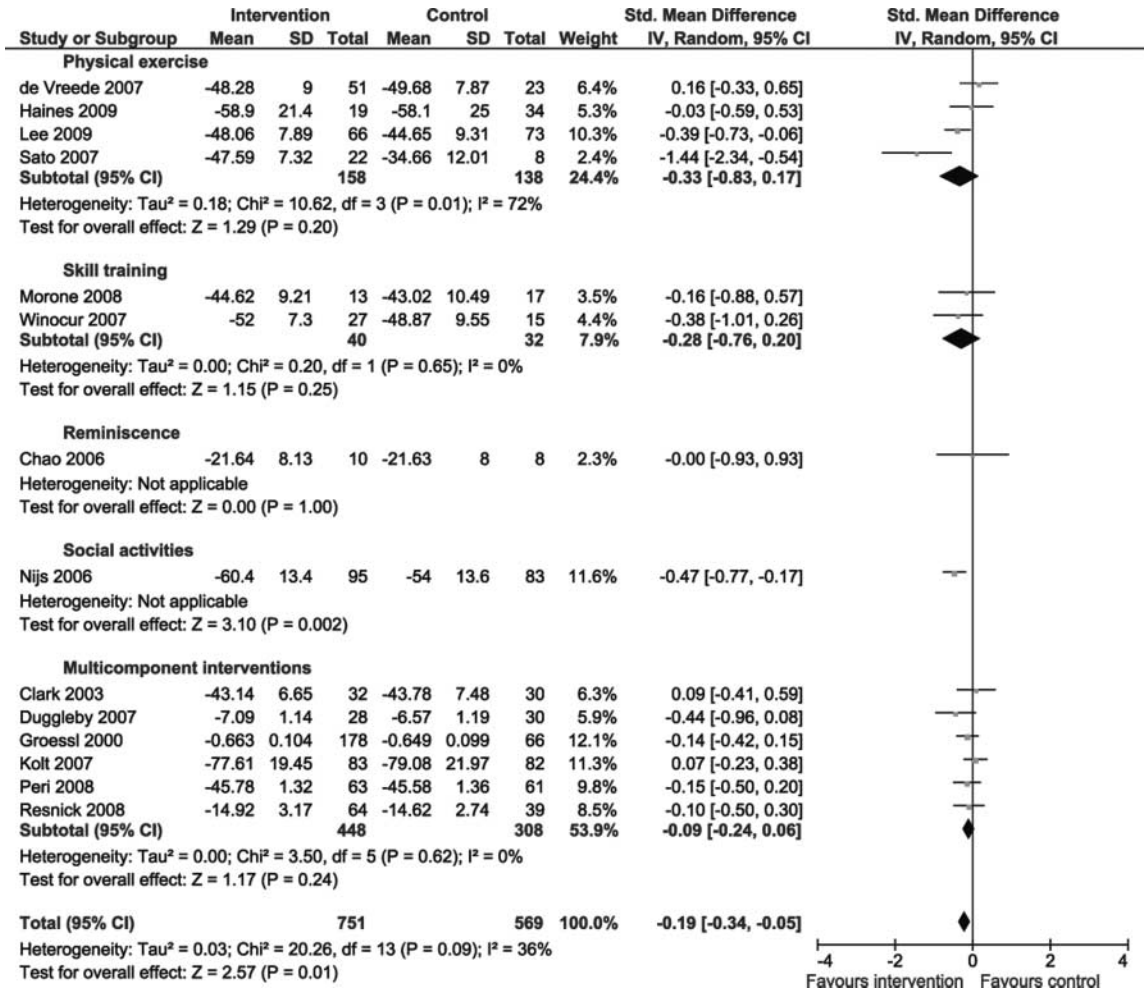

Fig. 2: Effect of psychosocial interventions versus no-intervention controls on quality of life (continuous data).

95% CI: −0.56 to 0.32). Two trials within this intervention type reported incidence of depressive disorders (dichotomous data). No statistically significant effect could be evidenced (OR: 0.84, 95% CI: 0.53 to 1.33). No useable data were available for social capital, functional level, costs or life satisfaction outcomes.

Reminiscence showed no statistically significant pooled effects in positive mental health (two trials, SMD: −0.47, 95% CI: −1.34 to 0.40) or life satisfaction (three trials, WMD: −1.08, 95% CI: −2.70 to 0.53). Reminiscence showed a statistically non-significant effect (five trials, SMD: −0.24, 95% CI: −0.62 to 0.13) on depressive symptoms. The power in the quality of life and functional level analyses (power = 0.05) was insufficient for effect analysis. The trials did not report any useable data for occurrence of depressive disorder, social capital or costs.

Compared with no intervention, social activities significantly reduced depressive symptoms among the participants (two trials, SMD: −0.41, 95% CI: −0.72 to −0.10). One study in a nursing home setting (Nijs *et al.*, 2006) where the intervention consisted of arranging family style mealtimes (e.g. mealtimes begin when everyone is seated, residents serve themselves) and the control group received the usual preplated service, resulted in a large improvement in quality of life outcome for the intervention group. The quality of life was measured with a

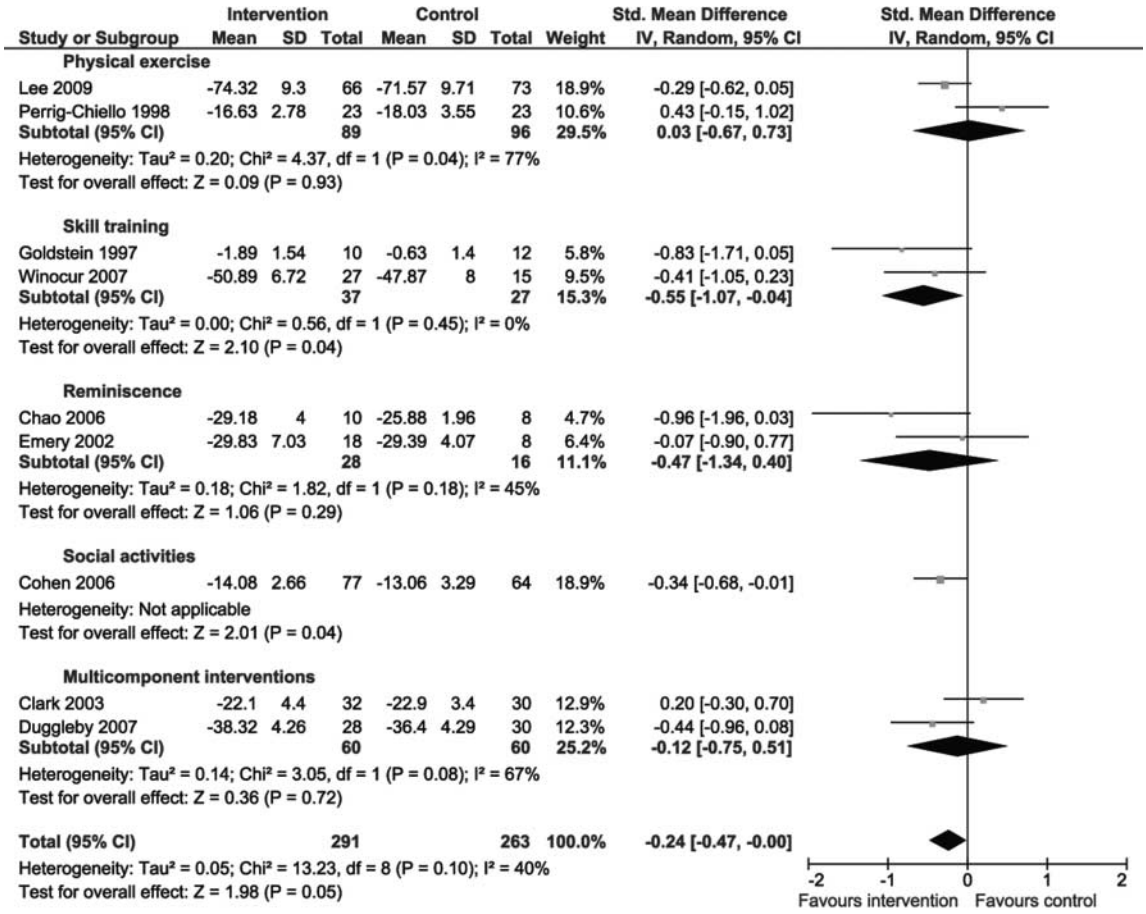

Fig. 3: Effect of psychosocial interventions versus no-intervention controls on positive mental health (continuous data).

less used scale, the Dutch Quality of Life of Somatic Nursing Home Residents Questionnaire and the finding was statistically significant (mean difference: −6.40, 95% CI: −10.38 to −2.42). One small trial (Yuen *et al*., 2008) reporting life satisfaction showed a large statistically significant improvement in the Life Satisfaction Index-A among participants with a role as voluntary language training mentors (mean difference: −5.30, 95% CI: −10.34 to −0.26). The participants in this psychosocial intervention tutored conversational skills to students with English as a second language. Statistically significant positive mental health benefits (mean difference: −1.02, 95% CI: −2.02 to −0.02) were reported based on the Philadelphia Geriatric Morale Scale score in a single social activity trial (Cohen *et al*., 2006). This intervention consisted of weekly singing rehearsals and several public performances in a chorale with a professional leader during the 30-week intervention period. The effect size for social capital (one trial, mean difference: 2.42, 95% CI: −0.66 to 5.50) was statistically non-significant. Functional level, occurrence of depressive disorder and costs were not measureable due to lack of eligible data.

The only multicomponent intervention reporting a life satisfaction outcome resulted in a statistically significant increase of life satisfaction for the intervention group (mean difference: −1.40, 95% CI: −1.65 to −1.15). This intervention (Peri *et al*., 2008) consisted of an individualized activity intervention based on activities of daily living over a 6-month period. One trial within this intervention category (van't Veer-Tazelaar *et al*., 2009) reported incidence of depressive disorders (dichotomous

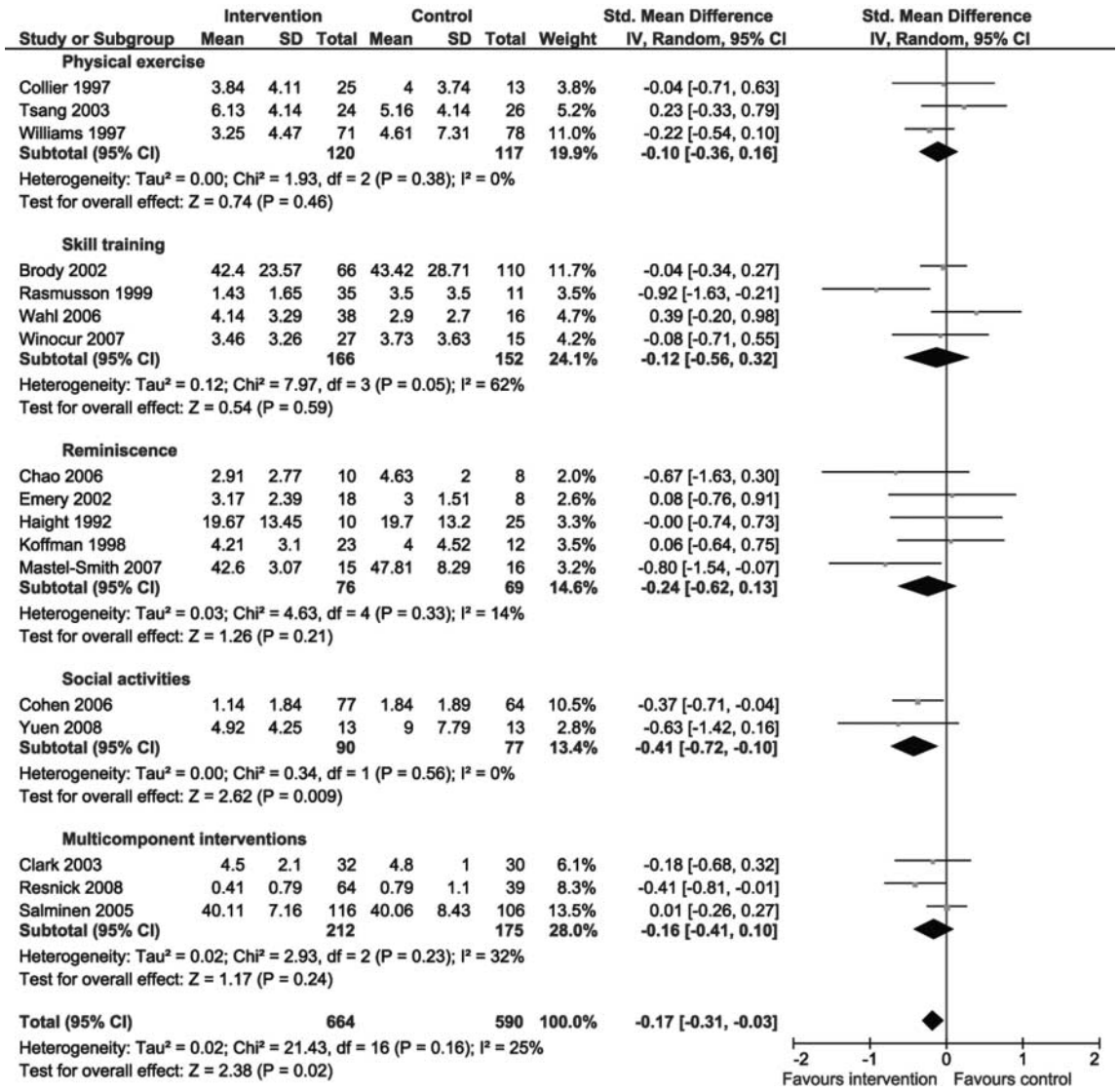

Fig. 4: Effect of psychosocial interventions versus no-intervention controls on depressive symptoms (continuous data).

data) and showed a statistically significant effect (OR: 0.34, 95% CI: 0.13 to 0.94). No statistically significant effect on positive mental health was found (two trials, SMD: −0.12, 95% CI: −0.75 to 0.51), neither on quality of life (six trials, SMD: −0.09, 95% CI: −0.24 to 0.06) or functional level (one trial, mean difference −1.30, 95% CI: −2.86 to 0.26). Multicomponent interventions showed a statistically non-significant weak effect on depressive symptoms (three trials, SMD: −0.16, 95% CI: −0.41 to 0.10). One trial (van't Veer-Tazelaar *et al.*, 2009) within the multicomponent intervention group provided eligible data on cost-effectiveness (mean difference: €532.00, 95% CI: −0.53 to 1064.53).

For the single group support trial, we were unable to retrieve any eligible data except for acceptability (OR: 0.97, 95% CI: 0.38 to 2.49). This intervention (Andersson, 1984) consisted of social support groups for older adults living alone and experiencing loneliness.

For the acceptability outcome no statistically significant pooled effects emerged for any of the intervention groups.

Efficacy: psychosocial interventions compared with other-intervention control trials

Two trials provided useable data for adequate comparisons between different psychosocial interventions. These trials compared exercise versus skill training. The pooled effect size for the two exercise interventions (Stiggelbout *et al*., 2004; MacFarlane *et al*., 2005) showed a statistically significant positive effect on functional level from participating in exercise (two trials, SMD: −0.33, 95 % CI: −0.55 to −0.10). The one trial reporting a depressive symptoms outcome showed no statistically significant difference between exercise and skill training interventions (mean difference: 1.44, 95% CI: −1.19 to 4.07). Physical exercise interventions showed no effect on the positive mental health outcome (two trials, WMD: −2.38, 95% CI: −6.61 to 1.86), quality of life outcome (two trials, SMD: −0.26, 95% CI: −0.88 to 0.35), social capital outcome (one trial, mean difference: −1.57, 95% CI: −3.34 to 0.20) or life satisfaction outcome (one trial, mean difference: −0.40, 95% CI: −3.69 to 2.89), when compared with skill training interventions.

No eligible data could be retrieved for the costs or dichotomous depression outcomes.

Comparing the effectiveness of the interventions based on their approach and duration

In order to investigate the most effective approaches, further analysis was carried out for those intervention trials that were categorized as having a universal, selective or indicated prevention approach.

Fourteen studies reported a quality of life outcome in the meta-analysis, of which 11 were categorized as using the selective prevention approach (targeting risk groups for mental ill-health) while three studies represented the universal approach. The universal prevention category showed a statistically significant effect on quality of life (SMD: −0.26, 95% CI: −0.49 to −0.02), while the selective interventions had at most a small effect (SMD: −0.19, 95% CI: −0.37 to 0.00). Among the 17 studies reporting a depressive symptoms outcome, the interventions with a universal preventive approach (10 studies) evidenced a statistically significant pooled reduction in depressive symptoms (SMD: −0.32, 95% CI: −0.50 to −0.14). Among the six studies where the interventions were targeted to certain risk groups, e.g. older adults with physical limitations, no statistically significant pooled effect could be found for the depressive symptoms outcome (SMD: −0.04, 95% CI: −0.25 to 0.17). The only study with an indicated approach where the study participants suffered from sub-clinical symptoms of depression generated a power of 0.38 and effect was therefore not analysed.

Of the nine studies reporting a positive mental health outcome, five had a universal and four a selected approach. Although the pooled effect of these trials was statistically significant, neither of the approaches alone showed statistically significant improvement in the positive mental health outcome; universal trials (five trials, SMD: −0.21, 95% CI: −0.53 to 0.12), and selective trials (four trials, SMD: −0.30, 95% CI −0.71 to 0.12).

