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The Economic Case for the Prevention of Mental Illness

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Abstract

Poor mental health has profound economic consequences. Given the burden of poor mental health, the economic case for preventing mental illness and promoting better mental health may be very strong, but too often prevention attracts little attention and few resources. This article describes the potential role that can be played by economic evidence alongside experimental trials and observational studies, or through modeling, to substantiate the need for increased investment in prevention. It illustrates areas of action across the life course where there is already a good economic case. It also suggests some further areas of substantive public health concern, with promising effectiveness evidence, that may benefit from economic analysis. Financial and economic barriers to implementation are then presented, and strategies to address the barriers and increase investment in the prevention of mental illness are suggested.

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INTRODUCTION

Mental health problems are distressing, producing negative consequences for individuals who are unwell, for their families, and often also for their peers (at school or in the workplace, for example), their employers, and the wider society. Mental health problems can cause temporary incapacity, abject misery, self-loathing, and personal shame and can lead to public stigma and discrimination in many different settings. They may sometimes prompt violent behavior, self-harm, and suicidal ideation, consequences that have led most societies to develop legal powers to restrict individual liberties in the event of assumed or confirmed incapacity or dangerousness.

Poor mental health also has profound economic consequences. In 2013, mental disorders were the leading element in health care spending in the United States, some \$201 billion (82), as compared with \$147 billion for another major area of expenditure, heart conditions. A prime reason for this difference was the much greater levels of spending on long-stay institutions (nursing homes, psychiatric institutions, and prisons), as well as on mental health support for those on active military duty. In total, 40% of all mental health-related spending was on these forms of care. Excluding dementia, total costs of mental illness were still \$163 billion.

These health system costs represent still only a minority of the total adverse impacts of poor mental health. Poor mental health also increases the risks of additional physical morbidities, such as diabetes, and premature mortality. Notwithstanding these additional health system costs, most of the costs to society from poor mental health fall beyond health care systems (72, 74). Many of these costs arise from reductions in contributions to national economic output, mainly through curtailed participation in employment, as well as lower levels of volunteering and informal caring. Society also incurs additional spillover effects, such as increased strains placed on police and the criminal justice system, and family members experience physical and mental health impacts.

Given this burden, researchers and some policy makers around the world have called for a greater emphasis to be placed on prevention in policy, practice, and research in low-, middle-, and high-income countries (13, 112). Individuals are more susceptible to poor mental health when exposed to multiple risk factors, such as a challenging prenatal environment, economic disadvantage or social isolation, and traumatic experiences (including neglect, abuse, and bullying), as well as a lack of stimulation, general adversity, and stressful life events (3). Prevention can focus on reducing the chances of exposure to these and other risks and/or on implementing protective measures that strengthen family and social support and enhance resilience. Cumulative exposure to risk can be substantially reduced through effective actions taken not only during infancy and childhood (14, 41), but also across the life course, including at key transition points in life, such as leaving school, becoming a parent, losing a job, or retiring from the labor force.

USING ECONOMIC ARGUMENTS TO SUPPORT THE CASE FOR A GREATER FOCUS ON PREVENTION

Despite the benefits that should arise from the avoidance of poor mental health, investments in the prevention of mental disorders, let alone actions to promote mental well-being, have not traditionally commanded substantial resources from health systems around the world (60). Arguments illustrating that there is an economic as well as a moral imperative to invest in prevention may help to speed up implementation because difficult choices must always be made about the ways in which finite resources available to budget holders can be used. It is simply not enough to know that interventions are effective; the opportunity costs of investing money and human resources in any one intervention will be the alternative ways in which those resources could have been deployed.

Economic evaluation is one way of identifying these trade-offs. It involves an analysis of the costs derived and outcomes achieved from delivering one or more interventions either against no action or against other potential uses of those resources (20). While such evaluation has historically had less influence on health policy making in the United States (38) than in many other countries, it has still been influential in specific settings and especially with respect to public health and health promotion activities, where it has been championed by agencies such as the US Centers for Disease Control and Prevention (11).

Economic evaluation can be conducted in several different ways; one approach, known as cost utility analysis, measures changes in quality of life. The threshold at which an intervention is considered cost-effective will vary, but a cost of \$50,000 or less per quality-adjusted life year (QALY) gained has often been considered a lower boundary for cost-effectiveness in a US context (70). Another approach, cost-benefit analysis, places a monetary value on the benefits of improved outcomes, where an intervention is considered cost-effective if the value of benefits outweighs costs incurred. As the value of preventing mental illness could be compared with any other way in which budget holders (within and outside the health system) decide to spend public funds, e.g., on actions to improve education or reduce crime, it lends itself well to public health activities that involve multiple sectors and can have multiple impacts.

An economic evaluation can be linked to a trial, or alternatively data on costs and effects from multiple sources can be synthesized to model economic impacts. These models are frequently used in evaluating health promotion and disease prevention interventions, in part because they allow for estimates to be made about much longer-term outcomes than are usually possible in trials, sometimes over several decades (58). In this regard, one key source of economic data has been the evidence inventory and cost-benefit analysis produced by the Washington State Institute for Public Policy. The long-term economic models it has developed have informed thinking on the benefits of preventive actions for both children and adults and have influenced decision making in Washington state and across the United States (108).

Having briefly noted the impacts of poor mental health and the role that economic evaluation can play in informing decision making, we now consider what is known about the economic case for prevention. We cannot fully cover in this article the substantive literature on the economic case for prevention. Instead, we provide an illustrative overview of actions that have been considered cost-effective in selected contexts. Our focus is mainly on primary prevention, covering universal actions delivered to the general population or to everyone in a specific setting, e.g., in a school, as well as some selective actions targeted at specific population groups who have previously been identified as being at higher risk of developing mental health problems. The latter, for example, could include individuals in insecure employment or the long-term unemployed. In general, we do not look at indicative actions targeted at those who are already displaying signs of having mental health problems but who do not meet the diagnostic criteria for mental disorders. Other notable topics that we do not discuss are cost-effective collaborative care actions to promote better physical health by addressing mental health concerns; support for the mental health of carers; actions to tackle addictive disorders, including gambling; and the rapidly changing world of digital interventions to promote better mental well-being.

The evidence is set out from a life course perspective. Risks to mental health begin at birth and then develop at different life transition points, such as from school to work and from work to retirement. We highlight areas that we believe are promising for future economic evaluation, discuss some of the challenges with this evidence base, and consider how it may be strengthened. In doing so, we also put the spotlight on approaches that have been used in different settings around the world to facilitate greater use of economic evidence in decision making. This approach includes generating economic arguments that cross sectoral boundaries and include

economic benefits to sectors other than the health system. All values are reported in 2016 US dollars.