The three studies reporting a statistically non-significant dichotomous depression outcome (OR: 0.69, 95% CI: 0.41 to 1.17) all had an indicative approach. Two of the studies measuring functional level had a selective approach and their effect was statistically non-significant (SMD: −0.34, 95% CI: −0.71 to 0.04). The one study with a universal approach reporting on the functional level outcome lacked adequate power for the analysis (power = 0.05). The two studies reporting a social capital outcome both had a universal approach and the effect of these interventions was statistically non-significant (mean difference: −0.16, 95% CI: −1.00 to 0.68). The one study reporting a cost-effectiveness outcome had an indicated approach and the results of the intervention were statistically non-significant (mean difference: €532.00, 95% CI: −0.53 to 1064.53). The five studies in the meta-analysis reporting life satisfaction outcome all had a universal approach and their effect was statistically non-significant (SMD: −0.64, 95% CI: −1.52 to 0.23). Even though universal trials evidenced significant effects on several outcomes compared with the other intervention approaches, no significant variances between the three approaches could be found when comparing their effect sizes ($Q_b = 4{,}77$, $P > 0.05$ for depressive symptoms outcome including all three approaches).

The psychosocial interventions comparing intervention participants with no-intervention participants were also compared according to length of intervention (where data on duration was available). The 20 interventions with duration of up to 3 months (12 weeks) were compared with the 12 interventions with a longer duration period of up to 16 months.

Interventions with a duration of >3 months had a statistically significant positive effect on quality of life outcome (eight trials, SMD: −0.28, 95% CI: −0.47 to −0.08), while shorter interventions evidenced an inadequate power (0.66). The study with the longer intervention (Peri *et al*., 2008) that reported data on life satisfaction had a statistically significant positive effect (mean difference: −1.40, 95% CI: −1.65 to −1.15) while the shorter interventions had no statistically significant pooled effect on life satisfaction (four trials, SMD: −0.28, 95% CI: −0.62 to 0.06). The interventions with a longer duration period had a statistically significant positive effect on depressive symptoms outcome (six trials, SMD: −0.19, 95% CI: −0.34 to −0.05) compared with shorter interventions (11 trials, SMD: −0.15, 95% CI: −0.40 to 0.10). Longer interventions enhanced positive mental health among intervention participants (four trials, SMD: −0.23, 95% CI: −0.46 to −0.00). The effect of the shorter interventions on this outcome was statistically non-significant (five trials, SMD: −0.31, 95% CI: −0.81 to 0.20). The effect of the one long intervention (OR: 0.34, 95% CI: 0.13 to 0.94) on dichotomous depression was statistically significant, while the two short interventions had no statistically significant effect on this outcome (OR: 0.84, 95% CI: 0.53 to 1.33).

The two trials measuring social capital outcome both had a longer intervention duration period their effect was statistically non-significant (SMD: −0.16, 95% CI: −1.00 to 0.68). The long intervention study reported a functional level outcome and showed no statistically significant effect: (one trial, mean difference: −1.30, 95% CI: −2.86 to 0.26) the two trials with a shorter intervention duration lacked adequate power for effect analysis (0.78). The one trial reporting cost outcome was a long intervention, showing no statistically significant effect on costs (mean difference: €532.00, 95% CI: −0.53 to 1064.53). The differences in effect between long and short interventions were statistically significant on life satisfaction (Q_b = 28,20, $P < 0.001$) and quality of life ($Q_b = 3,87$, $P \leq 0.05$) outcomes.

Sensitivity analyses

To investigate the robustness of our findings, sensitivity analyses were performed, for randomized controlled trials only. We found our results to be robust in spite of inclusion of non-randomized controlled trials. Considering the randomized controlled trials only, the overall effect of psychosocial interventions on depressive symptoms remained virtually unchanged (14 trials, SMD: −0.17, 95% CI; −0.32 to −0.02). Among the 14 trials measuring quality of life, which showed a statistically significant pooled effect, there were two non-randomized trials and statistical significance was retained even after removing these trials (SMD: −0.18, 95% CI: −0.34 to −0.01). However, removing three non-randomized trials from the group of studies measuring positive mental health resulted in loss of the significance of the effect (SMD: −0.14, 95% CI: −0.50 to 0.22). The overall pooled effect for life satisfaction was based on five randomized trials.

The analog to ANOVA showed that differences in effect between randomized and non-randomized trials were non-significant ($Q_b = 0.92$ to 1.89, $P > 0.05$).

DISCUSSION

Our findings show that the gathered effect of psychosocial interventions focusing on enhancing the mental health of older adults displays a small but statistically significant improvement on quality of life and positive mental health among intervention participants. The interventions also had a weak but statistically significant effect on reducing depressive symptoms among the intervention participants. The statistically significant pooled effects of these outcomes were based on data from between 9 and 17 trials.

When analysing the interventions according to their promoting or preventive approach, trials with a universal approach evidenced a small, statistically significant improvement of quality of life as well as also significantly reducing depressive symptoms. A similar effect of universal interventions was found in an earlier review investigating effects on depression

among all age groups (Jané-Llopis *et al.*, 2003). However, neither in this previous review nor in the current one was the difference between intervention approaches statistically significant.

When looking at the efficiency of interventions according to duration, two-thirds of the interventions in this review were shorter interventions (under 3 months). This group of trials exhibited no pooled statistically significant effects for any outcomes. Interventions with a longer duration displayed a positive effect on quality of life and positive mental health compared with shorter interventions. Longer interventions also displayed a statistically significant effect on depressive symptoms and dichotomous depression outcomes compared with shorter interventions. A previous review of community-based multicomponent interventions aiming to retain physical function (analysing outcomes such as physical function and activities of daily living) among older people evidenced no statistically significant difference in effect for different duration periods (Beswick *et al.*, 2008). Likewise, an earlier meta-analysis of psychosocial interventions to reduce loneliness (Masi *et al.*, 2010) evidenced no impact of intervention duration on effect size.

Analysing the effects of interventions with regards to length of follow-up would be of interest. However, many studies merely reported pre- and post-intervention data preventing a sufficient analysis of this aspect of efficacy.

In this review, the three social activity interventions in the meta-analysis significantly improved the four outcomes with available data: positive mental health (Cohen *et al.*, 2006), quality of life (Nijs *et al.*, 2006) and life satisfaction (Yuen *et al.*, 2008) were improved and depressive symptoms reduced (Cohen *et al.*, 2006; Yuen *et al.*, 2008). However, these promising findings are based on few trials and thus need replication. In addition to the trials in this category, several of the studies in other intervention groups contained different forms of social contact and support that could have contributed to the results. The improvement of life satisfaction in the multicomponent group could be partly due to interventions encompassing social components. Systematic reviews (Cattan *et al.*, 2005) and meta-analysis (Masi *et al.*, 2010) of psychosocial interventions aiming to increase social contacts and reduce loneliness have previously evidenced reduced levels of loneliness and improved mental health among intervention participants.

In this review, the skill training interventions with educational and/or behavioural components had a statistically significant effect on positive mental health outcome. In an earlier review (Cattan *et al.*, 2005), educational interventions proved to be effective in mental health promotion through reduction in loneliness and social isolation among older adults. With regards to behavioural components, another review and meta-analysis focusing on depression prevention has previously indicated that interventions with behavioural components appeared to be harmful for older adults (Jané-Llopis *et al.*, 2003). It should, however, be noted that inclusion criteria of these reviews differed from the current review, both in respect of participant characteristics and in intervention content.

The effects of other categories of psychosocial interventions on mental health were small or non-significant. The physical exercise and reminiscence interventions had no statistically significant pooled effects on any outcomes with available data when compared with no intervention. Contrary to our negative findings regarding promotion and prevention, an earlier review of reminiscence and life review interventions showed a large statistically significant treatment effect on depressive symptoms in older adults (Bohlmeijer *et al.*, 2003). That review included a wider age range of participants suffering from mild to severe depression.

Group support, such as discussions and exchanges of experiences in groups, has been previously applied in psychosocial interventions (Birk *et al.*, 2004). The single group support trial (Andersson, 1982) did not provide other data on outcomes than acceptability data. According to the published report of that study, social support groups designed to strengthen social networks may decrease loneliness among older adults as well as help to increase social contacts and social activities of older people. An existing review of prevention programmes covering all ages highlighted social support as the most effective intervention type (Jané-Llopis *et al.*, 2003). Clearly, there is a need for trials exploring the effect of social support in older adults.

The lack of statistical significance in some of the findings is probably the result of a combination of a small effect size and lack of statistical power due to the low number of studies,

many of which included small samples. One factor that could explain the relative lack of effect is the duration of the interventions and the frequency of the intervention sessions. One of the social activity interventions that gave statistically significant results (Cohen *et al*., 2006) lasted for 30 weeks and contained a high frequency of sessions. Another important ingredient in this particular intervention was visibility; the participants got to display the creative product of the intervention via public performances. The other social activity intervention (Yuen, 2002; Yuen *et al*., 2008) considered in the meta-analysis gave the participants in the intervention group a social role and an important task that reportedly made them feel useful and needed. These social elements might have an important impact on the outcomes of the interventions.

A major limitation of the review is the lack of comprehensive reporting of trials, often lacking information essential for the meta-analysis (e.g. trial adherence, means and standard deviation values from each of the trial arms and measurement points). Owing to lack of detailed descriptions of study design and procedures, there were also difficulties in assessing methodological quality and risk of bias. Additionally, the file-drawer effect should always be taken into account when interpreting meta-analysis results. Furthermore, because of the wide range of outcome measurement scales in the trials included in the review, it was for the most part only possible to calculate the SMD.

Another limitation is the heterogeneity of trials. The trials are very different from each other in regard to intervention content, leading to challenges in categorizing the interventions based on their content. The reported heterogeneity levels were, however, acceptable, ranging from 25 to 40% on statistically significant outcomes in the overall analyses of effectiveness of any psychosocial intervention versus no intervention. Analyses of differences in effect between types of psychosocial interventions did not evince a statistically significant variability by the intervention group, with the exception of life satisfaction and thus overall analyses of the effect of any type of psychosocial measures were feasible. Furthermore, to avoid losing sight of an effective type of intervention by performing an overall meta-analysis only, we also analysed effectiveness for each type of psychosocial intervention separately.

Some of the limitations of this review may be due to the broad approach applied when selecting interventions. To compensate this, strict inclusion criteria regarding study design and participant characteristics were applied.

Implications for research and practice

From a public health perspective the overall effect of psychosocial interventions in the promotion of mental health found in this review is small but promising. Mental health promotion and depression prevention through psychosocial interventions are beneficial, but further evidence of effectiveness and cost-effectiveness is needed before large scale implementation.

The findings point out social activities for proven efficacy among the psychosocial interventions to prevent depression and improve mental well-being. Based on our results, meaningful social activities, tailored to the older individual's abilities, preferences and needs should be considered when aiming to improve mental health among older people. Duration of interventions should also be considered in practice, because longer interventions, lasting for >3 months, exhibited positive effects on mental well-being and depressive symptoms. These findings should be taken into account and applied in the design and replication of interventions with evidenced positive effects. The heterogeneity within the older population should not only be considered in intervention planning and implementation, but also in the description of the study sample in research reports.

Our results highlight the potential for effective actions to promote mental health and prevent depression in older people, but it also accentuates the sparseness of research evidence. Investing in evaluation of measures to promote mental health and prevent depression is a necessity, taking into consideration the magnitude of the problem and the potential benefits to be reached by effective interventions. At this stage, development and evaluation of psychosocial interventions to support mental health of older people needs to be a research priority. Policy makers need to be aware of the limitations of the current evidence base and any large-scale implemented programme should be carefully evaluated to enrich our common knowledge base on good practice for promotion

of mental health and prevention of depression among older people.

CONTRIBUTORS

The search strategies were designed by A.K.F. and K.W. with guidance from Pia Pörtfors and Eeva-Liisa Aatola. A.K.F. screened the literature, selected the studies, and extracted and coded the data with assistance from K.W., J.N. and Anette Engsbo. A.K.F., J.N., and K.W. analysed and interpreted the findings and drafted the manuscript. All authors (A.K.F., J.N., K.W.) contributed to the revision of the manuscript and approved the final version. A.K.F. is guarantor.

SUPPLEMENTARY DATA

Supplementary data are available at *HEAPRO* online.

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APPENDIX: REFERENCES TO STUDIES INCLUDED IN THE REVIEW

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Investing in mental health and well-being: findings from the DataPrev project

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SUMMARY

A systematic review was conducted to determine the extent to which an economic case has been made in high-income countries for investment in interventions to promote mental health and well-being. We focused on areas of interest to the DataPrev project: early years and parenting interventions, actions set in schools and workplaces and measures targeted at older people. Economic evaluations had to have some focus on promotion of mental health and well-being and/or primary prevention of poor mental health through health-related means. Studies preventing exacerbations in existing mental health problems were excluded, with the exception of support for parents with mental health problems, which might indirectly affect the mental health of their children. Overall 47 studies were identified. There was considerable variability in their quality, with a variety of outcome measures and different perspectives: societal, public purse, employer or health system used, making policy comparisons difficult. Caution must therefore be exercised in interpreting results, but the case for investment in parenting and health visitor-related programmes appears most strong, especially when impacts beyond the health sector are taken into account. In the workplace an economic return on investment in a number of comprehensive workplace health promotion programmes and stress management projects (largely in the USA) was reported, while group-based exercise and psychosocial interventions are of potential benefit to older people. Many gaps remain; a key first step would be to make more use of the existence evidence base on effectiveness and model mid- to long-term costs and benefits of action in different contexts and settings.

Key words: economic evaluation; mental health promotion; children; older people; workplaces

INVESTING IN MENTAL HEALTH AND WELL-BEING

Economics, mental health and well-being

The personal, social and economic costs of poor mental health, much of which fall outside the health-care sector, have been well documented. In the European Economic Area alone, the costs of depression and anxiety disorders have been estimated at €136.3 billion (2007 prices). The majority of these costs, €99.3 billion per annum, are due to productivity losses from employment (Andlin-Sobocki *et al.*, 2005). Behavioural problems that arise in childhood and remain significant in adult life can increase costs not only to the health system, but also to criminal justice and social services, with reduced levels of employment and lower salaries when employed and having adverse impacts on personal relationships (Scott *et al.*, 2001; Fergusson *et al.*, 2005; Smith and Smith, 2010). Poor mental health is the leading or second most reason for early retirement or

withdrawal from the workforce on health grounds (McDaid, 2011).

While these are serious impacts, they are in themselves insufficient to justify investment in measures to promote mental health and well-being. For this, it is important not only to identify robust evidence-informed actions, but also to look at their costs and resource consequences, within and beyond the health system. Resources are always finite, with many potential alternative uses, and careful choices have to be made on investment and priority setting. It is perhaps even more critical to highlight whether investment in the promotion of mental health and well-being might represent good value for money and help avoid future costs of poor mental health during the current austere climate when health and other public sector budgets are under substantial pressure, and when mental health promotion may not be seen as a high priority for policy makers (McDaid and Knapp, 2010).

As part of the EC funded DataPrev project, a systematic review was conducted to identify the state of the evidence base on the use of economic evidence in helping to make the case for investment in mental health and well-being in the four areas of focus to the project: early years and parenting interventions, actions set in schools and workplaces and measures targeted at older people.

METHODS

Our objective was to identify economic evaluations, i.e. studies comparing the effectiveness and costs of two or more health-focused interventions, to promote mental health and well-being and/or prevent the onset of mental health problems.

Inclusion and exclusion criteria

Two distinct types of study were eligible for inclusion. First, economic evaluations conducted concurrently or retrospectively alongside a randomized controlled trial. An exception to this criterion was applied to workplace health promotion interventions where controlled trials are rare; in this case other empirical study designs alongside an economic analysis were also eligible. Economic evaluations conducted using a modelling approach, whereby effectiveness data were collected from one or more previous controlled studies and then combined with data on costs, were also included. Economic evaluations had to be consistent with different approaches commonly applied in health economics, including cost-effectiveness, cost–benefit, cost-consequence, cost–utility and cost-offset analyses. While we cannot discuss the differences between these approaches here, the interested reader can refer to numerous guides, e.g. (Drummond *et al.*, 2005; Shemilt *et al.*, 2010).

To be eligible for inclusion studies also needed to include either a measure of positive mental health, e.g. use of the SF-36 mental health summary scale or other measures of quality of life, specific measures of well-being or alternatively quantify the prevention of psychosocial stress and/or mental disorders. We excluded studies relating to the prevention of dementia, as well as those focused on individuals with learning difficulties from our analyses. Interventions needed to have a primary objective of promoting health. This meant that we excluded some education and child care centred interventions that had subsequently been shown to have a positive impact on mental health (among other outcomes) (Barnett, 1998; Barnett and Masse, 2007).

Papers that focused on the treatment of individuals with existing mental health problems were excluded, with the exception of studies that looked at how the treatment of parents with mental health problems might promote/protect the mental health of their children, as well as those reporting proxy outcomes, such as improvements in parent–child interaction and the prevention of child abuse. Children were assumed to be between the ages of 0 and 16, while studies in respect of older people focused on people aged 65 plus.

Search process

A search strategy designed to identify economic evaluations in bibliographic databases (Sassi *et al.*, 2002) was combined with a range of mental health promotion/mental disorder terms and a set of population/setting specific keywords and phrases. Mental health-related terms and concepts included in the search included mental health, positive mental health, mental and emotional well-being, personal satisfaction, quality of life, happiness, resilience, energy and vitality. Health promotion and prevention-

related keywords and phrases were also combined with terms related to poor mental health, including psychological stress, post-natal/post-partum depression, conduct disorder and child behavioural disorders.

We searched PubMed, PsycINFO, EMBASE, CINAHL, PAIS, Criminal Justice Abstracts, Web of Science, Scopus, EconLit and the National Health Service (NHS) Economic Evaluation Database at the University of York. Only results that reported abstracts (or chapter summaries) in English were included; geographical coverage was limited to the European Economic Area, plus EU Candidate Countries, Switzerland and other Organisation for Economic Co-operation and Development (OECD) members. Our review covered the period from January 1990 to December 2010. The electronic search was complemented by a limited search for key terms in Google Scholar, the general Google search engine and scrutiny of relevant websites, e.g. think tanks, universities, government departments and agencies. We also undertook a handsearch of a small number of journals and examined the reference lists of included studies, as well as citations of papers that met our inclusion criteria.