AREAS WITH A STRONG ECONOMIC EVIDENCE BASE FOR ACTION

Maternal and Infant Mental Health

The economic case for action starts in pregnancy. Between 10% and 20% of women may experience poor perinatal depressive symptoms (30, 47). Better management of mental health during pregnancy can also help mitigate problems such as anxiety, psychosis, and post-traumatic stress disorders. Men also experience mental health effects; recent studies in the United Kingdom and Italy report that 4–6% of new fathers experience depressive symptoms (21, 69) and as many as 18% experience anxiety disorders (52). Poor perinatal mental health can have long-lasting adverse impacts for a child's emotional health, as well as for physical and cognitive development (39). From a societal perspective, the lifetime costs of perinatal depression and perinatal anxiety alone to both mother and child have been estimated at \$112,299 and \$51,622, respectively; costs to the education and criminal justice sectors outweigh costs to the health care system (6). These costs suggest that there is a good case for investing in measures to identify the risk of depression in new and expectant mothers; several countries, including Australia, New Zealand, and England (60), have programs or guidelines to promote opportunities to screen for depression, action that is also recommended by the US Preventive Services Task Force (91). A number of economic evaluations now point to the cost-effectiveness of measures to prevent and/or intervene early on perinatal depression, including health visitor support and access to psychological therapies (33).

Children and Adolescents

There is also a strong economic evidence base on actions to protect the mental health of children and adolescents. These actions include parenting programs that can help promote positive mental well-being and reduce the risk of poor emotional development. Universal programs for all and targeted programs for parents of children at risk of mental health problems, or who are already experiencing behavioral difficulties, have been shown to be effective (27, 83, 105, 106). In the United States, targeted programs were shown to generate a positive return on investment, taking into account benefits to the health, education, and criminal justice sectors, as well as the labor market upon reaching adulthood. These ranged between \$1.80 and \$3.30 for every \$1 spent on programs targeted at children with behavioral problems (109). A recent economic evaluation also synthesized effectiveness data from five trials of the Incredible Years parenting program for parents of children aged 5 years, alongside cost data for delivery of the program in a UK context (28). Modeling costs and benefits over a longer time period to age 30 and again accounting for impacts on health, welfare, education, and criminal justice services, investigators noted a return of \$4.57 for every \$1 spent. The potential payoffs from universal primary preventive parenting programs may be even greater, generating long-term returns on investment of up to \$9.29 per \$1 spent (109). These greater savings are due primarily to the avoidance of additional cases of child abuse and neglect.

Schools also present an ideal setting for the delivery of many interventions. Substantial positive returns on investment in US modeling analyses have been reported for many school-based programs. One example is the Good Behavior Game, which seeks to elicit positive behaviors from children through a rewards-based game. With a return on investment of \$65.47 (109), this

program has been associated with longer-term favorable mental, physical, and educational outcomes (43) and has been implemented in multiple locations within and beyond the United States.

Workplaces

There is also a compelling economic case for investing in actions in the workplace. Poor mental health contributes to reduced productivity at work, greater likelihood of absence due to sickness, and a higher probability of unemployment (71, 73). In all OECD countries, people diagnosed with a mental disorder account for 30–40% of disability benefit caseloads, and total disability benefit expenditure related to mental illness accounts for ~0.7% of gross domestic product on average (73). If improved mental well-being, or mental illness prevention, can help employees stay at work, and work to their full productive potential, then the economic and societal benefits are potentially very significant. Strong incentives already exist for employers to invest in the health of their workforces, not only to maximize performance but also to keep company health insurance premiums in check.

We cannot go into detail here on the economic evidence base supporting many different types of actions that can be taken in workplaces. We do note, however, that there are two broad levels for action. First, organizational measures can include awareness training for managers on mental health and well-being at work, appropriate risk assessment, and management of stress and poor mental health. Second, actions can be targeted at individual workers, such as the provision of access to exercise facilities and psychological support for those experiencing distress. Most, but not all, of the existing economic literature focuses on individual-level rather than organizational-level actions (34, 96).

Many recent economic analyses have been conducted outside the United States, where incentives for workplaces to invest in health are weak, as social health insurance and tax-funded health care systems have traditionally shouldered much of the cost of work-related health problems. Nonetheless, in Europe, a number of different organizational-level and individual-level workplace mental health promotion measures have been estimated to generate returns on investment, over a 1-year period, of between \$0.81 and \$13.62 for every \$1 of expenditure in the program (57). The greatest returns on investment were generated from programs that improved line managers' and workers' knowledge of mental health risks, as well as from the provision of personalized exercise programs. These returns on investment were partly to employers but also to publicly funded health care systems.

Suicide and Self-Harm

Given that suicide is often one of the most well-known potential consequences of poor mental health, it may be surprising that the evidence base on cost-effective actions to prevent suicide and self-harm is limited (59). Suicide and nonfatal deliberate self-harm events were estimated to cost more than \$58.4 billion in the United States in 2013, of which only \$1.7 billion represented costs to the health care system (88). Most of these costs were for nonfatal self-harm; in the United States, estimates indicate ~25 attempts for every 1 completed suicide (19). On average, the lifetime cost of each completed suicide in this study was \$1.3 billion.

Researchers have identified numerous effective suicide prevention measures (35, 113), but there is still only a relatively small literature on cost-effective actions. Recent modeling work in England, looking at appropriate psychosocial assessment and aftercare following hospital-presenting deliberate self-harm, reported a return on investment of ~\$3 for every \$1 spent when looking at the use of health, police, and local government services, and this estimate increases

to \$15 per \$1 spent when impacts on time out of the labor force due to injury and premature death were factored in (63). This work drew on recent detailed analysis of the costs of hospital-presenting self-harm (99). It also took into account the economic benefits of a likely reduction in the future risk of suicidal behavior as the time to any subsequent self-harm event increased (75).

Another recent European study looked at the cost-effectiveness of school-based suicide prevention strategies (1). This study reported a relatively low 43% probability that a school-based mental health awareness program would be considered cost-effective in a European context, but the analysis did not include some of the long-term benefits associated with reducing suicidal behavior. Canadian analysis modeling a multicomponent suicide prevention strategy that would involve population mental health campaigns, training for primary care and other service gatekeepers, and appropriate support to address depression was reported to have a highly favorable cost per life year saved of \$3,549 (104). An economic case for sector-specific suicide prevention strategies can also be made. A multicomponent strategy to prevent suicide in the construction industry in New South Wales, Australia, reported that total costs averted (including those associated with nonfatal events) would be \$1.79 million compared with an implementation cost of \$0.39 million, generating a return on investment of nearly 5:1 to the government funding the program (18). Measures to restrict access to means, such as safety measures on bridges (such as the Golden Gate Bridge) can be highly cost-effective in the long term (5).