In addition, we also looked for any economic analyses of mental health promoting interventions previously shown in companion systematic reviews on effectiveness conducted as part of the DataPrev study to be effective in promoting mental health and well-being. Where these reviews identified evidence of the impact of an intervention on mental health and well-being, any studies that looked at the economic case for investment in those interventions, even if focused on non-health benefits, such as improved educational attainment, reduced crime and violence, were then eligible for inclusion.

References were initially screened independently by two reviewers (D.M. and A.P.) on the basis of their abstracts/summaries to determine whether they met study inclusion criteria. In the case of disagreement the two reviewers discussed the paper and came to a final decision on inclusion/exclusion, erring on the side of inclusion where no easy agreement could be reached. The full text of all references appearing to meet initial inclusion criteria was then retrieved and a final assessment made. Ultimately included studies were coded and stored in an Endnote database. An assessment of the quality of studies was also made, making use of two published economic evaluation checklists (Drummond and Jefferson, 1996; Evers *et al.*, 2005). Overall this process meant that >3000 references were assessed (see Figure 1).

RESULTS

Parenting, early years and school-based interventions

There has been a considerable body of research into the effectiveness of interventions to promote/protect the mental health and well-being of children and their parents, both within and external to school settings (Adi *et al.*, 2007a, b; Dretzke *et al.*, 2009); there is also a small but growing number of studies looking at the economic case for taking action, albeit largely set in either a USA or UK context. We also identified one study protocol for an economic evaluation of an internet-based group intervention to prevent mental health problems in Dutch children whose parents have mental health or substance abuse problems (Woolderink *et al.*, 2010). Overall the results are mixed, as the summary of findings from 26 papers and reports in Tables 1 and 2 indicate.

Empirical studies

Table 1 includes several studies looking at the impact of health visitors, including the well-cited Nurse Family Partnership programme developed in New York in the 1980s (Olds *et al.*, 1993). Focusing on new mothers, but with a special emphasis on teenage, single- and low-income mothers, the study followed 400 mothers and their children over a 15-year period. Looking at a broad range of outcomes going beyond positive maternal and child mental health outcomes, an initial analysis reported net costs per woman of $1582 (1980 prices) over the first 4 years for the whole population, but net savings of $180 per high-risk woman (Olds *et al.*, 1993).

Home visiting programmes have also been examined in England; some focused directly on child mental well-being, others on avoiding post-natal depression, a risk factor for poor child mental health (Murray, 2009). A controlled trial of an intensive home visiting programme and social support programme for

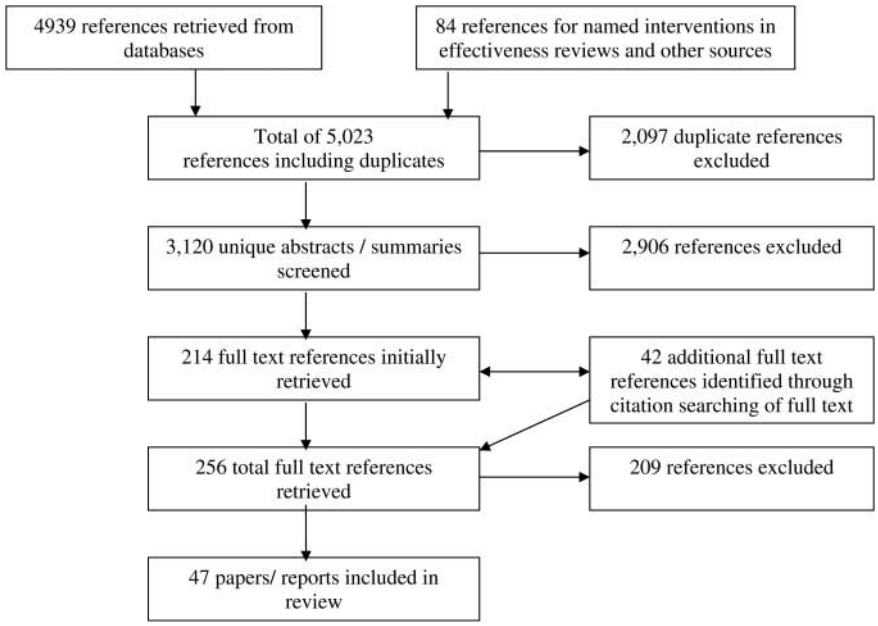

Fig. 1: Search flow chart.

vulnerable families where children could be at risk of abuse or neglect reported a cost per unit improvement in maternal sensitivity and infant cooperativeness of £3246 (2004 prices) (Barlow *et al.*, 2007; McIntosh *et al.*, 2009). The challenge with such a finding, however, is judging whether this well-being improvement represents value for money, as it uses a clinical outcome measure which cannot be compared with other uses of resources within the health-care system. Both cost–utility analyses where outcomes are measured in a common metric, such as the Quality Adjusted Life Year (QALY) where a maximum cost per QALY deemed to be cost effective can be determined in different contexts, or cost–benefit analyses where both outcomes and costs are measured in monetary terms can be used to overcome this problem, although neither approach is without its own limitations (Kilian *et al.*, 2010).

In England, a randomized controlled trial of health visitor delivered psychological therapies for women at high risk of post-natal depression improved outcomes at lower costs than health visitor usual care. There was a 90% chance that the cost per QALY gained would be <£30 000; a level generally considered to be cost effective in an English context (Morrell *et al.*, 2009). Another trial of women at high risk of post-natal depression compared health visitor delivered counselling and support for mother–infant relationships to routine primary care, finding that if society was willing to spend £1000 to prevent 1 month of post-natal depression then the intervention would have a 71% chance of being cost effective with mean net benefits of £384 (2000 prices) (Petrou *et al.*, 2006). This contrasted with an earlier study on the use of post-natal support workers to reduce the risk of post-natal depression which did not appear cost effective (Morrell *et al.*, 2000). However, the former study needs to be interpreted carefully as neither the change in costs or outcomes in the trial were significant and a comparable measure such as the QALY was not be used. Covering a longer time period and looking at additional benefits to children and mothers may have strengthened study findings.

Compared with standard health visitor care, no effectiveness or economic benefit was found in making use of supportive home visits to ethnically diverse mothers in London (Wiggins *et al.*, 2004, 2005). Home visiting was also compared with participation in a mother–child attachment group intervention in Canada. While no difference in effects was reported, costs were significantly lower in the attachment group (Niccols, 2008). We also found a recent

Table 1: Economic analyses alongside empirical studies of parenting, early years and school-based interventions promoting mental health and well-being

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/price year	Synthesis of costs and effectiveness data
(Cunningham *et al.*, 1995), Canada	I: Large group community-based parenting programmes	Parents of 150 pre-school/ kindergarten children at high risk of developing conduct disorders	RCT	Community-based groups were reported to be more than three times as much as clinic/individual parenting sessions	Community group had a significantly greater number of solutions to problems than control groups ($p < 0.05$) Significantly better in reducing behavioural problems at home compared with the clinic group ($p < 0.05$). Community group reported greater improvement than the clinic group, but significantly better parental sense of competence in the clinic control group ($p < 0.05$)	Health sector and travel costs	No synthesis of costs and benefits. Community-based group reported have better outcomes than clinic-based programmes and to be six times more cost-effective because of higher number of people reached by group sessions
	C: Clinic-based individual parenting programmes or 6 months waiting list	6 months	CCA			CAD. Price year not stated	
(Edwards *et al.*, 2007), Wales	I: The Webster-Stratton Incredible Years group parenting programme	Parents of 116 children aged 36–59 months at risk of developing conduct disorders	Pragmatic	The mean cost per child attending the parenting group: £934 for 8 children and £1289 for 12 children containing initial costs and materials for training group leaders.	Risk of conduct disorder linked with child behaviour. Significant improvement in mean intensity scores for child behaviour on Eyeberg scale in the intervention group of 27 points compared with no change in the control group ($p < 0.0001$)	A multiagency public sector perspective: health, special educational and social services	Incremental cost per five point improvement on the Eyeberg intensity scale would be £73. Given a ceiling ratio of £100 per point change 83.9% likelihood of being cost-effective
	C: 6 months waiting list	6 months	RCT	Incremental costs of all health, social and special education services were £1992.29 compared with £49.14 in the control group		2004 GBP	Estimated to cost £5486 to bring child with highest intensity score below clinical cut-off for risk of developing conduct disorders
			CEA				

(Foster, 2010), USA	I: Fast Track intervention: multi-year, multi-component prevention programme targeting antisocial behaviour and violence. Includes curriculum based on the PATHS programme which focuses on social and emotional learning. Includes parent training, home visiting, academic tutoring, social skills training	891 children identified at first year of entry to school system and provided intervention services over a 10-year period	RCT	Intervention cost $58 000 per child. Average health service costs (excluding programme costs) per child were $2450 in the intervention group	Focus on broad range of long-term outcomes that are associated with onset of conduct disorder in childhood: delinquency, school failure and use of school services, risk of substance abuse. No significant intervention effects were found	Public purse	No ratio reported the author states that 'the most intensive psychosocial intervention ever fielded did not produce meaningful and consistent effects on costly outcomes. The lack of effects through high school suggests that the intervention will not become cost-effective as participants progress through adulthood' (Foster, 2010)
	C: No intervention		CEA			2004. USD	
(Foster *et al.*, 2008), USA	Population wide implementation of multi-level Triple P intervention. (see Mihalopoulos *et al.*, 2007)	Parents and children in nine counties in South Carolina	Ongoing RCT in South Carolina	The costs for universal media and communication components: less than $0.75 per child in population	Outcomes of intervention are not reported here. Instead a threshold analysis conducted to identify costs that could be avoided if programme effective. Thresholds in line with those reported in previous studies	Programme costs plus costs to participants of various events	Estimated that the cost of implementing Triple P could be recovered in 1 year by a 10% reduction in child abuse and neglect
			COA	Total costs of providing interventions from levels 2–5 $2, 183, 812 or cost per family of $22 or $11.74 per child		USD. Price year not stated	
(Foster *et al.*, 2007), USA	I: Incredible Years Programme with three components: a child-based training programme (CT), a parent-based training programme (PT) and a teacher-based training programme (TT).	459 children aged 3–8 not receiving mental health treatments and their parents	Six RCTs	The total cost per child was $1164 with CT, $1579 with PT, $2713 with CT and PT, $1868 with PT and TT, $1454 with CT and TT and $3003 with CT, PT and TT	Parent–child interaction measured using Dyadic Parent–Child Interactive Coding System–Revised (DPICS-R; observer reported). Preschool behaviour measured using Behar Preschool Behavior Questionnaire (PBQ; teacher reported) used	Intervention costs to health and education system, including travel and refreshments and childcare costs	If payers have willingness to pay of $3000 per unit of improved behaviour on PBQ then PT and TT treatment are most cost-effective, while for values lower than $3000 no treatment was the preferred strategy
	Each component focused on improving children's behaviour through the promotion of socially appropriate interaction skills.	Data taken from six clinical trials	CEA		Parent–child interaction improved significantly for all intervention groups, except CT only. Preschool behaviour improved significantly all treated groups except for the CT, PT and TT group	2003 USD	If parent–child interaction improvement then if willingness to pay of $2500 per unit of effectiveness, the CT, PT and TT option was the most cost-effective in almost 70% of cases
	C: Comparisons were made between different combinations of the three components plus no intervention	To end of delivery of Incredible Years programme					

Continued

Table 1: *Continued*

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/price year	Synthesis of costs and effectiveness data
(Foster and Jones, 2006, 2007), USA	I: Fast Track intervention: multi-year, multi-component prevention programme targeting antisocial behaviour and violence. Includes curriculum-based on the PATHS programme which focuses on social and emotional learning. Includes parent training, home visiting, academic tutoring, social skills training	891 children identified at first year of entry to school system and provided intervention services over a 10-year period	RCT	The average cost $58 283 per participant	Diagnosis of conduct disorder using the Diagnostic Interview Schedule for Children Self Report of Delinquency instrument for violence	Public purse	Cost per case of conduct disorder averted: $3 481 433 for all population; $752 103 for high-risk individuals
			CEA		Effectiveness outcomes are not explicitly reported in paper—only the incremental cost-effectiveness ratios	2004, USD	Cost per act of inter-personal violence prevented $736 010
	C: No intervention		10 years				Intervention not considered cost effective for lower risk groups Would be cost-effective for highest risk groups if societal willingness to pay above $750 000
(Hiscock *et al.*, 2007), Australia	I: Advice and education from maternal and child health nurses to improve infant sleep and maternal well-being.	328 mothers reporting infant sleep problems at 7 months	Cluster RCT	The mean cost for intervention: £96.93 versus control family: £116.79. (non-significant difference)	Significant reduction in reported infant sleep problems at 10 months for the intervention group : 56 versus 68% ($p = 0.04$) and at 12 months 39 versus 55% ($p = 0.007$). Significant mean difference in risk of post-natal depression for the intervention group—1.4 on Edinburgh Post Natal Depression Scale ($p < 0.007$); significantly improved mental health scores on SF-12 for intervention—mean difference 3.9 $p < 0.001$	Health-care perspective	Ratio not reported as intervention dominant: lower costs, higher benefits
		5 months	CCA			(MCH sleep consultations, other health-care services and interventions costs)	

	C: Usual consultations at Maternal and Child Health Centres					GBP. Price year not stated	
(McIntosh *et al.*, 2009) and (Barlow *et al.*, 2007), England	I: An intensive home visiting programme	131 vulnerable families at risk of abuse and neglect	Multicentre RCT	Health service only: intervention £5685 versus control £3324	Statistically significant improvement in maternal sensitivity and infant co-operativeness components of the CARE Index outcome measure. Maternal sensitivity 9.27 in the intervention group versus 8.20 in the control group ($p = 0.04$)	Health and societal perspectives	No ratio assessing cost-effectiveness per unit improvement in maternal sensitivity or infant co-operativeness
	C: Care as usual	18 months	CCA	Societal costs: intervention £7120 versus £3874 for control	Infant co-operativeness 9.35 versus 7.92 in the control group ($p = 0.02$)	2004 GBP	However, cost per child identified as being at risk of neglect would be at least £55 016
					0.059 rate increase in (non-significant increase in protection of children from abuse and neglect		
(Morrell *et al.*, 2000), England	I: Post-natal support from a community midwifery support workers: practical and emotional support, to help women rest and recover after childbirth	523 new mothers aged 17 plus	RCT	At 6 months, the intervention group had significantly meant higher costs of £180. (equivalent to cots of support worker)	No evidence of significant difference in health status between groups using SF-36 or in post-natal depression using the Edinburgh Post Natal Depression Scale at 6, 6 weeks or 6 months	Health service	No ratio reported as comparator dominant with lower costs and no difference in outcomes
	C: Standard midwife care, plus up to 10 visits from support workers during first 28 days	6 weeks and 6 months	CCA	At 6 months these differences persisted with mean cost of £815 in the intervention group versus £639 in the control group		1996 GBP	
(Morrell *et al.*, 2009), England	I: Health visitor delivered psychological interventions, cognitive behavioural approach (CBA) or person-centred approach (PCA)+ SSRI	418 women at high risk of post-natal depression	Pragmatic randomized cluster trial	No significant difference in costs at 6 months between intervention and controls: £339 versus £374	At 6 months 45.6% of women in the intervention group compared with 33.9% of control found to be at risk of post-natal depression with scores >12 on the Edinburgh Post-Natal Depression Scale ($p = 0.028$)	NHS and social service perspective	No ratio and intervention dominant with similar or lower costs and better outcomes. In sensitivity analysis 90% chance of being cost-effective if threshold between £20 000–30 000 per QALY gained
	C: Health visitor usual care	6 months; analysis at 12 months of small sample only	CCA		SF-6 used to generate Quality Adjusted Life Year values. Incremental gain of 0.003 QALYs in the intervention group (0.026 versus 0.023)	2005 GBP	In a small sample at 12 months intervention also dominant
			CUA				

Continued

Table 1: *Continued*

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/price year	Synthesis of costs and effectiveness data
(Niccols, 2008), Canada	I: Eight session parent group 'Right From the Start' (RFTS) to enhance skills in reading infant cues and responding sensitively	76 mothers of infants	RCT	The mean costs per person per session were significantly lower for intervention: RFTS: $44.04 versus home visiting: $91.26 ($p < 0.001$)	No significant differences in outcomes on infant attachment security (measured by Attachment-Q set AQS) or maternal sensitivity (measured using Maternal Behaviour Q-score)	Health system plus parental travel costs	No incremental cost-effectiveness ratio as lower cost and better outcomes. Average cost per gain in A QS score for intervention was $430.08 compared with $1283.54. In sensitivity analysis for every $100—Return on investment three to eight times greater than for home visiting
	C: Routine health visiting	8 months	CEA			CAD. Price year not stated	
(Olds *et al.*, 1993), USA	I: Home visiting programme, social support for mother until child is age 2	400 new mothers. Emphasis on teenage, single and low-income mothers; but also other mothers	RCT	For whole population incremental programme cost $3246	Health outcomes reported in other papers, including positive effects on child mental health/ risk of abuse/maternal mental health	Societal	Net costs of $1582 per mother for whole population. Net savings of $180 per mother in the low-income group
	C: Screening for developmental problems at 2 years; free transportation to regular prenatal and well-child care local clinics	48 months	COA	For low-income population incremental programme cost $3133		1980. USD	
			Societal	Economic analysis focused on long-term costs of government programmes assumed to be influenced by improved maternal and child health			
(Petrou *et al.*, 2006), England	I: Health visitor delivered counseling and support for mother–infant relationship	151 expectant mothers at high risk of post-natal depression	RCT	Mean intervention group costs per mother–infant pair were £2397 versus £2278 in the control group. Non-significant difference of £119.50	There was a non-statistically significant difference in time spent with post-natal depression (9.57 weeks in the intervention group versus 11.71 weeks in the control group)	Health and social care perspective	Incremental cost per depression free month gained of £43
	C: Routine primary care	18 months	CEA			2000; GBP	If willingness to pay of £1000 for preventing 1 month of post-natal depression, intervention 71% chance of being cost-effective (71%) with mean net benefit of £384
			CBA				

(Scott *et al.*, 2010), England	PALS study (Primary Age Learning Skills Trial)	174 children in very deprived areas of London from diverse ethnic backgrounds (76% were from minority groups)	RCT	The programme cost was £1343 per child. Total cost of the programme was £176 000	Child behaviour problems (measured through observation and Parent Account of Child Symptoms Schedule. Conduct scale of Strengths and Difficulties Questionnaire (SDQ) also completed. Parenting monitored using approach of Conduct Problems Research Programme. No significant differences in outcomes were reported with the exception that the intervention group had greater use of child centred parenting and more use of calm discipline	Study funder plus health service	No ratio provided. Authors stated programme may need to be designed to increase parent uptake and engagement to be cost-effective
	I: Basic Incredible Years Parenting Programme (12 weeks) plus 6 weeks manualized SPOKES (Supporting Parents on Kids Education in Schools) Literacy programme to help parents interact with children over books they are using I + SPOKES (6 weeks)→Primary Age Learning Skills (PALS) C: No intervention		CCA			GBP price year not stated	
(Wiggins *et al.*, 2004, 2005), England	I: Supportive listening home visits by a support health visitor (SHV) or year of support from community groups (CG) providing drop in sessions, home visiting and/or telephone support	731 culturally diverse new mothers living in deprived inner city London	RCT	There were no significant differences in total costs between those in SHV, CG and control groups after 12 or 18 months although the interventions tend to be more costly: the 18 month mean costs estimated to be £3255, £3231 and £2915, respectively	Maternal depression was measured at 8 weeks and 14 months post-partum using Edinburgh post-natal depression scale (EPDS). General health questionnaire (GHQ12) used at 20 months post-partum	Public sector, voluntary groups and mothers	No ratio reported as no difference in outcomes found
	C: Standard health visitor services	12 and 18 months	CUA			2000 GBP	No net economic cost or benefit of choosing either of the two interventions or standard health visitor services

RCT, randomized controlled trial; CBA, cost–benefit analysis; CEA, cost-effectiveness analysis; CCA, cost-consequences analysis; CUA, cost–utility analysis; COA, cost-offset analysis.