Older Age

Other than actions to reduce the risk of dementia, strategies to protect mental health in older ages have not received as much attention from economists as have strategies targeted to earlier points in the life course. At least 12% of older people in the United States and other high-income countries are affected by clinically significant levels of depression at any one time (9, 22, 92, 110). Risk factors that have been associated with depression in this population group include involuntary social isolation and loneliness (24, 93). Loneliness is also a risk factor for higher rates of poor physical health, such as coronary heart disease and stroke (100). Meta-analyses of studies with psychological or social interventions to prevent depression in older people have reported a small but statistical effect; use of social activities showed the most pronounced impact (23, 25, 53). Evidence has shown that, in addition to universally delivered interventions, actions targeted at groups of older people who are at high risk for depression, such as those with chronic physical illness or the bereaved, can be effective (16).

Evidence on the cost-effectiveness of nonmedical interventions to tackle social isolation and loneliness is emerging. One example is economic analysis as part of a randomized controlled trial in the United Kingdom, which evaluated the impact of participation in a 14-week professionally led community choir group on mental well-being. Compared with no action, this trial reported a significant improvement in mean SF-12 mental health scores for the intervention group at 6-month follow-up and a modest 60% chance of being cost-effective at a cost of \$29,000 per QALY threshold gained (15), a value that would be considered cost-effective in a US context. More work needs to be undertaken to consider a broader range of group activities, as well as volunteering by older people.

An economic analysis in the Netherlands supports the use of a stepped care approach, which involves watchful waiting, guided self-help using bibliotherapy, problem solving, and referral to a primary care physician as a cost-effective means of preventing depression and anxiety among at-risk older people. This approach successfully reduced the incidence of anxiety or depressive disorders by 50% over 24 months at a cost of no more than \$5,852 per depression-free year gained (102, 103).

AREAS WHERE RESEARCH ON THE ECONOMIC EVIDENCE BASE SHOULD BE STRENGTHENED

This article calls attention to the economic evidence base on the prevention of mental disorders through actions in and outside of the health sector. The studies described here only provide a partial snapshot of the evidence; many in-depth reviews of empirical and modeling studies on the economic case for action in different settings and focused on different parts of the life course are available (17, 34, 46, 51, 54, 59, 63, 66–68, 76, 84, 114). Nevertheless, it is also important to consider some of the gaps in this evidence base. In this section, we highlight some areas of public mental health where we believe that there may be promising evidence on effectiveness but little or no economic analyses yet available.

Addressing Bullying

A promising area where more evaluation is required concerns bullying, both in the real world and online. Bullying affects considerable numbers of young people; rates reported in US high schools range between 15% and 25% for males and females, respectively (77). There is more uncertainty on cyberbullying; estimates of cyberbullying victimization for US pupils range between 3% and 72% (86). Useful evidence from the United Kingdom show that children who have been bullied not only are at higher risk of mental health problems as young people, but also experience long-lasting adverse impacts on health, employment, and earnings that last well into middle age (10). While the mechanisms that link bullying victimization to mental health problems in adulthood are poorly understood (95), possible mechanisms include the biological embedding of stress—young people who are bullied have greater vulnerability to stress and psychopathology as they grow up—and the concurrent development of anxiety or depression in childhood (90). Another suggestion is that young people who are bullied might have a higher risk of bullying victimization as adults, with direct consequences for their mental health (4).

Effective actions to tackle bullying could be very cost-effective, given these short- and long-term impacts. A prime candidate for economic analysis is KiVA, which is a school-based antibullying program developed in Finland that focuses on enhancing the empathy, self-efficacy, and antibullying attitudes of classroom peers, addresses bullying and cyberbullying, and is delivered by teaching staff (42). Following a successful randomized controlled trial in Finland, a subsequent large nonrandomized trial involving more than 150,000 students also demonstrated lower risks of being a perpetrator (22% reduction) or victim (18% reduction) of bullying (42). It was also effective in tackling cyberbullying (111). On the basis of this evidence, KiVa has now been rolled out across more than 90% of Finnish schools and is being tested in other countries, including the United Kingdom, where an economic analysis alongside a randomized controlled trial is ongoing (12). Economic modeling work in the UK has also been conducted to provide decision makers with a sense of the potential long-term case (61). This modeling work assumes Finnish effect sizes are achievable, uses UK implementation costs, and estimates avoidable long-term economic costs of bullying using evidence from the 1958 British birth cohort (10). The model estimates that net savings for a cohort of 200 children until age 50, including long-term impacts on labor force earnings and wealth accumulation, would be \$66,172.

Mindfulness

Another area where work is required concerns the use of mindfulness training and mindfulness-based psychological therapy programs. Evidence on effectiveness in promoting well-being and

preventing mental health problems is far from consistent, but some reviews of trials suggest that it can be an effective alternative to conventional approaches to addressing (perinatal) depression and anxiety, as well as stress in higher-risk groups, including some groups of workers and informal carers (40, 55, 89). In the United Kingdom, a school-based trial is now under way that involves more than 5,700 pupils, and includes a cost-effectiveness analysis, to test whether mindfulness can promote better mental health, well-being, and emotional functioning (49). Mindfulness-based cognitive therapy has also been effective in reducing the risk of recurrent depression (50), but its cost effectiveness remains to be established (48).

Supporting Young People Who Are Not in Employment, Education, or Training

The transition from adolescence into adulthood is a period characterized by mental health challenges. Young adults who are not in employment, education, or training (NEET) are at risk of long-term economic disadvantage and social exclusion. The risk of being NEET is linked to mental health problems (81). Innovative and inclusive holistic programs have been developed to prevent the social exclusion of young people. Headspace is a center-based program to provide support for young people's emotional, social, and mental well-being in Australia. The cost of the comprehensive Headspace service appears comparable to that of community mental health care (37). In Finland, the Time Out! case management model for young men at high risk of social exclusion (2) has been found to be cost-effective in a randomized controlled trial, mainly due to its positive effects on employability. The break-even point for cost-effectiveness was a 3–4% increase in employment rate (80). In the United States, Multidimensional Family Therapy (MDFT) has evolved as a comprehensive, family-focused multilevel intervention to support adolescents with behavioral problems (101). We are not aware of any formal cost-effectiveness analysis of MDFT, but a cost analysis indicated that the average cost of a course of MDFT with 12–15 sessions delivered over 12 weeks was ~\$2,900 and was less costly than the treatment-as-usual regime (26). Taken together, evaluation results indicate that investment in comprehensive one-door services for young people may be highly cost-effective when gains in sectors other than health are taken into account.

Addressing the Psychological Impacts of Job Insecurity and Economic Restructuring

The risks to psychological health related to job insecurity and job loss have received little attention. A large literature indicates that risks to mental health among those who experience job insecurity and fear job loss may be as great as the risks identified for those who are unemployed (45, 97). Employees who survive a workplace downsizing may also be at risk (8). We have previously argued that occupational health services should have an important role to play in providing support to protect the psychological well-being of all employees, including those who lose their jobs during and following any business restructuring (107); however, there remain few efforts to evaluate the cost-effectiveness of such schemes.

Housing and Urban Planning

Improvements in population mental health may be achieved by focusing on places as well as on people. More work can be done to assess the value of investing in good housing and better urban planning. Both approaches help create the basis for human interaction and social capital, which in turn is beneficial for population mental health (31). Poor-quality housing is associated with poorer mental well-being and increased risk of mental disorders or exacerbation of mental disorder

symptoms, whereas good-quality housing is associated with better mental well-being, reduced risk of mental disorder, and faster recovery (98). Although some work has demonstrated the value of helping homeless and other vulnerable groups to obtain housing (56), there is a gap on the mental health-related economic benefits of improving the quality of housing.

Exposure to Nature

Mental health-friendly urban planning creates possibilities for social interaction and provides access to green (vegetation) and blue (water) spaces. A growing body of evidence, albeit mainly from cross-sectional studies, indicates that green space in particular is protective for the mental health of children and adults in the United States and elsewhere (7, 29). For example, data from more than 95,000 adults in the UK Biobank found significantly lower rates of major depression in individuals living in areas with higher levels of vegetation (85). In a cross-sectional analysis in the Netherlands, green space has also been associated with a lower level of suicide risk (36). A small trial in the United States suggests that family physician prescriptions for visiting parks, as well as encouraging more unsupported park visits, may help reduce stress levels, but larger-scale studies are required to confirm this finding (79). Opportunities also exist to look at the longer-term psychological benefits of regular participation in social group exercise activities, such as free organized 5-km park runs now found in some US cities and in many countries around the world (32).

These data all suggest that a case can be made for looking at the mental health-related economic benefits of more investment in better designed and accessible green spaces, particularly in cities (85). However, health policy is only beginning to recognize nature as a cost-effective tool in planning healthy cities (87). Evaluation of city planning cost-effectiveness is highly complicated, and we were unable to find any economic analyses related to mental health for these interventions. Some evaluations of the overall health benefits of physical activity in green spaces, such as the Walking the Way to Health Initiative in the United Kingdom, have been published. This program was estimated to accumulate \$7 in benefits for every \$1 invested as a result of improved health (94). Furthermore, a cross-sectional study of the habits of 280,000 people was used to estimate the health-related benefits of recreational physical activities in natural environments such as parks and at the seashore in England. For all of England, health economic benefits of physical activities were estimated to be worth \$3.16 billion per annum.

USING ECONOMIC EVIDENCE TO INFORM POLICY MAKING AND PRACTICE

This article has identified a wide range of economic evidence that supports investment in prevention, as well as some areas where it would be helpful to establish an economic case. However, prevention, as well as promotion and early intervention, does not receive sufficient attention and support (3). Why is this the case? **Table 1** highlights some common barriers to the implementation of mental health promotion and mental ill-health prevention interventions, as well as potential ways in which these barriers can be overcome (65).

One challenge in all contexts is that promoting and protecting mental health involve multiple sectors. These are issues for more than just mental health services or even health systems. Collaboration with external sectors can be problematic; improved mental health is not often a primary policy objective for these agencies. Thus, they may be reluctant to commit resources to mental health, even if compensated by health agencies for doing so. Fragmented funding and accountability structures are also likely to pose additional barriers to action. For instance, one sector may shoulder the financial responsibility for delivering a service, while another sector is perceived to

Table 1 Illustrative barriers and facilitators to implementation of programs to prevent mental illness

Barriers	Facilitators
Fragmentation of responsibility for delivery across stakeholders and sectors	Create conditions to build partnerships across sectors, such as colocating staff in the same premises or local consulting to achieve early multisector buy-in. Increase flexibility in regulatory arrangements to promote partnership working. Develop cross-sectoral strategies.
Fragmentation of funding across stakeholders and sectors	Allow scope for pooled budgets for jointly agreed activities. Establish dedicated streams of funding for cross-sectoral prevention and promotion actions.
Lack of awareness of the value of better mental health and/or insufficient information on economic case for investment	Make use of economic models to highlight short, mid-, and long-term costs and benefits of prevention.
Limited incentives in health and nonhealth sectors to invest in prevention	Identify the interests of non-mental health sectors and highlight costs and benefits related to these interests, e.g., education-related outcomes for schools, crime and justice outcomes for police and correctional services, or work-related outcomes for employers.
Limited capacity to deliver services	As part of mental health and well-being strategies, map the current availability of services and identify any gaps in capacity. Look for mechanisms to embed development of capacity into routine training where possible, e.g., within teacher training courses.
Lack of local champions to argue for prevention in mental health strategies	Identify potential local champions and relevant local stakeholders that are interested in fostering change and are (a) familiar with the policy-making process, or could become so, and (b) could coordinate and discuss potential actions with the community as a whole.

make most of the gains (and avert costs) at some future point in time. One example of this result could occur if a school-based mental health promotion service is reliant on funds from a local/state education budget rather than from a mental health service budget. The education budget holder may be reluctant to fund the service if it believes that most of the future benefits will not accrue to the school (or the wider education system) but instead flow to another sector, in this case the mental health system.

Overcoming these different motivations and financial disincentives involves moving toward a shared vision for mental health between different stakeholders within and external to the health system. It may take time to build alliances among local stakeholders, including local politicians, for the development of a more joined-up approach to these issues. Involving stakeholders at an early stage in strategic planning will facilitate the important step of obtaining buy-in for future implementation. An example of this approach in England is the wide consultation that took place over many months in the county of Kent as part of the county council's process of developing a range of mental well-being and health promotion actions (44). It allowed individuals to express their ideas about the types of potential activity that might be implemented before matching these activities with evidence on their effectiveness. Modest steps such as seizing opportunities to colocate staff from different organizations within the same building can also help enhance relationships and build trust between individuals and organizations (62).