Table 2: Economic modelling analyses of parenting, early years and school-based interventions promoting mental health and well-being

Bibliographic information	Intervention (I), comparator (C) and study population	Sources of model parameters	Type of model and timeframe	Intervention cost	Perspective/price year	Economic results
		Study population	Economic analysis			
(Aos *et al.*, 2004), USA	I: Nurse–Family Partnership for low-income women: intensive visiting by nurses during pregnancy and the first 2 years after birth to promote child's development and provide instructive parenting skills to the parents	Systematic review and meta-analysis of evaluations of trials of preventive programmes conducted since 1970. Five trials identified	Decision analytical modelling	Cost of programme over 2.5 years: $9118	Societal	Total benefits $26 298. Net benefits $17 180. Benefit to cost ratio: 2.88 to 1 including primary recipient crime avoided: $14 476; secondary programme recipient: $1961;child abuse and neglect: $5686; alcohol: $541; illicit drugs: $309
	C: Screening for developmental problems at 2 years; free transportation to regular prenatal and well-child care local clinics	Cost of programme from Olds (2002)	To age 74		2003. USD	
		Review of literature and statistics to estimate cost offsets of effective action	CBA			
		Parents and children. Low income and at-risk pregnant women bearing their first child				
(Aos *et al.*, 2004), USA	I: Home visiting programmes for at-risk. Mothers and children: including instruction in child development and health, referrals for service or social and emotional support programmes	Systematic review and meta-analysis of evaluations of trials of preventive programmes conducted since 1970	Decision analytical modelling;	Costs: $4892	Societal	Benefits: $10 969. Net benefits: $6077 including child abuse and neglect avoided: $1126; alcohol: $107; illicit drugs (disordered use): $61
	C: Usual care	13 trials identified	To age 74	Synthesis of cost from a number of different home visiting projects	2003. USD	
		Cost of programme from multiple papers in literature review	CBA			
		Review of literature and statistics to estimate cost offsets of effective action				
		Mothers considered to be at risk for parenting problems in terms of age, marital status and education, low income, mothers testing positive for drugs at the child's birth				
(Aos *et al.*, 2004), USA	I: Comprehensive school programme to reduce risk and bolster protective factors to prevent problem behaviours. Includes classroom, school and family involvement elements. Known as Caring School Community (CSC) or Child Development Project	Systematic review of evaluations of trials of preventive programmes conducted since 1970. One trial identified. Battistich *et al.* (1996)	Decision analytical modelling	Cost of programme per participant $16 over 2 years (based on personal communication with programme co-ordinator)	Societal	Costs: $16; benefits: $448

	C: No intervention	Programme costs from personal communication with programme co-ordinator	To age 74 CBA		2003. USD	Benefit to cost ratio: 28.42 to 1 No mental health impacts included in benefits which covers drugs and alcohol only
(Aos *et al.*, 2004), USA	I: 'Behavioural Vaccine' to encourage good behaviour at school. A 'Good Behaviour Game' is regularly played with prizes given to winning teams (who have better behaviour)	Systematic review of evaluations of trials of preventive programmes conducted since 1970. One trial identified. Kellam and Anthony (1998) focusing solely on tobacco	Decision analytical modelling	Costs: $8	Societal	Benefit to cost ratio: 25.92 to 1. But benefits only look at tobacco consumption avoided
	C: No intervention	Review of literature and statistics to estimate cost offsets of effective action Hypothetical children in first 2 years of school	To age 74 CBA	Benefits: $204	2003 USD	
(Aos *et al.*, 2004), USA	I: Seattle Social Development project: to train teachers to promote students 'bonding to the school, to affect attitudes to school, behaviour in school, plus parent training'. Delivered for 6 years	Systematic review of evaluations of trials of preventive programmes conducted since 1970. One trial identified. Hawkins *et al.*, (1999, 2005)	Decision analytical modelling	Costs: $4590	Societal	Benefits: $14 426
	C: No intervention	604 children from age 6 in high-crime urban areas in non-randomized controlled empirical study	To age 74 CBA		2003 USD	Benefit to cost ratio: 3.14 to 1. Benefits: crime: $3957; high school graduation: n: $10 320; K-12 grade repetition: $150
(Embry, 2002), USA	I: 'Behavioural Vaccine' to encourage good behaviour at school. A 'Good Behaviour Game' is regularly played with prizes given to winning teams (who have better behaviour)	*Ad hoc* review of literature on effectiveness. Additional data on budgetary impact from unrelated work in Wyoming	Decision analytical modelling	Implementation cost: $200 per child per year versus medication costs: $70 per child per month for children with behavioural problems	Health and education	If GBG cost $200 per child per year to implement for 5000 5 and 6 year olds, there would be potential costs averted of $15–20 million from a 5% reduction in special education placement, 2% reduction in involvement with corrections and 4% reduction in lifetime prevalence of tobacco use
	C: No intervention	Hypothetical 5000 5- and 6-year-old children at school in Wyoming	Lifetime COA		USD. Price year not stated	

Continued

Table 2: *Continued*

Bibliographic information	Intervention (I), comparator (C) and study population	Sources of model parameters	Type of model and timeframe	Intervention cost	Perspective/price year	Economic results
		Study population	Economic analysis			
(Hummel *et al.*, 2009), England	I: Whole school intervention to promote emotional and social well-being in secondary schools. Involves classroom intervention and peer mediation	Effectiveness data taken from paper identified through systematic review (Evers *et al.*, 2007)	Decision analytical modelling	The estimated net total cost for a school with 600 pupils aged 11–16 is £9300 per year, or £15.50 per pupil per year	Education sector;	If intervention can reduce victimization by 15%, then cost per QALY gained of £9600. At a threshold of £20 000 it is 82% probable that the intervention is cost-effective, and at a threshold of £30 000, 92% probable
	C: No intervention	Hypothetical 600 school children aged 11–16	Lifetime	Classroom intervention: £7300; peer mediation: £3900; teacher time saved £1900	GBP. Price year not stated	
			CUA COA			
(Karoly *et al.*, 1998, 2005), USA, Outcome data from Olds *et al.*, (1997)	I: Home visiting programme; social support for mother until child is age 2	Data for high- and low-risk women taken from original outcome data of a Nurse–Family Partnership evaluation by Olds *et al.* (1997)	Decision analytical modelling	Cost of programme: $7271	Societal	Benefit to cost ratio:
	C: No intervention	Costing analysis builds on previous costings reported by Olds *et al.* (1993)	Lifetime	Monetary benefits to society include costs averted to public purse (including health and crime), additional income of mothers, reduction in victim costs of crime	2003 USD	High risk: 5.7 to 1 ($41 419: 7271)
		400 new mothers. Emphasis on teenage, single- and low-income mothers; but also other mothers	CBA			Low risk: 1.26 to 1 ($9151: $7271)
(McCabe, 2008), England	I: Universally delivered school-based PATH programme with three sessions per week of teacher led intervention; 10 weeks parent training	Systematic review of literature to identify (limited) effectiveness data	Decision analytical modelling	Cost per child per annum £125	Education sector	If positive impacts on emotional functioning only is £10 594 per QALY gained. Probability that cost per QALY is <£30 000 per QALY is 65%
	C: No intervention	Hypothetical cohort of children aged 7	3 years		2008 GBP	If the intervention impacts upon school performance (cognitive functioning) and emotional functioning, then £5500 per QALY. Prob QALY being <£30 000 is 66%
			CUA			

(Mihalopoulos *et al.*, 2007) and Turner *et al.* (2004), Australia	Triple P-Positive Parenting Programme, compared with no intervention	Systematic review that identified five RCTs on Triple P	Decision analytical modelling	The annual cost of implementing	'Government as third part funder' within health sector and criminal justice and education	Triple P has better outcomes and costs are outweighed by conduct disorder averted as long as prevalence of conduct disorder at least 7%
	Level 1: media and communication strategy targeting all parents	Children aged 2–12 years at risk of developing conduct disorders	To age 28	Triple P in Queensland to 572 701 children aged 2–12 years would be: AUD 19.7 million	2003 AUD	To pay for itself 1.5% of cases of conduct disorder would have to be averted per annum
	Level 2: 1–2 session intervention; Level 3: more intensive but brief 4-session primary care intervention; Level 4: 8–10 session active skills training programme; Level 5 targets parenting, partner skills, emotion coping skills and attribution retraining for the highest risk families		CEA COA	The cost for each level of intervention would be Level 1: AUD 240 000 Level 2: AUD 5.8 million Level 3: AUD 5.7 million Level 4: AUD 4 million Level 5: AUD 3.6 The average cost per child: AUD 34 The cost of implementing Triple P to one cohort of 2 year olds would be AUD 9.6 million. The average cost per child in the cohort would be AUD 51		

RCT, randomized controlled trial; CBA, cost–benefit analysis; CEA, cost-effectiveness analysis; CCA, cost-consequences analysis; CUA, cost–utility analysis; COA, cost-offset analysis.

Australian study that reported that the provision of advice and materials within a maternal and child health centre to mothers of infants with sleep problems had similar costs but better mental health outcomes for mothers and improved sleep patterns for infants compared with standard clinic consultations (Hiscock *et al.*, 2007).

As Table 1 indicates, a number of economic evaluations of parenting studies conducted alongside randomized controlled trials have been published, some set in schools, others focused on pre-school age children. In addition we identified one published study protocol for an ongoing evaluation in Wales (Simkiss *et al.*, 2010). An evaluation of the Webster-Stratton Incredible Years parenting programme in Wales, while finding the intervention to be cost-effective for all 3–5-year-old children at risk of conduct disorder, suggested that the intervention would be most cost-effective for children with the highest risk of developing conduct disorder (Edwards *et al.*, 2007). Analysis from a trial looking at 3–8-year-old children in the USA also suggests that combining the parenting component of Incredible Years with child-based training and teacher training, even though more expensive, can be more cost-effective (Foster *et al.*, 2007).

As with many health promotion interventions, benefits are only achieved if there is uptake and continued engagement with an intervention over a period of time. One Canadian study looked at community group versus clinic-based individual parenting programmes; while both approaches were effective in reducing the risk of conduct disorders the community group approach was six times more cost-effective because it reached a larger number of parents (Cunningham *et al.*, 1995). A trial of the Incredible Years Programme, combined with a manualized intervention using reading to promote interaction between disadvantaged parents and their children in London, would however only be cost-effective if uptake and engagement rates could be improved (Scott *et al.*, 2010).

The most negative studies were linked to empirical analysis of the Fast Track programme, a 10-year, multi-component prevention programme implemented in four areas in the USA and focused in part on the promotion of better mental well-being and the prevention of anti-social behaviour and violence. Although this included as one component a school curriculum approach based on PATHS (Promoting Alternative Thinking Strategies), it did not appear to be cost-effective. This may have been partly due to limitations in outcomes data in the study, but even if the intervention could be targeted solely at high-risk children it would only be cost-effective if society was willing to pay more than $750 000 (2004 prices) per case of conduct disorder averted (Foster and Jones, 2006, 2007; Foster, 2010). In all of these Fast Track studies no specific monetary valuation was placed on the maintenance of better mental health and well-being, but rather on the long-term consequences to non-health sectors, such as criminal justice.

Modelling studies

As Table 2 indicates, economic models have been used to estimate some of the long-term potential costs and benefits associated with parenting, early years and school-based interventions. Further economic analysis, drawing on 15-year outcome data (Olds *et al.*, 1997) suggested that the economic case for home visiting for all women was much stronger, given the impacts it had in terms of reducing abuse, violence, the need for social welfare benefits and improved employment prospects (Karoly *et al.*, 1998, 2005). Benefits outweighed costs by a factor of 5.7 to 1 for high-risk women and 1.26 to 1 for low-risk women.

As part of a wide-ranging economic analysis of early intervention programmes commissioned by the Washington State Legislature, several programmes relevant to DataPrev were modelled. It should be noted that the authors of these analyses acknowledged that a limitation of their modelling analysis was that it did not put a monetary value on the economic benefits associated with gains in social and emotional mental well-being or broad health benefits. This was due to the terms of the reference received from the Washington State Legislature, which limited the outcomes for all evaluations to crime, substance abuse, educational outcomes, teenage pregnancy, teenage suicide attempts, child abuse, neglect and domestic violence (Aos *et al.*, 2004).

Nonetheless this Washington State review included further evidence of an economic case for action. Analysis of the Nurse Family Partnership, making use of further updated cost

data (Olds *et al.*, 2002) reported a benefit to cost ratio of 2.88 to 1 when modelling benefits to child school leaving age, with major benefits due to crime avoided (Aos *et al.*, 2004). Combining data from several similar home visiting programmes a benefit: cost ratio for programmes targeting high-risk mothers had a 2:1 return on investment, with net benefits per mother of $6077 (2003 prices). (Aos *et al.*, 2004).

Turning to school-based interventions, the Caring School Community scheme developed in the USA (Battistich *et al.*, 1996) and now being implemented in Europe, can be delivered at a cost of $16 per pupil over 2 years, and potentially generate a return on investment of 28:1, even when just looking only at benefits of reduced drug and alcohol problems alone (Aos *et al.*, 2004). Using data from the Seattle Social Development Project, which implemented a teacher and parent intervention including child social and emotional development for 6 years and then followed up these children from age 12 to 21 (Hawkins *et al.*, 2005), costs of $4590 (2003 prices) per child were outweighed by benefits that were three times as great. Again this analysis may be conservative, as no monetary value was placed on the significant improvements seen in mental and emotional health (Aos *et al.*, 2004).

Another school-based intervention that has been modelled is the Good Behaviour Game (GBG), an approach which seeks to instil positive behaviours in children through participation in a game, with prizes given to winning teams who behave better. Potential net cost savings of between $15 and $20 million might be achieved for a hypothetical cohort of 5- and 6-year-old children if the programme could achieve a 5% reduction in special education placements, a 2% reduction in involvement with prison services and a 4% reduction in lifetime prevalence of tobacco use (Embry, 2002). Focusing solely on the economic benefits from evidence on a reduction in tobacco use rather than on any of its mental well-being benefits (Kellam and Anthony, 1998), another analysis of the GBG reported a return of investment of 25:1 (Aos *et al.*, 2004).

As Table 2 shows several economic models have looked at the case for investing in the multi-component, manualized multi-level Triple P-Positive Parenting Programme in a number of different settings. Modelling the potential benefits of universal application of Triple P to the Queensland child population aged 2–12, the average cost per child would be AUD 34 (2003 prices). It would appear to offer very good value for money when assumed to reduce the prevalence of conduct disorder by up to 4%, generating cost-savings of AUD 6 million. The intervention would have better outcomes and costs would be outweighed by conduct disorder averted as long as the prevalence of conduct disorder was at least 7% (Turner *et al.*, 2004; Mihalopoulos *et al.*, 2007). In a USA context, an economic model predicted that the costs of Triple P could be recovered in 1 year through a modest 10% reduction in the rate of child abuse and neglect (Foster *et al.*, 2008).

In England, modelling work for NICE (National Institute for Health and Clinical Excellence) looking at the universal use of a teacher delivered PATHS programme for children combined with parent training was reported to have a 66% chance of having a cost per QALY gained of <£30 000. Combining emotional and cognitive benefits in the model's base case scenario the cost per QALY gained would be £5500 (McCabe, 2008). Other modelling work looking at universal use of social and emotional learning interventions for 11–16-year-old children, and drawing on a review of effectiveness evidence on its application to the prevention of bullying (Evers *et al.*, 2007), suggested that if the intervention reduces victimization by 15% then it would have an 92% of having a cost per QALY <£30 000 (Hummel *et al.*, 2009).