One key ingredient is to highlight sector-specific benefits from investing in prevention. Take a school-based service as an example. Highlighting the benefits (and economic value) of better pupil mental health—for instance in terms of reduced truancy and classroom disruption, better teacher mental health, a reduced need for expensive special needs educational support or successful completion of the school year—may be helpful in persuading school budget holders (or local property taxpayers) to invest in prevention programs. Some economic modeling approaches used to inform decision making, for instance in the United Kingdom and the United States, specifically adopt this

approach, highlighting costs and benefits of interventions to different sectors over different time periods (63, 109).

Mechanisms to help share the financial risks and rewards for mental health promotion programs among sectors can also help with implementation. A range of regulatory and financial incentives have been used effectively to encourage intersectoral partnership working at local and national levels for mental health and other public health activities in a number of different countries (62). This approach could include the implementation of measures to allow the development of pooled-sector budgets for mental health activities, as well as the provision of federal and other governmental sources of earmarked funding, conditional on this work being done in partnership across sectors. One example of this approach has been time-limited competitive grants for partnership work on mental health promotion from the Public Health Agency of Canada's Innovation Strategy (78). Successful projects can be eligible for additional funding and scale-up.

These economic and financial factors are just some of the barriers to implementation. Other issues can include a lack of support for the identification and development of local champions who can make the case for mental health. In England, to address this issue, seven nongovernmental organizations came together to create the Mental Health Challenge and to encourage local government politicians to champion mental health issues (<http://www.mentalhealthchallenge.org.uk/the-challenge/>). These local politicians now receive information and support from the Mental Health Challenge team. To address limited workforce capacity, resources may also need to be invested in training relevant frontline workers in mental health awareness. Then, for example, teachers might be better able to recognize pupils (and indeed colleagues) who may be at risk for mental health problems and to refer them to appropriate channels for support.

CONCLUSIONS

We have presented selected work from the economic evidence base supporting investment in the prevention of mental illness across the life course and in different country and system contexts, although we have also illustrated some examples of potential evidence gaps that research funders may wish to address. As with the evidence base on cost-effective public health interventions in general, much of the evidence base has been generated using economic models (64), allowing potential long-term as well as short-term impacts for different sectors to be presented. Assumptions about effect size, costs, and other parameters can also be varied to test the robustness of findings.

Investigators also have opportunities to adapt models that were developed in one setting to look at the economic case in other settings. This approach may involve making different assumptions about likely effectiveness and costs on the basis of differences in implementation pathways, as well as differences in sectors that will be responsible for paying for and delivering services. Models can also be used to help strengthen the case for investing in further local evaluations of preventive actions. For all their value, the results of models (and indeed trials) are only as good as the quality of their inputs; no model will ever be perfect, so assumptions made in models must remain transparent so that policy makers and others can better assess the relevance of models to their individual circumstances. Despite these caveats, initiatives to build on existing repositories of knowledge about the economic case for action may help society to achieve some of the unrealized potential that would arise from the prevention of mental illness.

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LITERATURE CITED

1. Ahern S, Burke LA, McElroy B, Corcoran P, McMahon EM, et al. 2018. A cost-effectiveness analysis of school-based suicide prevention programmes. *Eur. Child Adolesc. Psychiatry* 27:1295–304
2. Appelqvist-Schmidlechner K, Upanne M, Henriksson M, Parkkola K, Stengård E. 2010. Effects of a psycho-social support programme for young men. Randomised trial of the Time Out! Getting Life Back on Track programme. *Int. J. Ment. Health Promot.* 12:14–24
3. Arango C, Díaz-Caneja CM, McGorry PD, Rapoport J, Sommer IE, et al. 2018. Preventive strategies for mental health. *Lancet Psychiatry* 5:591–604
4. Arseneault L. 2017. The long-term impact of bullying victimization on mental health. *World Psychiatry* 16:27–28
5. Atkins Whitmer D, Woods DL. 2013. Analysis of the cost effectiveness of a suicide barrier on the Golden Gate Bridge. *Crisis* 34:98–106
6. Bauer A, Knapp M, Parsonage M. 2016. Lifetime costs of perinatal anxiety and depression. *J. Affect. Disord.* 192:83–90
7. Bezold CP, Banay RF, Coull BA, Hart JE, James P, et al. 2018. The association between natural environments and depressive symptoms in adolescents living in the United States. *J. Adolesc. Health* 62:488–95
8. Brenner MH, Andreeva E, Theorell T, Goldberg M, Westerlund H, et al. 2014. Organizational downsizing and depressive symptoms in the European recession: the experience of workers in France, Hungary, Sweden and the United Kingdom. *PLOS ONE* 9:e97063
9. Briggs R, Tobin K, Kenny RA, Kennelly SP. 2018. What is the prevalence of untreated depression and death ideation in older people? Data from the Irish Longitudinal Study on Aging. *Int. Psychogeriatr.* 30:1393–401
10. Brimblecombe N, Evans-Lacko S, Knapp M, King D, Takizawa R, et al. 2018. Long term economic impact associated with childhood bullying victimisation. *Soc. Sci. Med.* 208:134–41
11. CDC (Cent. Dis. Control Prev.), Cent. State Tribal Local Territ. Support. 2018. Public health economics. *Public Health Professionals Gateway*. <https://www.cdc.gov/stltpublichealth/pheconomics/index.html>
12. Clarkson S, Axford N, Berry V, Edwards RT, Bjornstad G, et al. 2016. Effectiveness and micro-costing of the KiVa school-based bullying prevention programme in Wales: study protocol for a pragmatic definitive parallel group cluster randomised controlled trial. *BMC Public Health* 16:104
13. Collins PY, Patel V, Joestl SS, March D, Insel TR, Daar AS. 2011. Grand challenges in global mental health. *Nature* 475:27–30
14. Costello EJ. 2016. Early detection and prevention of mental health problems: developmental epidemiology and systems of support. *J. Clin. Child Adolesc. Psychol.* 45:710–17
15. Coulton S, Clift S, Skingley A, Rodriguez J. 2015. Effectiveness and cost-effectiveness of community singing on mental health-related quality of life of older people: randomised controlled trial. *Br. J. Psychiatry* 207:250–55
16. Cuijpers P, Smit F, Lebowitz BD, Beekman ATF. 2011. Prevention of mental disorders in late life. In *Principles and Practice of Geriatric Psychiatry*, ed. MT Abou-Saleh, CLE Katona, A Kumar, pp. 844–49. Chichester, UK: Wiley
17. Donker T, Blankers M, Hedman E, Ljótsson B, Petrie K, Christensen H. 2015. Economic evaluations of Internet interventions for mental health: a systematic review. *Psychol. Med.* 45:3357–76
18. Doran C, Ling R. 2014. *The economic cost of suicide and suicide behaviour in the NSW construction industry and the impact of MATES in Construction suicide prevention strategy in reducing this cost*. Rep., MATES Constr., Spring Hill, Qld., Aust. <http://mcaus.bpnw46jvgyfcmdux.maxcdn-edge.com/wp-content/uploads/2016/03/2014-Economic-cost-of-suicide-in-NSW.pdf>
19. Drapeau CW, McIntosh JL. 2017. *U.S.A. Suicide 2016: Official Final Data*. Rep., Am. Assoc. Suicidol., Washington, DC. http://suicideprevention.nv.gov/uploadedFiles/suicidepreventionnv.gov/content/SP/CRSF/Mtgs/2018/2016_AAS_USA_data.pdf
20. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance G. 2015. *Methods for the Economic Evaluation of Health Care Programmes*. Oxford, UK: Oxford Univ. Press. 4th ed.