Promoting mental health at the workplace

A number of reviews have looked at evaluations of the effectiveness of interventions delivered in the workplace to promote better mental health and well-being (Kuoppala *et al.*, 2008; Corbiere *et al.*, 2009; Martin *et al.*, 2009a). Actions can be implemented at both an organizational level within the workplace and targeted at specific individuals. The former includes measures to promote awareness of the importance of mental health and well-being at work for managers, risk management for stress and poor mental health, for instance looking at job content, working conditions, terms of employment, social relations at work, modifications to physical working environment, flexible working hours, improved employer–employee

communication and opportunities for career progression. Actions targeted at individuals can include modifying workloads, providing cognitive behavioural therapy, relaxation and meditation training, time management training, exercise programmes, journaling, biofeedback and goal setting.

Tables 3 and 4 summarize key findings on the economic case for investment in workplace mental health promotion from empirical and modelling-based studies. While the costs to business and to the economy in general of dealing poor mental health identified at work have been the focus of attention by policy makers in Europe and elsewhere in recent years (Dewa *et al.*, 2007; McDaid, 2007), less attention has been given to evaluating the economic costs and benefits of promoting positive mental health in the workplace. A recent review for NICE found no economic studies looking specifically at mental well-being at work had been published since 1990 (National Institute for Health and Clinical Excellence, 2009a).

In part this may be due to a lack of incentives for business to undertake such evaluations, as well as issues of commercial sensitivity. There have been few controlled trials of organizational workplace health promoting interventions, let alone interventions where mental health components can be identified and even fewer where information on the costs and consequences of the intervention are provided (Corbiere *et al.*, 2009). Moreover, many actions within the corporate world do not tend to be published in academic journals or books but rather in company literature. This makes studies more difficult to find and a full search of company literature was beyond the scope of our review. Most workplace health promotion evaluations related to mental health have focused on helping individuals already identified as having a mental health problem remain, enter or return to employment (Lo Sasso *et al.*, 2006; Wang *et al.*, 2006; Brouwers *et al.*, 2007; McDaid, 2007; Zechmeister *et al.*, 2008).

In fact, we were able to identify several economic analyses with some focus on mental health promotion (Table 3), largely from a US context where employers have had an not inconsiderable incentive to invest in workplace health promotion programmes, given that they typically have to pay health-care insurance premiums for their employees (Dewa *et al.*, 2007). At an organizational level, modelling work undertaken as part of the UK Foresight study on Mental Capital and Well-being suggests that substantial economic benefits that could arise from investment in stress and well-being audits, better integration of occupational and primary health-care systems and an extension in flexible working hours arrangements (Foresight Mental Capital and Wellbeing Project, 2008).

Modelling analysis of a comprehensive approach to promote mental well-being at work, quantifying some of the business case benefits of improved productivity and reduced absenteeism was also produced as part of guidance developed by NICE (Table 4). It suggested that productivity losses to employers as a result of undue stress and poor mental health could fall by 30%; for a 1000 employee company there would be a net reduction in costs in excess of €300 000 (National Institute for Health and Clinical Excellence, 2009b). Another analysis looking at the English NHS workforce reported potential economic gains from reducing absence levels down to levels seen in the private sector that would be equivalent to >15 000 additional staff being available every day to treat patients. This would amount to an annual cost saving to the English NHS of £500 million per annum (Boorman, 2009).

Most analyses have focused on actions targeted at individuals, such as stress management programmes, which are less complex to evaluate. There have been a number of economic assessments of general health promotion and wellness programmes (Pelletier, 1996, 2001, 2005, 2009; Chapman, 2005), but few have specifically mentioned mental well-being orientated components, and even when they do include these components they may not report mental health or even stress-specific outcomes. The Johnson and Johnson wellness programme, which includes stress management, has been associated with a reduction in health-care costs of $225 per employee per annum (Ozminkowski *et al.*, 2002), while a 4-year analysis of the Highmark company wellness programme, including stress management classes and online stress management advice, reported a return on every $1 invested of $1.65 when looking at the impact on health-care costs (Naydeck *et al.*, 2008). Neither analysis reported specific impacts on mental well-being or stress. Another study of an intervention to help cope with stress in the computer industry did not find any significant difference in stress levels, but it was associated

Table 3: Economic analyses of primary studies evaluating interventions promoting mental health and well-being at work

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/ price year	Synthesis of costs and effectiveness data
(Loeppke *et al.*, 2008), USA	I: Health-risk assessment, lifestyle management, nurse telephone advice line and telephone nurse-led disease management	543 employees of company, matched with employees in other companies that were not enrolled in a health promotion programme	Observational study with matched controls	Costs of intervention are not reported	Overall improved health of workforce and significant reduction in overall levels of combined physical and mental health risk ($p < 0.001$)	Perspective not stated	Paper states that there are net savings after taking account of costs of intervention, but level of net savings not reported
	C: No intervention	3 years		Average decrease in 3.5 days per annum in absenteeism in the intervention group. No change in the control group. No significant difference in productivity at work	Majority of employees, where data available, maintained gains over 3 years	Price year not stated	
					Compared with control populations significant decrease in prevalence of depression from 17.9 to 10% ($p < 0.01$), but statistically significant increase for anxiety from 7.9 to 10.2% ($p < 0.01$)		
(McCraty *et al.*, 2009), USA	I: Power to change stress management and health-risk reduction programme. Includes emotion refocusing and restructuring techniques	75 correctional officers at a youth facility	Quasi-experimental study with waiting list controls	Cost of programme not reported	Intervention associated with improvements in scales measuring productivity ($p < 0.01$) motivation ($p < 0.01$), gratitude ($p < 0.05$), positive outlook ($p < 0.05$) and reductions in anger ($p < 0.05$) and fatigue ($p < 0.05$). In addition there was a significant increase in depression in the control group ($p < 0.05$)	Health system	43% of the intervention group had a sufficient reduction in number of risk factors to reduce projected health-care costs compared with just 26% of control group
	C: Waiting list	3 months	CCA	Projected average health-care cost per employee in the intervention group based on number of overall risk factors was reduced to $5377 from $6556. This compared with a reduction in from $6381 to $5995 in the control group		2004 USD	Intervention was associated with an average annual saving of $1179 per employee, compared with a reduction of $386 per employee in the control group (sample size too small for statistical significance on cost differences with controls)
(Mills *et al.*, 2007), England	I: A multi-component health promotion programme incorporating a health-risk appraisal questionnaire, access to a tailored health improvement web portal, wellness literature, and seminars and workshops focused upon identified wellness issues	1518 employees at the UK headquarters of a multi-national company	Before and after study	Annual cost of programme per company employee £70	Overall number of health-risk factors decreases significantly (by 0.48) in the intervention group	Company	Improved work performance and reduced absenteeism led to return of investment (ROI) of 6.19: 1

Continued

Table 3: *Continued*

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/ price year	Synthesis of costs and effectiveness data
		12 months	CBA	Significant difference in absenteeism between control and intervention groups largely due to increase in absenteeism in the control group	Work performance also increased significantly by 0.61 points to 7.6 on work performance scale No significant changes in these outcomes in control groups	GBP. Price year not stated	Net benefits of £621 per employee
(Munz *et al.*, 2001), USA	I: Comprehensive worksite stress management programme consisting of self-management training and an organizational level stressor reduction process	79 customer sales representatives in a telecommunications company	Non-randomized controlled trial; other work units were control groups	Costs of intervention not reported	Self-management training group had significantly less stress than control group on the perceived stress scale (2.63 versus 3.11) ($p < 0.05$). Significantly less likely to experience depression on the Centre for Epidemiological Studies-Depression Scale (CES-D) 11.60 versus 18.90 ($p < 0.05$). The training group also had significantly better levels of relaxation, positive energy and less tiredness than the control group using the positive and negative affect schedule ($p < 0.05$)	Not stated	No synthesis of costs and benefits. Significant improvement in emotional well-being in the intervention group compared with the control group;
	C: No intervention	3 months	COA	23% increase in sales revenue per order in the intervention group compared with 17% in the control group. 24% reduction in absenteeism in the intervention group compared with the control group	Individuals also had significantly greater sense of independence and job control in the intervention group ($p < 0.05$)		Benefits not reported in monetary terms, but at organizational level; 23% increase in sales revenue per order in the intervention group compared with 17% in the control group. Twenty four percent reduction in absenteeism in the intervention group compared with the control group.
(Naydeck *et al.*, 2008), USA	I: Comprehensive wellness programme including on-line sessions for nutrition, weight management, stress management, and smoking cessation; on-site classes in stress and weight management. Access to exercise facility and incentives to participate in walking programme	1892 employees who participated in company wellness programme. Matched controls from non-participants in company and non-participants in other companies	Observational study with matched controls	Total costs per employee per year were $138.74	No specific health benefits—mental or physical were reported—the study focused on reduction in overall health-care costs only of the wellness programme	Company as payer of health-care premiums for employees	Reduction in health-care costs over 4 years for the programme were $1 335 524, with net savings of $527 121 and a return on investment of $1.65
	C: No health promotion programme	4 years	COA, CBA			2005 USD	

(Ozminkowski *et al.*, 2002), USA	I: Multi-component Health and Wellness Programme including health profiles, risk management programmes and access to fitness centres, including financial incentives of up to $500 to participate in programmes	11 584 US-based employees of multi-national company	Before and after study making use of health claims data	Cost of programme not reported. Impact on health-care utilization reported. On average after 4 years overall reduction in health-care costs per worker of $224.66. This consisted of increase in cost of emergency department visits of $10.87; and decreases in costs of outpatient/ doctor visits $45.17; mental health visits $70.69 and inpatient days of $119.67	Mental health (or other health-related outcomes) not reported. Instead changes in utilization of health-care services reported, including specific use of mental health service visits	Company (as health-care payer)	Investing in wellness programme associated with a large reduction in utilization of health-care services including mental health services over 4 years. On average savings per employee of $225 per year
	C: No intervention	60 months	COA	Impact on productivity not considered		2000 USD	Impacts on productivity not considered
(Rahe *et al.*, 2002), USA	I: Stress management programme focused on coping with stress through six group sessions and personal feedback	501 computer industry company and local city government employees	RCT	Cost of intervention $103 per employee	Stress, anxiety and coping levels improved significantly in all three groups after 12 months ($p < 0.05$), but there was no significant difference between groups with the exception of negative responses to stress for computer industry employees. Full intervention group computer industry employees had a significantly greater improvement in negative response, followed by partial intervention group and waiting list controls ($p = 0.012$)	Company perspective (as health-care payer)	No ratio reported, as no significant difference in stress, anxiety and coping
	C: Self-help groups with e-mail personal feedback (partial intervention) and waiting list control	12 months	CCA	Costs would be lower at $47.50 if delivered by in house medical professionals	There was a nearly significant difference in self-reported days of illness for the intervention group		But significant 34% reduction in health-care utilization by intervention participants compared with the control groups ($p = 0.04$) Concluded that this reduction in costs would more than cover the costs of delivering the intervention if delivered by in-house professionals
(Renaud *et al.*, 2008), Canada	I: Comprehensive health promotion programmes to provide employees with information and support for risk factor reduction, using a personalized approach and involving the organization's management as both programme participants and promoters. Programme includes modules on stress management, healthy eating and physical activity	270 company employees	Before and after study. No controls. COA	Cost of the intervention not reported Costs avoided not directly reported in monetary terms, but in terms of absenteeism and staff turnover	Significant reduction in stress levels away from work as reported using Global Health Profile Score over 3 years falling from 27 to 17% ($p < 0.0001$). There was also a reduction in feelings of depression with 54.8% of participants stating that they rarely felt depressed after 3 years compared with 38.5% at baseline ($p < 0.0001$). There was also a reduction in the number of people experiencing signs of stress ($p < 0.0001$)	Company perspective	No ratio. Significant reduction in high levels of stress, signs of stress and feelings of depression

Continued

Table 3: *Continued*

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/ price year	Synthesis of costs and effectiveness data
	C: No control	3 years					Costs not directly reported staff absenteeism decreased by 28% and staff turnover by 54%
(van Rhenen *et al.*, 2007), Netherlands	I: Cognitive focused stress management programme	242 stressed and non-stressed employees of a telecommunications company	RCT	Costs not stated	No significant impact on sickness-related absenteeism between groups overall. Very marginally significant impact of cognitive interventions in delaying time to sickness	Company	Study authors commented costs not affected as overall no difference in impact on absenteeism
	C: Brief relaxation and physical exercise intervention	12 months	COA				

RCT, randomized controlled trial; CBA, cost–benefit analysis; CEA, cost-effectiveness analysis; CCA, cost-consequences analysis; CUA, cost–utility analysis; COA, cost-offset analysis.

Table 4: Economic modelling studies for interventions promoting mental health and well-being at work

Bibliographic information	Intervention (I) and comparator (C)	Sources of model parameters / Study population Model timeframe	Type of model and timeframe / Economic analysis	Intervention cost	Perspective/ price year	Economic results
(National Institute for Health and Clinical Excellence, 2009a). England	I: Comprehensive mental health promotion programme	Systematic review of literature for effectiveness data	Decision analytical modelling study	Cost of intervention not estimated, just costs averted	Company	Positive steps to improve the management of mental health in the workplace, including prevention and early identification of problems, could result in annual cost savings to company of 30%. In an organization with 1000 employees, this is equivalent to cost savings of £250 607 a year
	C: No intervention	Hypothetical company with 1000 employees	12 months		2009 GBPs	

with a significant reduction in overall reported illness and a one-third decrease in the use of health-care services which would more than cover the costs of the intervention (Rahe *et al.*, 2002).

One study that did report mental health outcomes looked at the economic case for investing in multi-component workplace-based health promotion programme (personalized health and well-being information and advice; health-risk appraisal questionnaire, access to a tailored health improvement web portal, wellness literature, and seminars and workshops focused on identified wellness issues). Using a pre-post test study design, participants were found to have significantly reduced health risks, including work-related stress and depression, reduced absenteeism and improved workplace performance. The cost of the intervention to the company was £70 per employee; there was a 6-fold return on investment due to a reduction in absenteeism and improvements in workplace productivity (Mills *et al.*, 2007).

The experience of employees in another health promotion scheme over 3 years was compared with matched controls. Overall levels of risk to health were significantly reduced, while there was also a significant reduction in the prevalence of depression, although rates of anxiety significantly increased. There were net cost savings from a health-care payer perspective, although the costs of participation in the health promotion programme were not reported (Loeppke *et al.*, 2008). In Canada, an uncontrolled evaluation of a comprehensive workplace health promotion programme, including information for stress management reported a significant reduction in stress levels, signs of stress and feelings of depression at the end of a 3-year study period. While costs of the programme were not reported, staff turnover and absenteeism decreased substantially (Renaud *et al.*, 2008). A small controlled study looking at a programme to prevent stress and poor health in correctional officers working in a youth detention facility in the USA, reported incremental cost savings of more than $1000 over 3 months, although the sample size was too small to be significant. However, the study did not monetize the value of reported productivity gains, while there were positive changes in outlook, attitudes, anger and fatigue (McCraty *et al.*, 2009).

Studies can also be identified where no impacts on absenteeism rates of stress management interventions were identified (van Rhenen *et al.*, 2007). In other cases analyses of a combination of organizational and individual stress management measures did report improvements in emotional well-being, as well as in productivity and reduced absenteeism, but no cost data were provided (Munz *et al.*, 2001). We also identified an ongoing cost–benefit analysis currently being conducted alongside a randomized controlled trial of a mental health promotion intervention to prevent depression targeted at managers in small and medium size companies involving cognitive behavioural therapy and delivered by DVD in Australia (Martin *et al.*, 2009b).

Investing in the mental health and well-being of older people

The final area we reviewed concerned the mental health and well-being of older people. Sixteen per cent of older people may have depression and related disorders; potentially the prevention of such depression, particularly among high-risk groups such as the bereaved, might help avoid significant costs to families, and health and social care systems (Smit *et al.*, 2006). Evaluations from a wider range of countries were identified, most notably from the Netherlands (Table 5). In addition to published studies discussed below, we also were able to identify some ongoing cost-effectiveness studies where protocols had already been published in open access journals (Joling *et al.*, 2008; Pot *et al.*, 2008).

Several studies looked at different types of home visiting interventions to promote well-being and reduce the risk of depression, with mixed results. Neither a home visit programme by nurses in the Netherlands nor a programme to promote the befriending of older people in England was found to be effective or cost-effective (Bouman *et al.*, 2008a, b; Charlesworth *et al.*, 2008; Wilson *et al.*, 2009). We did identify a cost–utility analysis from the Netherlands conducted alongside a randomized controlled trial comparing a home visiting service provided by trained volunteers with a brochure providing information on depression (Onrust *et al.*, 2008). It targeted older people who had been widowed for between 6 and 9 months and who were experiencing some degree of loneliness.