21. Epifanio MS, Genna V, De Luca C, Roccella M, La Grutta S. 2015. Paternal and maternal transition to parenthood: the risk of postpartum depression and parenting stress. *Pediatr. Rep.* 7:5872
22. Forlani C, Morri M, Ferrari B, Dalmonte E, Menchetti M, et al. 2013. Prevalence and gender differences in late-life depression: a population-based study. *Am. J. Geriatr. Psychiatry* 22:370–80
23. Forsman AK, Nordmyr J, Wahlbeck K. 2011. Psychosocial interventions for the promotion of mental health and the prevention of depression among older adults. *Health Promot. Int.* 26(Suppl. 1):i85–107
24. Forsman AK, Nyqvist F, Wahlbeck K. 2011. Cognitive components of social capital and mental health status among older adults: a population-based cross-sectional study. *Scand. J. Public Health* 39:757–65
25. Forsman AK, Schierenbeck I, Wahlbeck K. 2011. Psychosocial interventions for the prevention of depression in older adults: systematic review and meta-analysis. *J. Aging Health* 23:387–416
26. French MT, Roebuck MC, Dennis ML, Diamond G, Godley SH, et al. 2002. The economic cost of outpatient marijuana treatment for adolescents: findings from a multi-site field experiment. *Addiction* 97(Suppl. 1):84–97
27. Furlong M, McGilloway S, Bywater T, Hutchings J, Smith SM, Donnelly M. 2012. Behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years (review). *Evid.-Based Child Health* 8:318–692
28. Gardner F, Leijten P, Mann J, Landau S, Harris V, et al. 2017. Could scale-up of parenting programmes improve child disruptive behaviour and reduce social inequalities? Using individual participant data meta-analysis to establish for whom programmes are effective and cost-effective. *Public Health Res.* 1(10). <https://doi.org/10.3310/phr05100>
29. Gascon M, Sánchez-Benavides G, Dadvand P, Martínez D, Gramunt N, et al. 2018. Long-term exposure to residential green and blue spaces and anxiety and depression in adults: a cross-sectional study. *Environ. Res.* 162:231–39
30. Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. 2005. Perinatal depression: a systematic review of prevalence and incidence. *Obstet. Gynecol.* 106:1071–83
31. Gong Y, Palmer S, Gallacher J, Marsden T, Fone D. 2016. A systematic review of the relationship between objective measurements of the urban environment and psychological distress. *Environ. Int.* 96:48–57
32. Grunseit A, Richards J, Merom D. 2017. Running on a high: parkrun and personal well-being. *BMC Public Health* 18:59
33. Gurung B, Jackson LJ, Monahan M, Butterworth R, Roberts TE. 2018. Identifying and assessing the benefits of interventions for postnatal depression: a systematic review of economic evaluations. *BMC Pregnancy Childbirth* 18:179
34. Hamberg-van Reenen HH, Proper KI, van den Berg M. 2012. Worksite mental health interventions: a systematic review of economic evaluations. *Occup. Environ. Med.* 69:837–45
35. Hawton K, Witt KG, Salisbury TL, Arensman E, Gunnell D, et al. 2016. Psychosocial interventions following self-harm in adults: a systematic review and meta-analysis. *Lancet Psychiatry* 3:740–50
36. Helbich M, de Beurs D, Kwan M-P, O'Connor RC, Groenewegen PP. 2018. Natural environments and suicide mortality in the Netherlands: a cross-sectional, ecological study. *Lancet Planet. Health* 2:e134–39
37. Hilferty F, Cassells R, Muir K, Duncan A, Christensen D, et al. 2015. *Is headspace making a difference to young people's lives? Final report of the independent evaluation of the headspace program.* SPRC Rep. 08/2015, Soc. Policy Res. Cent. (SPRC), Univ. N.S.W., Sydney, Aust. <https://headspace.org.au/assets/Uploads/Evaluation-of-headspace-program.pdf>
38. Huserau D, Culyer AJ, Neumann P, Jacobs P. 2015. How do economic evaluations inform health policy decisions for treatment and prevention in Canada and the United States? *Appl. Health Econ. Health Policy* 13:273–79
39. Ibanez G, Bernard JY, Rondet C, Peyre H, Forhan A, et al. 2015. Effects of antenatal maternal depression and anxiety on children's early cognitive development: a prospective cohort study. *PLOS ONE* 10:e0135849
40. Janssen M, Heerkens Y, Kuijer W, van der Heijden B, Engels J. 2018. Effects of mindfulness-based stress reduction on employees' mental health: a systematic review. *PLOS ONE* 13:e0191332

41. Jorm AF, Mulder RT. 2018. Prevention of mental disorders requires action on adverse childhood experiences. *Aust. N. Z. J. Psychiatry* 52:316–19
42. Karna A, Voeten M, Little TD, Poskiparta E, Alanen E, Salmivalli C. 2011. Going to scale: a non-randomized nationwide trial of the KiVa antibullying program for grades 1–9. *J. Consult. Clin. Psychol.* 79:796–805
43. Kellam SG, Wang W, Mackenzie AC, Brown CH, Ompad DC, et al. 2014. The impact of the Good Behavior Game, a universal classroom-based preventive intervention in first and second grades, on high-risk sexual behaviors and drug abuse and dependence disorders into young adulthood. *Prev. Sci.* 15(Suppl. 1):S6–18
44. Kent County Council. 2015. *Kent transformation plan for children, young people and young adults' mental health and wellbeing*. Rep., Kent County Council, Maidstone, UK. <https://www.westkentccg.nhs.uk/about-us/our-plans-reports-and-strategies/kent-transformation-plan-for-young-people/>
45. Kim TJ, von dem Knesebeck O. 2015. Is an insecure job better for health than having no job at all? A systematic review of studies investigating the health-related risks of both job insecurity and unemployment. *BMC Public Health* 15:985
46. Knapp M, McDaid D, Parsonage M, eds. 2011. *Mental health promotion and mental illness prevention: the economic case*. Rep., Dep. Health, London. http://eprints.lse.ac.uk/32311/1/Knapp_et_al_MHPP_The_Economic_Case.pdf
47. Ko JY, Rockhill KM, Tong VT, Morrow B, Farr SL. 2017. Trends in postpartum depressive symptoms—27 states, 2004, 2008, and 2012. *MMWR* 66:153–58
48. Kuyken W, Hayes R, Barrett B, Byng R, Dalgleish T, et al. 2015. Effectiveness and cost-effectiveness of mindfulness-based cognitive therapy compared with maintenance antidepressant treatment in the prevention of depressive relapse or recurrence (PREVENT): a randomised controlled trial. *Lancet* 386:63–73
49. Kuyken W, Nuthall E, Byford S, Crane C, Dalgleish T, et al. 2017. The effectiveness and cost-effectiveness of a mindfulness training programme in schools compared with normal school provision (MYRIAD): study protocol for a randomised controlled trial. *Trials* 18:194
50. Kuyken W, Warren FC, Taylor RS, Whalley B, Crane C, et al. 2016. Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: an individual patient data meta-analysis from randomized trials. *JAMA Psychiatry* 73:565–74
51. Le LK, Hay P, Mihalopoulos C. 2018. A systematic review of cost-effectiveness studies of prevention and treatment for eating disorders. *Aust. N. Z. J. Psychiatry* 52:328–38
52. Leach LS, Poyser C, Cooklin AR, Giallo R. 2016. Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: a systematic review. *J. Affect. Disord.* 190:675–86
53. Lee SY, Franchetti MK, Imanbayev A, Gallo JJ, Spira AP, Lee HB. 2012. Non-pharmacological prevention of major depression among community-dwelling older adults: a systematic review of the efficacy of psychotherapy interventions. *Arch. Gerontol. Geriatr.* 55:522–29
54. Lee YY, Barendregt JJ, Stockings EA, Ferrari AJ, Whiteford HA, et al. 2017. The population cost-effectiveness of delivering universal and indicated school-based interventions to prevent the onset of major depression among youth in Australia. *Epidemiol. Psychiatr. Sci.* 26:545–64
55. Lever Taylor B, Cavanagh K, Strauss C. 2016. The effectiveness of mindfulness-based interventions in the perinatal period: a systematic review and meta-analysis. *PLOS ONE* 11:e0155720
56. Ly A, Latimer E. 2015. Housing first impact on costs and associated cost offsets: a review of the literature. *Can. J. Psychiatry* 60:475–87
57. Matrix Insight. 2013. *Economic analysis of workplace mental health promotion and mental disorder prevention programmes and of their potential contribution to EU health, social and economic policy objectives*. Fin. Rep., Exec. Agency Health Consum., Brussels. https://ec.europa.eu/health/sites/health/files/mental_health/docs/matrix_economic_analysis_mh_promotion_en.pdf
58. McDaid D. 2014. Economic modelling for global mental health. In *Global Mental Health Trials*, ed. G Thornicroft, V Patel, pp. 265–81. Oxford, UK: Oxford Univ. Press

59. McDaid D. 2016. Making an economic case for investing in suicide prevention: quo vadis? In *The International Handbook of Suicide Prevention: Research, Policy and Practice*, ed. RC O'Connor, J Pirkis, pp. 775–90. Chichester, UK: Wiley Blackwell. 2nd ed.
60. McDaid D, Hewlett E, Park A-L. 2017. *Understanding effective approaches to promoting mental health and preventing mental illness*. OECD Health Work. Pap. 97, OECD, Paris. <https://www.oecd-ilibrary.org/docserver/bc364fb2-en.pdf?expires=1540426361&id=id&accname=guest&checksum=5E733168AC51930246CFA28B2A92540D>
61. McDaid D, Hopkin G, Knapp M, Brimblecombe N, Evans-Lacko S, Gan C. 2018. *The economic impact of the KiVa anti-bullying interventions in UK schools*. Rep., MQ, London. <https://s3.eu-central-1.amazonaws.com/www.joinmq.org/The+Economic+Case+for+Prevention+in+Young+People%E2%80%99s+Mental+Health+-+Bullying.pdf>
62. McDaid D, Park A-L. 2016. *Evidence on financing and budgeting mechanisms to support intersectoral actions between health, education, social welfare and labour sectors*. Health Evid. Netw. Synth. Rep. 48, World Health Organ. Reg. Off. Eur., Copenhagen. http://www.euro.who.int/__data/assets/pdf_file/0004/318136/HEN-synthesis-report-48.pdf?ua=1
63. McDaid D, Park A-L, Knapp M. 2017. *Commissioning cost-effective services for promotion of mental health and wellbeing and prevention of mental ill health*. Rep., Public Health Engl., London. http://eprints.lse.ac.uk/85944/1/McDaid_Commissioning%20cost-effectgive%20services_2017.pdf
64. McDaid D, Sassi F, Merkur S. 2015. *Promoting Health, Preventing Disease. The Economic Case*. Maidenhead, UK: Open Univ. Press
65. McDaid D, Wilson E, Knapp M. 2017. *Barriers and facilitators to commissioning cost-effective services for promotion of mental health and wellbeing and prevention of mental ill-health*. Rep., Public Health Engl., London. http://eprints.lse.ac.uk/85956/1/McDaid_Mental%20%20health_barriers%20and%20facilitators_2017.pdf
66. Mihalopoulos C, Chatterton ML. 2015. Economic evaluations of interventions designed to prevent mental disorders: a systematic review. *Early Interv. Psychiatry* 9:85–92
67. Mihalopoulos C, Vos T. 2013. Cost-effectiveness of preventive interventions for depressive disorders: an overview. *Expert Rev. Pharmacoecon. Outcomes Res.* 13:237–42
68. Mihalopoulos C, Vos T, Pirkis J, Carter R. 2011. The economic analysis of prevention in mental health programs. *Annu. Rev. Clin. Psychol.* 7:169–201
69. Nath S, Psychogiou L, Kuyken W, Ford T, Ryan E, Russell G. 2016. The prevalence of depressive symptoms among fathers and associated risk factors during the first seven years of their child's life: findings from the Millennium Cohort Study. *BMC Public Health* 16:509
70. Neumann PJ, Cohen JT, Weinstein MC. 2014. Updating cost-effectiveness—the curious resilience of the \$50,000-per-QALY threshold. *N. Engl. J. Med.* 371:796–97
71. OECD. 2012. *Sick on the Job? Myths and Realities about Mental Health and Work*. Mental Health Work Ser. Paris: OECD
72. OECD. 2014. *Making Mental Health Count. The Social and Economic Costs of Neglecting Mental Health Care*. Health Policy Stud. Ser. Paris: OECD
73. OECD. 2015. *Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work*. Mental Health Work Ser. Paris: OECD
74. Olesen J, Gustavsson A, Svensson M, Wittchen HU, Jonsson B. 2012. The economic cost of brain disorders in Europe. *Eur. J. Neurol.* 19:155–62
75. Olfson M, Wall M, Wang S, Crystal S, Gerhard T, Blanco C. 2017. Suicide following deliberate self-harm. *Am. J. Psychiatry* 174:765–74
76. Park A-L, McDaid D, Weiser P, Von Gottberg C, Becker T, Kilian R. 2013. Examining the cost effectiveness of interventions to promote the physical health of people with mental health problems: a systematic review. *BMC Public Health* 13:787
77. Pontes NMH, Ayres CG, Lewandowski C, Pontes MCF. 2018. Trends in bullying victimization by gender among US high school students. *Res. Nurs. Health* 41:243–51