Table 5: Economic analyses of interventions promoting mental health and well-being for older people

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/price year	Synthesis of costs and effectiveness data
Baumgarten *et al.* (2002), Canada	I: Adult day-care programme. Included personalized programme of therapeutic and preventive activities, developed after in-depth evaluation of specific needs and abilities. Objectives to reduce psychosocial problems, keep ability to perform activities of daily living, maintain nutrition and exercise	280 patients older than 60 years of age, referred to any day centre	RCT	Mean cost of the services per client was CAD 2935 (±5536) in the intervention group and CAD 2138 (±4530) in the control group	Frequency of depression symptoms was measured using the Centre for Epidemiologic Studies Depression Scale (CES-D). There was a reduction in depression scores in both groups—16.9 to 16.5 in the intervention group, and 15.7 to 14.6 in the control group. No significant difference	Health, social and long-term care	No ratio reported as no significant difference in clinical outcomes or in costs. Intervention considered by authors as not shown to be cost-effective
	C: Usual care (not described)	3 months	CCA	These differences were not statistically significant	Anxiety scores on State-Trait Anxiety Scale went 39.7 to 39.2 in the intervention group, and 38.1 to 36.4 in the control group. No significant difference No significant change in functional status or in caregiver burden between the two groups	1991 CAD	
(Bouman *et al.*, 2008a, b), Netherlands	I: Eight home visits by home nurses with telephone follow-up.	330 community-dwelling people aged 70–84	RCT	Overall total cost per person, including the cost for the home visiting programme was €450 higher in the intervention group than in the control group. This difference was not statistically significant	Effectiveness analysis used a Self Rated Health Scale which looks at physical, mental and social functioning. No significant difference found in outcomes, but values not reported in paper	Health, social car and long-term care	No ratio reported as no significant difference in outcomes. On average intervention programme would have higher costs of €1525 but this was not statistically significant
	C: Usual care	24 months	CEA				Deemed to have only a 10% chance of being cost-effective
(Charlesworth *et al.*, 2008) and Wilson *et al.* (2009), England	I: Access to an employed befriending, facilitator and then offer of befriend in addition to usual care	236 carers of people with dementia (PwD). Mean age of carers was 68 years (range 36–91 years) and the mean age of PwD was older at 78 years	RCT	Total intervention cost at 15 months £122, 665; control group £120, 852. This difference was not significant	Depression and anxiety measured using Hospital Anxiety and Depression Scale (HADS). Positive affect measured using Positive and Negative Affect Schedule. Loneliness using Loneliness Scale	Societal, public purse, voluntary sector and household	Incremental cost per incremental QALY gained of £105 494. In sensitivity analysis, only a 42.2% probability of being below threshold of £30 000 per QALY gained.
	C: Usual care	15 months	CUA		Incremental Quality of Life Years (QALY) gained using EQ-5D over 15 months of 0.017 QALYs (0.946 versus 0.929). This was not significant		Not found to be effective nor cost-effective

(Cohen *et al.*, 2006), USA	I: Participation in choral singing group to promote mental and physical health	166 English language-speaking healthy community-dwelling people aged >65	RCT	Cost figures not stated but noted that significantly greater increase in doctor costs in the comparison group and lower increase in drug consumption in the intervention group	Philadelphia Geriatric Morale Scale; Geriatric Depression Scale Short Form; and engagement in social activities measured. Significantly lower decline in morale in the intervention group 14.15–14.08 versus 13.51–13.06 ($p < 0.05$). Significant reduction in loneliness 35.11–34.60 versus 38.26–37.02 ($p < 0.1$). No significant differences in depression, but significantly less decline in number of weekly activities in the intervention group 5.37–4.29 versus 4.88–2.58 ($p < 0.01$)	Health-care costs	No ratio but intervention dominant with better outcomes and lower costs than control group
	C: No action	12 months	Cost-offset analysis				
(Hay *et al.*, 2002), USA	I: Weekly group activity sessions by occupational therapists to promote positive changes in lifestyle. Topics included health behaviours, transportation, personal safety, social relationships, cultural awareness and finances.	163 ethnically diverse independent-healthy older people.	RCT	Programme costs $548 per person in OT group; $144 in social activity control group; $0 in passive control group.	Quality of life measured using the SF-36 and found to be statistically significantly in favour of OT group of 4.5% compared with combined controls ($p < 0.001$)—although actual QALY scores not reported in paper	Health and social care	Incremental cost per QALY gained with OT was $10 666 (95% CI: $6747–$25 430) over combined controls, $13 784 (95% CI: $7724–$57 879) over passive control group and $7820 (95% CI: $4993–$18025) over the social activity control
	C: (i) Social activity control group who undertook activity sessions including craft, films, outings, games, dances; (ii) no-treatment control group ($n = 59$)	9 months	CUA	Annual total costs (including health-care costs and healthcare costs to caregiver costs) were $4741in OT group, $3982 in social activity control group, $5388 ± passive control group and $4723 for combined control group). These differences were not statistically significant		1995 USD	
(Markle-Reid *et al.*, 2006), Canada	I: Nursing health promotion services bolster personal resources and environmental supports in order to reduce the level of vulnerability, enhance health and quality of life	288 people aged 75+ and newly referred to the Community Care Access Centre for personal support services	RCT	Costs figures not stated but noted no statistical difference in costs between groups	SF-36 used to measure physical and mental health. Center for Epidemiological Studies in Depression Scale—CES-D used to assess level of depression. There was a statistically significant average incremental improvement in SF-36 mental health score of 6.32 in the intervention group (10.8 versus 4.48)	Health and social care services	No ratio as costs not significantly different but better outcomes at same cost

Continued

Table 5: *Continued*

Bibliographic information	Intervention (I) and comparator (C)	Target population and duration of economic analysis	Study design	Cost results	Mental health-related effectiveness results	Perspective/price year	Synthesis of costs and effectiveness data
	C: Usual home care services	6 months	CEA		Statistically significant reduction in mean depression symptom scores on CES-D score in intervention group of 2.72 (3.89 versus 1.17)		
(Munro *et al.*, 2004), England	I: Invitation to participate in free exercise classes every 2 weeks	20% least active older people in 12 primary care practices. 2283 in four practices were invited to exercise programme (of whom 590–26%—attended ≥1 session) and 4, 137 were controls	RCT	Mean costs €128 302/year, €125.78/session, €9.06/attender	Quality of life measured using the SF-36. Net significant QALY gains of 0.011 in the intervention group ($p < 0.05$)	Health-care payer perspective	Incremental cost per QALY gained of €17 174
	C: No invitation to participate	24 months	CUA	The incremental annual cost of the programme was €253 700 per 10 000 participants		2004. Euros, €s	
(Onrust *et al.*, 2008), Netherlands	I: Visiting service for older widow/ers bereaved for 6–9 months consisting of 10–12 home visits by a trained volunteer. Based on the Widow to Widow Programme	138 widows/78 widowers; 110 in the intervention group; 106 in the control group; Mean age of participants 68.8 (range 50–92)	RCT	Annual costs of intervention €553 per participant.	Quality of life measured using EQ-5D. Statistically significant improvement in QALYs gained in visiting service group (0.03; $p = 0.025$)	Health service costs, non-health patient costs (travelling, car parking etc); impact on ability to perform domestic tasks	Incremental cost per QALY gained €6827.
	Goal to bolster participant's personal resources through health assessment, managing risk factors and providing health education about lifestyles and disease management C: Brief brochure on depressive symptoms in addition to usual home care: case management, personal care, home support, nursing, occupational therapy, physiotherapy, social work and speech language therapy through community-based agencies	24 months	CUA	Annual mean overall costs of €3220 versus €2389 between intervention and control groups. However, difference in change in costs over time between two groups, €210, not significant		Intervention costs included time of volunteers 2003. Euros, €s	Given a willingness to pay per QALY gained of €20 000; the intervention has a 70% of being cost-effective

(Pitkala *et al.*, 2009), Finland	I: Psychosocial group rehabilitation for older people experiencing loneliness. Aim to empower, promote peer support and social integration	235 community-dwelling older people (74 plus) experiencing loneliness	RCT	Costs associated with health-care utilization	Psychological well-being measured using a six-dimensional questionnaire. Psychological well-being score improved statistically significantly in the intervention groups +0.11 versus 0.01 ($p < 0.05$)	Health care	No ratio as intervention has better outcomes and lower health-care costs
	C: No action	12 months	COA	Significant net reduction in health-care costs of €943 per person per year ($p < 0.05$)		Euros, €s. Price year stated	
(Van't Veer-Tazelaar, 2010), Netherlands	I: Stepped care intervention to prevent depression: watchful waiting, bibliotherapy, problem-solving treatment and antidepressant medication	170 people; mean age 81.4; 70% women	RCT	Cost per patient of watchful waiting €26; bibliotherapy €259.25; problem-solving treatment €638.24; screening and referral to GP €59.36	Depression assessed MINI/DSM–IV diagnostic status of depressive and anxiety disorders. Probability of depression/anxiety-free year was 0.88 in intervention group versus 0.76 in the control group ($p < 0.05$).	Societal	Incremental cost per depression/anxiety-free year gained was €4367. 94% probability of being cost-effective if willing to spend €20 000 per depression/anxiety-free year gained
	C: Routine primary care	12 months	CEA	Mean total costs in the intervention group €2985; control group €2453		2007 Euros, €s	

RCT, randomized controlled trial; CBA, cost–benefit analysis; CEA, cost-effectiveness analysis; CCA, cost-consequences analysis; CUA, cost–utility analysis; COA, cost-offset analysis.

Although improvements in quality of life were marginal, because of health service costs avoided the intervention had a 70% chance of being cost-effective, with a baseline cost per QALY gained of €6827 (2003 prices). In Canada a home nursing programme used to bolster personal resources and environmental supports of older people was also associated with a reduction in the risk of depression at no additional cost (Markle-Reid *et al.*, 2006). Recently a controlled trial of a stepped care approach for the prevention of depression in older people in the Netherlands was also found to be highly cost-effective at €4367 per depression/anxiety-free year gained (2007 prices) (Van't Veer-Tazelaar *et al.*, 2010).

Economic analyses also supported investment in some different types of group activities. Regular participation in exercise classes by older people was found to have some mental health benefits and be cost-effective from a health system perspective in England with a cost per QALY gained of €17 172 (2004 prices) (Munro *et al.*, 2004). Several studies also reported the beneficial effects to mental health of Tai Chi (MacFarlane *et al.*, 2005), but no formal cost-effectiveness analysis appears to have been undertaken. A study of 166 people randomized to participation in a choral singing group or no action was associated with a reduction in loneliness and lower health-care costs in the USA, albeit that the costs of the intervention were not estimated (Cohen *et al.*, 2006).Weekly group activity sessions led by occupational therapists in Canada significantly improved mental and physical health outcomes compared with participation in regular group social activities only. The incremental cost per QALY gained from a health and social care perspective was also considered to be cost-effective (Hay *et al.*, 2002). In Finland, a trial of psychosocial group therapy for older people identified to be lonely was also reported to be effective with a net mean reduction in health-care costs per participant of €943 (Pitkala *et al.*, 2009).

DISCUSSION

Our review indicates that there is an economic evidence base in all of the areas examined by DataPrev for some interventions to promote mental health and well-being in some very specific contexts and settings. In addition, we were able to identify published protocols of additional economic studies now underway. However, much of the existing economic literature that is available was beyond the scope of this review as it focused on actions targeted at the prevention of further deterioration, as well as the alleviation of problems in people already identified as having clinical threshold levels of mental disorder. This is consistent with the findings of previous reviews (Zechmeister *et al.*, 2008).

One important limitation of our review was the restriction to English language only materials, although papers in other languages that had abstracts in English were included in the review. Certainly the overwhelming majority of material that we found came from English-speaking countries, but this is consistent with previous reviews of economic evaluations of public health interventions where no language restrictions were applied (McDaid and Needle, 2009).

We will have missed relevant studies concerning workplace interventions that have been published in diverse corporate literature with apparent positive returns on investment, but with insufficient information to be included in this review (Price Waterhouse Coopers, 2008). This includes case studies on the UK Health, Work and Wellbeing website looking at four large and small companies in the pharmaceutical, hotel and leisure, transport and manufacturing sectors. All report some positive impacts on absenteeism and/or staff retention rates. In the case of London Underground, for example, a return of 8:1 on investment in a stress management programme was reported (http://www.dwp.gov.uk/health-work-and-well-being/case-studies/).

Great caution must be exercised in drawing any firm conclusions on the economic case for investment, but the case for action in childhood or targeted at mothers appears strong. The economic consequences of poor mental health across different sectors and persisting into adulthood mean that effective health visiting and parenting programmes can have very favourable cost–benefit ratios; all economic analyses reported here from a societal perspective were cost-effective. Narrower perspectives adopted in some other child focused studies where evidence of effect was found, for instance from a health or education

perspective alone, may undervalue the potential case for action.

Nine of the ten economic analysis set in the workplace reported favourable outcomes. Most of these studies looked solely at the impacts for employers, either in terms of paying for the health care of their employees or dealing with absenteeism and poor performance at work. No studies looking solely at the benefits of organizational level actions to promote well-being and mental health were found. Given that there is a literature on the effectiveness of some of these measures, there is scope for modelling work to look at the potential economic costs and benefits of these measures. Of the 10 studies looking at programmes for older people, 3 were found to have little chance of being cost-effective, but reasonable cost-effectiveness was reported for some group activities and home visiting activities.

In all areas we were able to identify published studies where no evidence of effect was found; these are also critical in helping to ensure resources are not used inappropriately. It is also the case that there has been little incentive to undertake formal economic evaluations of very low cost, but effective interventions, especially where costs are largely not borne by the public purse. One example of this are initiatives, often initially evaluated in low- and middle-income country contexts to promote skin-to-skin touch between mothers and their new born, where the principal cost is the time that the mother spends with her infant (Moore *et al.*, 2007; Maulik and Darmstadt, 2009).

Going forward our analysis of the methodological quality of studies suggests much room for improvement. While high-quality analyses were identified, most studies failed to separate presentation of data on resources used to deliver interventions from the costs of these resources. Few studies undertook more than a very cursory sensitivity analysis to account for uncertainty around estimates of effect and cost. There was little discussion of the distributional impacts of interventions, an issue that is of particular relevance in the context of public health and health promotion interventions, where engagement and uptake can be critical to effectiveness (McDaid and Sassi, 2010).

There is also a need for more common and consistent endpoints to improve comparability across different interventions and country settings. Reliance solely on topic-specific outcomes such the cost per unit improvement of maternal sensitivity or a reduction in loneliness mean that it is difficult to compare the case for different potential areas of intervention. One key challenge in economic analysis going forward is to develop measures that can adequately capture the benefits of improved mental well-being. The principal quality of life measure reported in studies here, the QALY, was designed to identify the benefits of the absence of illness rather than well-being. Work on other approaches to well-being is underway; but in the meantime making use of validated well-being instruments such as the Warwick-Edinburgh Mental Wellbeing Scale (Tennant *et al.*, 2007), alongside instruments used to value QALYs, such as the EQ-5D or SF-36, is merited. None of the cost–benefit analysis reported in this paper has elicited direct values for positive mental health: indeed the difficulty in putting a monetary value on well-being for cost–benefit analyses has been noted (Aos *et al.*, 2004). Another issue is that despite the links between poor physical and poor mental health, little economic analysis has focused on the economic case for preventing co-morbidity, for instance on the prevention of depression to promote cardiovascular health. This is another area that economists might explore further.

More use can also be made of economic modelling in the short term to help strengthen the evidence base for investing in mental health and well-being. Such an approach has recently been used to help inform policy making on the case for prevention of various mental health problems in both England and Australia (Knapp *et al.*, 2011; Mihalopoulos *et al.*, 2011). The DataPrev project has demonstrated that there is a substantial evidence base on effective interventions; most of these have not been subject to economic evaluation. Working with programme implementers to determine resource requirements, costs of delivery and any necessary local adaptations, economic models could be used to determine the likelihood that interventions are likely to be cost-effective in different contexts, and over different time periods. They can also be used to look at the case for investing in multi-level approaches to promotion and prevention, with some interventions targeted at the general population and others targeted solely at high-risk groups. Published examples of this approach include the Triple P programme for children (Mihalopoulos *et al.*,

2007; Foster *et al.*, 2008; Van't Veer-Tazelaar *et al.*, 2010) and stepped care for older people. Such models could also factor in key critical factors such as probability of uptake and continued engagement by different population groups.

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Supporting decision-making processes for evidence-based mental health promotion

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SUMMARY

The use of evidence is critical in guiding decision-making, but evidence from effect studies will be only one of a number of factors that will need to be taken into account in the decision-making processes. Equally important for policymakers will be the use of different types of evidence including implementation essentials and other decision-making principles such as social justice, political, ethical, equity issues, reflecting public attitudes and the level of resources available, rather than be based on health outcomes alone. This paper, aimed to support decision-makers, highlights the importance of commissioning high-quality evaluations, the key aspects to assess levels of evidence, the importance of supporting evidence-based implementation and what to look out for before, during and after implementation of mental health promotion and mental disorder prevention programmes.

Key words: evidence; decision making; mental health; promotion; prevention

WHY EVIDENCE IS CRITICAL FOR MENTAL HEALTH PROMOTION

Building on generic principles and the findings of studies in this issue, this short paper is a more reflective piece aimed at policy and decision-makers, to facilitate the greater use of evidence in decision-making and to promote the use of the evidence-base to support and validate decision-making for mental health promotion and mental disorder prevention (Box 1).

Evidence is commonly referred to as information with the aim to confirm a fact, offering proof that a certain statement reflects the actual reality, or the opposite, that a statement conflicts with the truth. The word evidence is used from different perspectives, ranging from testimony of expert witnesses in court to complex experimental research. A starting point of the evidence debate in the health field is evidence-based medicine (EBM), a conscientious, explicit and judicious use of current best evidence obtained by scientific method to make decisions about treatment and care of individual patients (Sackett *et al*., 1996). Growing concern about the use of treatment methods not based on state-of-the-art knowledge led to the creation of EBM. In EBM, individual studies on a specific topic are critically appraised with respect to how trustworthy or free of bias they are, and their results are synthesized (usually by systematic reviews and meta-analyses), with the findings then cast into evidence-based practice guidelines. EBM emphasizes the need to generate knowledge through controlled empirical research that can provide the most unbiased results.

Box 1: Definitions of mental health promotion and mental disorder prevention

Mental health promotion implies the creation of individual, social and environmental conditions that are empowering and enable optimal health and development. Such initiatives involve individuals in the process of achieving positive mental health and enhancing quality of life. It is an enabling process, done by, with and for the people.

Mental disorder prevention aims at reducing occurrence, frequency and re-occurrence of mental disorders, the time spent with symptoms, or the risk for a mental illness, preventing or delaying their occurrence and also decreasing their impact in the affected person, their families and society.

Evidence-based public health, defined as the public health endeavour in which there is an informed, explicit and judicious use of evidence that has been derived from any of a variety of science and social science research and evaluation methods (Rychetnik *et al*., 2002), follows the same principles as EBM. However, it includes a larger variety of evaluation methods that can capture the idiosyncrasies of the social context and the nature of public health interventions. Because of the complex nature of social interventions, evidence in public health may be best achieved by using both experimental and non-experimental methods.

As highlighted across the papers in this issue and stated elsewhere, and especially in the field of mental health promotion and mental disorder prevention, there is a difference between a systematic review of the literature and a systematic review of the best available evidence (Carter, 2010). This speaks to the limitations that have been associated with evidence-based public health (Kemm, 2006).

Regrettably, the word 'evidence' is used in the mental health promotion–mental disorder prevention field to refer to anything, from the results of a rigorous research study to the views of the general public. In addition to 'evidence' and 'evidence-based' being vague terms frequently used rather loosely, too often in this field, any intervention that has been subject to the most marginal of evaluations may be considered to be 'evidence-based', or often also wrongly named 'best practice'.

Much of the reflections in this paper are applicable to all complex interventions in public health, health promotion and beyond, which can be delivered across many different sectors and have outcomes relevant across education and social inclusion to growth and development, and which are not usually subject to the same mandatory requirements for evaluation as health-care treatments.

Especially in decision-making, it is essential to understand and be able to appraise the available evidence realizing the caveats of what is published as well as taking into account other variables that can help guide new policy directions. This paper reflects on decision-making and new policy directions for evidence generation and appraisal that can be applied to mental health promotion and mental disorder prevention, including the importance supporting the generation of high-quality evaluations, how to best asses and use evidence, the aspects to consider when supporting evidence-based implementation and what to look out for before, during and after implementation.

SUPPORTING THE GENERATION OF HIGH-QUALITY EVALUATIONS

As shown in the systematic reviews in this issue, taking evidence into account is critical in decision-making for implementation, as programmes vary greatly in their costs and cost-effectiveness (McDaid and Park, 2011) as well as in their potential impacts on health, mental health and other societal issues (Czabała *et al*, 2011; Forsman *et al*., 2011; Stewart-Brown and Schrader-McMillan, 2011; Weare and Nind, 2011).

Different relevant questions in policy- and decision-making that require evidence include: 'Does the intervention work?', 'Can it work in my setting?', 'What will it cost to deliver?' and 'What broad benefits may it convey?' Therefore, when trying to answer such questions, it is essential to identify what type of available evidence exists and might be helpful for this purpose.

In many cases, answering these questions does not necessarily mean commissioning new original research studies. As evidenced in this issue, the most powerful tool is the rigorous systematic review and (where possible) meta-analysis, as this combines the results from many previous well-designed studies rather than just relying on the results of a single study alone. Too often little is done to make use of all knowledge not only from previous evaluations but also from epidemiological research.

Whether existing evidence is sufficient or new has to be commissioned, decision-making and commissioning of useful evaluations should be based on high-quality studies that use the appropriate research designs to answer each specific question (Table 1) (Gray, 1996; Petticrew and Roberts, 2003). The evaluation and the related commissioning of evidence along with its interpretation should be broad based, and take into account other factors that will impact on successful implementation. These include the appropriateness and acceptability of an intervention in any one culture or setting, constraints on available human and financial resources, and any difference in the context in which an intervention is to be delivered (Petticrew and Roberts, 2005).

In addition, when commissioning studies, it is critical to ensure that methodological standards are adhered to both in the conducting and reporting of studies so to enhance the quality of evaluation. Guidelines have been developed by major international bodies on both the conducting and reporting of most research methodologies (e.g. Moher, 1998; Moher *et al*., 1999). To facilitate this, research funders build in incentives to ensure that high-quality studies comply with such guidelines. These guidelines apply as much to high priority studies undertaken in real-world conditions (where the evidence-base may still be limited), as they do to efficacy studies.

Ideally, in evaluative studies, appropriate outcome measures are chosen during the study development phase and according to a research hypothesis that matches the policy question. It is important to realize that convenient and readily available outcomes are not necessarily the most important or relevant ones (Gilbody *et al*., 2003).

Equally, sometimes the success or failure of mental health promotion interventions cannot be fully determined for a long period of time. All mental health promotion and mental disorder prevention programmes should routinely collect information on long-term health impacts (e.g. development of new cases of depression after a few years of the intervention; children long-term resilience and mental health outcomes) (Redmond *et al*., 2009), as well as social and economic outcomes (e.g. educational attainment, sick leave rates, crime), given the nature of such programmes in producing resilience and strengthening overall outcomes on the

Table 1: Typology of evidence (Petticrew and Roberts, 2003)

Research question	Qualitative research	Survey	Case–control studies	Cohort studies	RCTs	Quasi-experimental evaluations	Non-experimental evaluations	Systematic reviews
Effectiveness								
Does it work? Does doing this work better than doing that?				+	++	+		+++
Process of service delivery								
How does it work?	++	+					+	+++
Salience								
Does it matter?	++	++						+++
Safety								
Will it do more good than harm?	+		+	+	++	+	+	+++
Acceptability								
Will children/parents be willing to or want to take up the service offered?	++	+			++			+++
Cost-effectiveness								
Is it worth buying this service?					++			+++
Appropriateness								
Is this the right service for these children?	++	++						++
Satisfaction with the service								
Are users, providers and other stakeholders satisfied with the service?	++	++	+	+				+

long term (Donelan-McCall *et al.*, 2009; Eckenrode *et al.*, 2010). This is particularly relevant given the large range of multi-faceted outcomes that have resulted from mental health promotion programmes, showing impact on other sectors such as education, labour and employment, family cohesion etc., but only showing its impacts after a longer time span than that included in standard evaluations.

Especially in this complex types of interventions where health and social outcomes go hand in hand, long-term evaluations are essential. Interventions need sufficient time to show effect (or lack thereof) and to provide an accurate estimation of the duration of any effects. Knowledge of the duration of effects should help improve the effectiveness of interventions by guiding decisions about when and for how long interventions should be provided. Long-term follow-up can also show the real reach of programme effects and will lead to more convincing advocacy messages to influence the support for interventions (Flay, 2009).

ASSESSING AND USING EVIDENCE

When considering available evidence, it is essential to assess the quality of evaluations and the strengths and limitations of study findings, including the appropriateness of using a specific study design to evaluate the effects of an intervention and the likelihood that the results are susceptible to bias (Cochrane, 1976; Jadad *et al.*, 1998). However, it is also critical to look, for example, at the magnitude of effectiveness (how important or clinically significant a given result is in its context); the credibility of the study (is the study relevant to the wider population for whom the intervention is intended); how complete a study is (relevance of outcomes for all stakeholders); or the transferability of a study to a different context of that in which it was delivered (Rychetnik *et al.*, 2002; Grade, 2004; Herrman *et al.*, 2005; Rose *et al.*, 2006).

Using evidence in decision-making, even when of quality and readily available is not always easy; the lack of its use is much related to the need for transparency, clarity and simplicity in reporting study results (Clement and Buckley, 2011). The findings need to be presented in a way that makes sense to different audiences, including policymakers, professionals and the general public. For instance, traditional statistical outcomes could be transformed into understandable percentages of improvement, which are easier to understand (Moher *et al.*, 2010). It has been advised that to facilitate such decision-making processes, range of publications are available, facilitating the translation of science into policy and practice; for example, technical research publications could be accompanied by a brief non-technical summary of the findings; using workshops as a means to informing policymakers and other key stakeholders; or producing targeted documents adapted to communicate findings in a language that is more understandable but still using best available evidence (Jane-Llopis and Braddick, 2008; Jane-Llopis and Gabilondo, 2008; McDaid, 2008; Wahlbeck and Mäkinen, 2008).

Equally, it is rarely that intervention evaluations address the more complex issues around ethics or social responsibility. These broader equity issues will be critical when appraising the evidence and particularly need to be considered in good fairness in the decision-making process. Even for very robust and efficacious interventions, political factors and ethical considerations will need to be made to guide informed decisions. For example, the acceptability and fairness of a policy to a target population; in the case of population-based interventions, the fact that the intervention might be discriminating a subgroup of more marginalized individuals; whether policymakers may be willing to sacrifice some absolute gain in health in order to reduce inequalities in health status by focusing interventions on specific vulnerable population groups. Some of these issues are essential in decision-making and need balanced consideration, especially in times when interventions are coming under scrutiny, but it is important to note that there is no such thing as 'value-free evidence'; decisions will always be informed by various values and perspectives.

SUPPORTING EVIDENCE-BASED IMPLEMENTATION

During the needs assessment in a decision-making process, it is important to involve different stakeholders in the process of identifying policy relevant questions to ask and setting policy priorities (European Commission, 2005; World Health Organization, 2005; Rose *et al.*, 2006). To successfully implement evidence-informed policy, it is important to engage key stakeholders by

developing a shared vision, clear goals and objectives for a given intervention, considering the different values and acceptability to the general public of a given implementation decision (Barry and Jenkins, 2007). The goals of a given initiative need to be concrete, attainable, measurable and agreed by all members. An early assessment of participation readiness, such as community readiness, is also crucial in determining the nature and timescale of implementing a new programme (Jané-Llopis *et al*., 2005).

Just because an intervention has been effective in one country or culture, this does not mean that it will necessarily be effective elsewhere (Rothwell, 2005). When it is clear that an intervention can work in a new setting, studies should focus on identifying the mechanisms and processes of adaptation and reinvention that can help maintain effectiveness. It is essential to explore the transferability of preventive practices to different cultural situations. Qualitative research methods can be used alongside quantitative research methods to provide essential insights into the processes for successful transferability, adaptation and innovation (Dixon-Woods *et al*., 2004; Brownson *et al*., 2009).

One limitation of the available evidence for prevention and promotion in mental health is the lack of evaluation studies of programmes that have already been implemented and sustained in the real world (World Health Organization, 2004a,b; Jané-Llopis and Anderson, 2006). The creation of partnerships for the implementation and evaluation of new and existing interventions for prevention and promotion between practitioners and research teams should be stimulated (Lavis *et al*., 2003). Such collaborative alliances could result in research and practitioners working together in the design, implementation and evaluation of programmes and subsequently increase knowledge of effectiveness in the real world. This may help improve the quality of implemented interventions and generate the further real-world evidence that can help in the decision-making process (Pope and Mays, 2006).

BEFORE, DURING AND AFTER IMPLEMENTATION

The impacts of some interventions on health and other outcomes may take many years to be realized. In the absence of information on long-term outcomes, decision modelling techniques can be a very useful aid to the policymaking process. Using available data on short-term impacts and costs can be used to estimate long-term costs and consequences of different programmes. Data used in models about potential long-term impacts can be varied—if an intervention appears to be cost-effective using very conservative assumptions, this may provide powerful support for investment in promotion and prevention in mental health (Byford *et al*., 2003). Similarly, using what economists call threshold analysis, i.e. identifying the level of effectiveness that an intervention must achieve for a given level of resource in order to be considered cost-effective, can also be helpful. This has for instance been used to help inform policymakers about the potential cost-effectiveness of suicide prevention programmes (Hale *et al*., 2005).

As part of the policymaking processes, it can be important also to consider the mental health impacts of other public policy decisions. For instance, what might be the impact on mental health of a new urban regeneration scheme? How an investment in mental health promotion programmes at the workplace will affect absenteeism and productivity? Health impact assessment is a well-developed technique for identifying the potential health risks and opportunities associated with different policies. Incorporating health impact assessment (including mental health indicators) into the policymaking process can help promote a multi-sectoral approach to the promotion of mental health and well-being (Quigley *et al*., 2006). In this context, infrastructures that support mental health promotion and prevention and encourage collaboration within other public health initiatives as well as with other government sectors outside health can help ensure the sustainability of all programmes and a holistic approach to implementation. While the principles discussed in the evidence appraisal and decision-making processes in this paper are applicable across different sectors, specific idiosyncrasies of each sector would have to be taken into account. The need for efficient use of resources and the clear opportunity given the nature of many similar interventions with gains for different sectors point to the larger question that still remains to be tackled, how multi-sectorality and cross-government integration can be further embedded in decision-making processes.

CONCLUSION

In evidence-based decision-making in mental health promotion and prevention, guiding principles include:

(i) Thoroughly search for available information to avoid duplication;
(ii) Use high-quality available research-based information to answer appropriately questions that need answers;
(iii) Undertake critical assessment (ethical issues, acceptability, resources) to see if it fits with needs; and
(iv) Weigh the strengths and limitations of assessed evidence and decide on best course of action or no action.

Without evidence of effectiveness, it is difficult to make a case for investment in mental health. Moreover in the absence of good evidence, there is in fact a danger that inappropriate policies and practices are introduced that may both be harmful and waste scarce resources. However, it is important to note that there is no such thing as 'value-free evidence'; decisions will always be informed by various values and perspectives, and decision-makers will always inevitably be faced with certain degrees of uncertainty.

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Mental health and global well-being

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SUMMARY

A range of evidence-based, cost-effective interventions can be implemented in parenting, at schools, at the workplace and in older age to promote mental health and well-being. Such programmes need to be supplemented with actions to build mental health capital and promote resilience to manage and cope with the global risks that face humankind over the coming years. Actions need to connect mental and physical health and individuals need to be connected through health-promoting social networks; living environments need to be designed to support mental health and well-being; well-being indicators that include material living conditions, quality of life and sustainability can help drive healthy public policy. There is an urgent need to invest in skills training in decision-making, social interactions, building trust and cooperative behaviour that support the family of humanity as a whole as it faces the unprecedented stressors resulting from climate change.

Key words: mental health; well-being; resilience

INTRODUCTION

We began this supplement by noting that mental and behavioural disorders account for about one-third of the world's disability due to all ill-health amongst adults, and that unipolar depressive disorders are set to become the world's number one cause of ill-health and premature death in 2030, affecting high- and low-income countries alike (Anderson *et al*., 2011).

This burden of impaired mental health calls for extensive and urgent action to promote mental health and to prevent mental disorders. The papers in this supplement have described a range of evidence-based, cost-effective interventions that can be implemented in parenting, at schools, at the workplace and in older age, that promote mental health and well-being, reduce mental disorders and lead to improved productivity (Czabała *et al*., 2011; Forsman and Wahlbeck, 2011; McDaid and Park, 2011; Stewart-Brown and Schrader-McMillan, 2011; Weare and Hind, 2011). Finally, a sixth paper highlighted the importance of commissioning high-quality evaluations and the importance of policy makers in supporting evidence-based implementation (Jané-Llopis *et al*., 2011).

However, in addition to such evidence-based programmes, a lot more needs to be done if we are really going to have an impact in promoting mental health and well-being and in reducing the burden due to impaired mental health. This becomes crucial given the need to promote resilience to manage and cope with the global risks and stressors that face humankind over the coming years.

In this concluding paper we touch on a number of additional issues, including, for individuals, the connectedness between mental and physical health; the importance of environments

in which we live to support mental health and well-being; the importance of well-being indicators as drivers of change of supportive public policy; and the mental health imperative resulting from the global risk landscape. We conclude by considering why there is such a mismatch between what needs to be done and what is being done, and what can we do next.

CONNECTEDNESS BETWEEN MENTAL AND PHYSICAL HEALTH

Although some 28% of the global burden of non-communicable disease is attributed to mental and behavioural disorders, the full burden of mental disorders is likely to be underestimated because of inadequate appreciation of the connectedness between impaired mental health and other health conditions (Prince *et al*., 2007). Because these interactions are protean at the individual level, there can be no health without mental health. Impaired mental health increases the risk for communicable and non-communicable diseases, and contributes to unintentional and intentional injuries. Conversely, many health conditions increase the risk for impaired mental health. Thus, to increase its reach and impact, mental health promotion needs to be integrated into prevention and promotion programmes related to communicable diseases, including HIV, tuberculosis and malaria, intentional and unintentional injuries, pregnancy and child care, and non-communicable diseases, including cardiovascular and respiratory disorders and cancers (Prince *et al*., 2007).

Connectedness also works through social networks, which have a major impact on individual behaviours and outcomes. Data from the Framingham Heart Study have demonstrated that social networks determine much health-related behaviour, including alcohol (Rosenquist *et al.*, 2010) and tobacco use (Christakis and Fowler, 2008). Social networks can also worsen loneliness (Cacioppo *et al.*, 2009) and depression (Rosenquist *et al*., 2011).

Loneliness, for example, occurs in clusters, extends up to three degrees of separation, is disproportionately represented at the periphery of social networks and spreads through a contagious process (Cacioppo *et al.*, 2009). Comparison of the proportion of a person's friends and family who are lonely at one assessment, and the number of days per week that person feels lonely at the next future assessment, finds that an extra quarter day of loneliness is added per week to the average person who is surrounded by other lonely people compared with those who are not connected to anyone who is lonely. This suggests that efforts to reduce loneliness may benefit by actively targeting the people in the periphery to help repair their social networks and to create a protective barrier against loneliness that can keep the whole network from unravelling.

Similarly, depression spreads through a contagious process (Rosenquist *et al*., 2011). There is a powerful relationship between the fraction of a person's friends and family who are depressed at one assessment and the likelihood they will be depressed at the next future assessment. The determinant is not how many contacts a person has or how central a person is, but whether a large or small fraction of those contacts is also depressed. The relationship is significant and nearly doubles the likelihood of depression for the average person who is surrounded by other depressed people compared with those who are not connected to anyone who is depressed.

We should not forget that there are no dichotomies between people, for example, with and without depression, impaired mental health, hypertension, alcohol use disorders and so on (Rose, 1992). Rather, what society calls the 'deviants' are simply the tail of the population's own distribution, and such social distributions shift as a whole, reflecting the coherent nature of society. Inequalities within societies are one of the biggest drivers of such risk factors and outcomes (Wilkinson and Pickett, 2009). Health and social problems and impaired mental health are more prevalent in more unequal societies.

THE IMPORTANCE OF THE ENVIRONMENT IN WHICH WE LIVE

Hippocrates, writing 2500 years ago, advised anyone coming to a new city to enquire whether it was likely to be a healthy or unhealthy place to live, depending on its geography and the behaviour of its inhabitants [e.g. 'whether they are fond of excessive drinking' (Hippocrates, translated by Lloyd 1978)]. He continued, 'as a general rule, the constitutions and the habits of a people follow the

nature of the land where they live'. In his poem, Peter Bell the Third, Shelley (reprinted 2009) wrote, 'Hell is a city much like London/A populous and a smoky city/There are all sorts of people undone/And there is little or no fun done/Small justice shown, and still less pity'.

Although people who live in cities are, on average, wealthier and receive improved sanitation, nutrition and health care, they do have increased risk for chronic health disorders, a more demanding and stressful social environment and greater social disparities. Meta-analyses show that current city dwellers have a substantially increased risk for anxiety disorders (by 21%) and mood disorders (by 39%) (Peen *et al.*, 2010). Longitudinal studies suggest that the impact of urban life on impaired mental health is causal and not mediated by other epidemiological variables, and might be due to increased social evaluative threat, including social defeat and chronic social stress.

A recent study in Germany, using functional magnetic resonance imaging, found that urban upbringing and city living had independent impacts on processing of social evaluative stress (Lederbogen *et al.*, 2011). The study's participants lived or had lived in locations ranging from rural areas to large cities. The authors measured regional brain activation while participants performed a social-stress test which resulted in significant activity in brain structures known to be involved in emotion and stress. Of the activated brain regions, two were of particular interest: activation in the amygdala correlated with the size of the city in which an individual currently resided, and activation of the perigenual anterior cingulate cortex (pACC) correlated with how long a participant had lived in a large city during their childhood. Urban upbringing also affected the strength of the functional coupling between the amygdala and the pACC: those who had spent more time growing up in large cities had reduced functional connectivity between these two regions. Social threat, lack of control and subordination are all likely candidates for mediating the stressful effects of city life, and probably account for much of the individual differences seen.

Much can be done to counteract the impact of the living environment on mental well-being, including utilizing social networks to promote happiness, as well as changing the design of the living environment to increase other actions that promote mental health, such as physical activity. People who are surrounded by many happy people and those who are central in social networks are more likely to become happy in the future (Fowler and Chistakis, 2008). It seems that clusters of happiness result from the spread of happiness and not just a tendency for people to associate with similar individuals. A friend who lives within 1.6 km and who becomes happy increases the probability that a person is happy by 25%.

There are many strategies to promote physical activity in urban environments (Saelens *et al.*, 2003; Pucher *et al.*, 2009; Forsyth and Krizek, 2011), a key protective factor for mental health and well-being (McAuley *et al.*, 2011). For example, strategies to promote cycling include combinations of infrastructure, community design, pricing and enforcement of traffic regulations (Pucher and Buehler, 2008; Yang *et al.*, 2010). Interventions to promote walking tailored to people's needs, targeted at the most sedentary or at those most motivated to change, and delivered either at the level of the individual (brief advice, supported use of pedometers, telecommunications) or household (individualized marketing) or through groups, encouraged people to walk more, with the most successful interventions increasing walking among targeted participants by up to 30–60 min a week on average (Olgilvie *et al.*, 2007). Employers also have a role to play. Subsidizing employees who choose not to commute to work by car has been found to increase the proportion of employees who walk or cycle to work. California law requires many employers to offer commuters the option to choose cash in lieu of any parking subsidy offered. An analysis of eight firms that complied with the cash-out required found the number of employees who walked or biked to work increased by 39% (Shoup, 1997). Carbon dioxide emissions from commuting fell by 367 kg per employee per year. Government income tax revenues increased by $65 per employee per year because many commuters voluntarily traded tax-exempt parking subsidies for taxable cash.

THE IMPORTANCE OF WELL-BEING INDICATORS AS DRIVERS OF CHANGE

One way to help drive change for better mental health and well-being at the

jurisdictional level, country or municipal, is to broaden the measurement tools that governments use to monitor their progress, recognizing that absolute material wealth is not necessarily the major determinant of well-being (Andreou, 2010; Diener *et al.*, 2010). Thus, sole reliance on gross domestic product (GDP) as a country's measure of performance is inappropriate (Hall *et al.*, 2010). For example, the OECD Better Life Initiative includes measures of housing, income and wealth, jobs and earnings, social connections, education and skills, environmental quality, civic engagement and governance, health status, subjective well-being, personal security and work life balance in its assessment of countries' progress and well-being (OECD, 2011). The framework distinguishes between current material living conditions and quality of life, on the one hand, and the conditions required to ensure their sustainability over time, on the other (Figure 1). Material living conditions (or, economic well-being) determine people's consumption possibilities and their command over resources. While this is shaped by GDP, the latter also includes activities that do not contribute to people's well-being (e.g. activities aimed at offsetting some of the negative consequences of economic development) while it excludes non-market activities that expand people's consumption possibilities. Quality of life, defined as the set of non-monetary attributes of individuals, shapes their opportunities and life chances, and has intrinsic value under different cultures and contexts. And, sustainability of the socio-economic and natural systems where people live and work is critical for well-being to last over time. Sustainability depends on how current human activities impact on the stocks of different types of capital (natural, economic, human and social). However, suitable indicators for describing the evolution of these stocks are still lacking in many fields (Dasgupta, 2010; OECD, 2011).

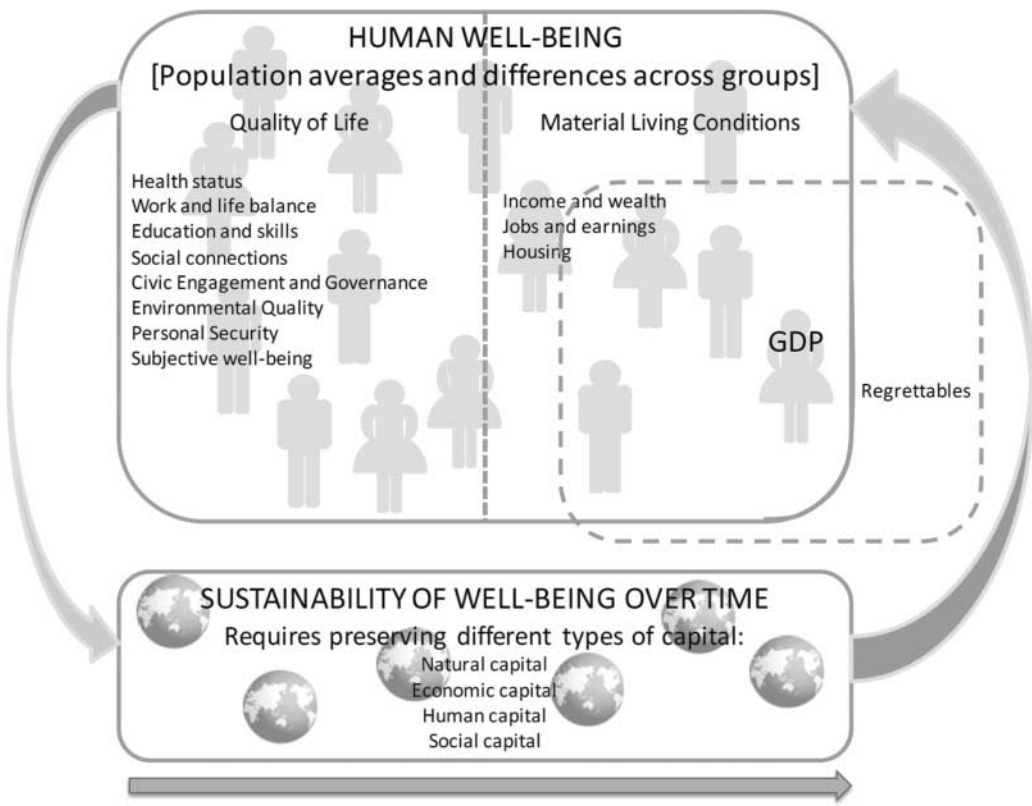

Fig. 1: Framework for OECD indicators (OECD, 2011).

THE MENTAL HEALTH IMPERATIVE RESULTING FROM THE GLOBAL RISK LANDSCAPE

Each year, the World Economic Forum publishes its global risks perception report. The 2011 report places climate change, which is, arguably, the greatest threat humankind currently faces (King, 2011) at the top of the global risks landscape along with other human-made crises, fiscal, chronic diseases and global governance failures (Figure 2).

Much has been written about the impacts of climate change on health and mental health and well-being (Fritze *et al.*, 2008; Costello *et al.*, 2009, 2011; Doherty and Clayton, 2011) and on the co-benefits of climate mitigation and health policies (Haines *et al.*, 2009). For example, moves towards lower-carbon-emission motor vehicles, and increased active travel with less use of motor vehicles in London and Delhi improve health by increasing physical activity (thus reducing disability adjusted life years) at the same time as reducing CO_2 emissions (Woodcock

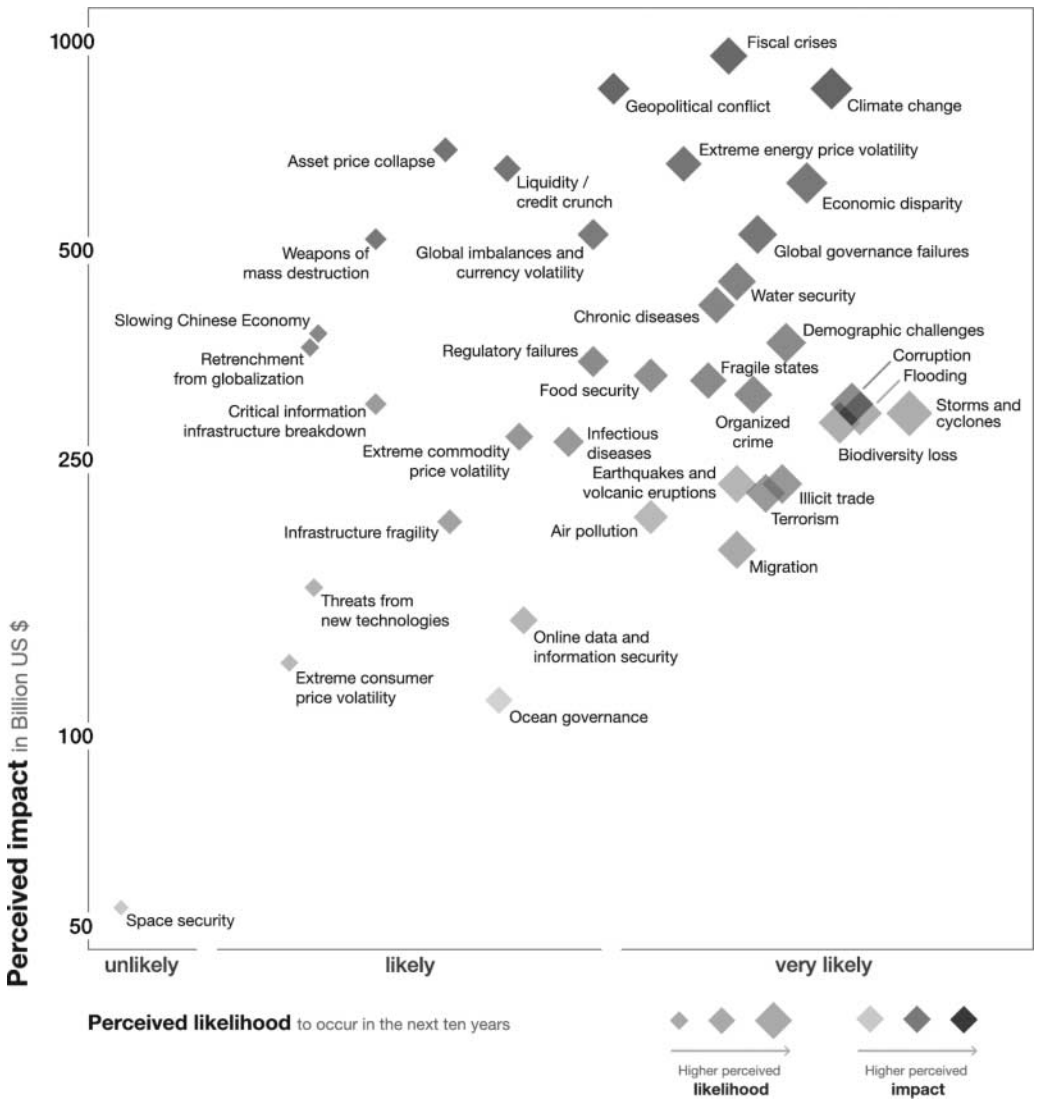

Fig. 2: Global Risks landscape 2011, perception data from the World Economic Forum's Global Risks Survey (World Economic Forum, 2011).

et al., 2009). There are also co-benefits to mental health and well-being and biodiversity from increased green spaces (Bird, 2007). The behavioural sciences have also informed efforts to mitigate or limit climate change, although, as with other responses to climate change, responses are influenced by both individual and contextual factors (Gifford, 2011; Sternm, 2011). Much has also been written about policy drivers of climate change adaptation (Biesbroek *et al*., 2010; Tompkins *et al*., 2010), and social and ecological resilience (Chuku and Okoye, 2009; Turner, 2010; Bunch *et al*., 2011).

However, much less has been written about the importance of mental health capital and resilience at the individual and community levels to adapt to the stressors imposed by climate change (Doherty and Clayton, 2011; Reser and Swim, 2011) and to prevent the social and community impacts of climate change that are likely to involve violence (Anderson and DeLisi, 2011) and intergroup conflict (Gilman *et al*., 2007) subsequent to displacement and relocation (Agyeman *et al*., 2009), socio-economic disparities (Doherty and Clayton, 2011) and decreased access to supportive and thriving ecosystems (Younger *et al*., 2008).

Much is now known about the neuroscience of emotional processing and resilience (Kim-Cohen and Gold, 2009) and factors that can moderate competence and resilience in development to avoid environmentally triggered depression and violence (Masten and Obradovic, 2006). Although genotypes can predispose to increased risk of depression (Caspi *et al*., 2003) and violence (Caspi *et al*., 2002), environmental interventions can reduce risk and promote mental health. For example, having a supportive relationship with an adult protects maltreated children from developing depression, even among genetically at-risk children (Kaufman *et al*., 2006). This suggests that interventions can be done to strengthen mental health capital, mitigating stress due to climate change and hopefully helping to prevent the negative social and community responses to climate change.

WHY IS THERE SUCH A MISMATCH BETWEEN WHAT NEEDS TO BE DONE AND WHAT IS BEING DONE

The question is why there is such a mismatch between what needs to be done and what is being done in promoting mental health and well-being. This is related to the environment in which our brains evolved. Our brains are optimized for finding food and rearing children in the African savannah (Grine and Fleagle, 2009; Lieberman, 2011). Our brains include a threat detection system that is exquisitely sensitive to the kinds of threats that our ancestors faced, but that is remarkably insensitive to the odds and consequences of the threats that we face today (Bar, 2009; Llinas and Roy, 2009). For example, the human brain devotes a great deal of time and space to processing information about other people, and leading us to be especially concerned when the threats other human agents produce are, to our dignity, values and honour (Gilbert and Wilson, 2009; Mitchell, 2009).

One solution to the mismatch is to frame problems in ways that appeal to human nature (Gardiner, 2011). For example, a simple study of the reuse of towels in hotel rooms found that towel reuse increased from 35% when a traditional message was used, 'help save the environment by reusing your towels' to 44%, when a more moral-based normative message was used, '75% of the guests who stayed in this room participated in our new resource savings program by using their towels more than once' (Goldstein *et al*., 2008). Another solution to the mismatch is to try change the way people think. People are capable of thinking rationally about odds and consequences, and it is not hard to teach them. Research shows that a simple 30 min lesson can dramatically improve people's decision-making that remains valid in new domains 1 month later (Larrick *et al*., 1990). We are developing a much better understanding of the neurobiological bases of human social interaction (Frith and Frith, 2010) and of communication and consensus decision-making and collective behaviour amongst humans (Dyer *et al*., 2009). These can be taught to increase reputation and trust and improve collective and cooperative behaviours. Cooperative behaviours, themselves, can be cascaded in human social networks (Fowler and Christakis, 2010). Experiments have shown that in both an ordinary public goods game and in a public goods game with punishment, focal individuals are influenced by fellow group members' cooperative behaviour in future interactions with other individuals who were not a party to the initial interaction. Furthermore, this influence persists

for multiple periods and spreads up to three degrees of separation (from person to person to person to person). The results suggest that each additional contribution a subject makes to the public good in the first period is tripled over the course of the experiment by other subjects who are directly or indirectly influenced to contribute more as a consequence.

What can we do next? As Stewart-Brown and Schrader-McMillan (Stewart-Brown and Schrader-McMillan, 2011), Weare and Hind (Weare and Hind, 2011) and McDaid and Park (McDaid and Park, 2011) have indicated, we need to expand our investments in supporting parents and in convening high-quality health-promoting schools that build mental health capital and promote resilience as youth move into adulthood. This should include skills training in decision-making, social interactions, building trust and cooperative behaviour for all of humanity. Building on the reviews of Czabała *et al.* (Czabała *et al*., 2011) and Forsman and Wahlbeck (Forsman and Wahlbeck, 2011), we need to design living and working environments that support mental health and well-being and that help preserve the mental health capital and cognitive functions of the middle age brain as it ages. We need to drive all of this with evidence (Jané-Llopis *et al*., 2011) and better indicators that reflect societal well-being. Finally, we should do our utmost to build resilience and adaptation strategies that support the family of humanity as a whole as it faces unprecedented stressors resulting from climate change.

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