78. Public Health Agency Can. 2017. Innovation strategy: equipping Canadians—mental health throughout life. *Government of Canada*. <https://www.canada.ca/en/public-health/services/innovation-strategy/mental-health.html>
79. Razani N, Morshed S, Kohn MA, Wells NM, Thompson D, et al. 2018. Effect of park prescriptions with and without group visits to parks on stress reduction in low-income parents: SHINE randomized trial. *PLOS ONE* 13:e0192921
80. Reini K. 2016. *Mielenterveyden edistämisen taloudelliset vaikutukset. Nuorten miesten syrjäytymistä ehkäisevän Aikalisä-tukipalvelun arviointi. [The economic effects of mental health promotion. An evaluation of the Time Out! support model to prevent social exclusion of young men.]* Work. Pap., Univ. Vaasa, Vaasa, Fin.
81. Rodwell L, Romaniuk H, Nilsen W, Carlin JB, Lee KJ, Patton GC. 2018. Adolescent mental health and behavioural predictors of being NEET: a prospective study of young adults not in employment, education, or training. *Psychol. Med.* 48:861–71
82. Roehrig C. 2016. Mental disorders top the list of the most costly conditions in the United States: \$201 billion. *Health Aff.* 35:1130–35
83. Ryan R, O'Farrelly C, Ramchandani P. 2017. Parenting and child mental health. *Lond. J. Prim. Care* 9:86–94
84. Sampaio F, Enebrink P, Mihalopoulos C, Feldman I. 2016. Cost-effectiveness of four parenting programs and bibliotherapy for parents of children with conduct problems. *J. Ment. Health Policy Econ.* 19:201–12
85. Sarkar C, Webster C, Gallacher J. 2018. Residential greenness and prevalence of major depressive disorders: a cross-sectional, observational, associational study of 94 879 adult UK Biobank participants. *Lancet Planet. Health* 2:e162–73
86. Selkie EM, Fales JL, Moreno MA. 2016. Cyberbullying prevalence among US middle and high school-aged adolescents: a systematic review and quality assessment. *J. Adolesc. Health* 58:125–33
87. Shanahan DF, Lin BB, Bush R, Gaston KJ, Dean JH, et al. 2015. Toward improved public health outcomes from urban nature. *Am. J. Public Health* 105:470–77
88. Shepard DS, Gurewicz D, Lwin AK, Reed GA Jr, Silverman MM. 2016. Suicide and suicidal attempts in the United States: costs and policy implications. *Suicide Life Threat Behav.* 46:352–62
89. Shi Z, MacBeth A. 2017. The effectiveness of mindfulness-based interventions on maternal perinatal mental health outcomes: a systematic review. *Mindfulness* 8:823–47
90. Singham T, Viding E, Schoeler T, Arseneault L, Ronald A, et al. 2017. Concurrent and longitudinal contribution of exposure to bullying in childhood to mental health: the role of vulnerability and resilience. *JAMA Psychiatry* 74:1112–19
91. Siu AL, Bibbins-Domingo K, Grossman DC, Baumann LC, Davidson KW, et al. 2016. Screening for depression in adults: US Preventive Services Task Force recommendation statement. *JAMA* 315:380–87
92. Steffens DC, Fisher GG, Langa KM, Potter GG, Plassman BL. 2009. Prevalence of depression among older Americans: the Aging, Demographics and Memory Study. *Int. Psychogeriatr.* 21:879–88
93. Steptoe A, Shankar A, Demakakos P, Wardle J. 2013. Social isolation, loneliness, and all-cause mortality in older men and women. *PNAS* 110:5797–801
94. Stone D. 2009. *An estimate of the economic and health value and cost effectiveness of the expanded WHI scheme 2009*. Tech. Inf. Note TIN055, Nat. Engl., Sheffield, UK. <http://publications.naturalengland.org.uk/file/95007>
95. Takizawa R, Maughan B, Arseneault L. 2014. Adult health outcomes of childhood bullying victimization: evidence from a five-decade longitudinal British birth cohort. *Am. J. Psychiatry* 171:777–84
96. Tan L, Wang MJ, Modini M, Joyce S, Mykletun A, et al. 2014. Preventing the development of depression at work: a systematic review and meta-analysis of universal interventions in the workplace. *BMC Med.* 12:74
97. ten Have M, van Dorsselaer S, de Graaf R. 2015. The association between type and number of adverse working conditions and mental health during a time of economic crisis (2010–2012). *Soc. Psychiatry Psychiatr. Epidemiol.* 50:899–907
98. Thomson H, Thomas S, Sellstrom E, Petticrew M. 2013. Housing improvements for health and associated socio-economic outcomes. *Cochrane Database Syst. Rev.* 2013(2):CD008657

99. Tsiachristas A, McDaid D, Casey D, Brand F, Leal J, et al. 2017. General hospital costs in England of medical and psychiatric care for patients who self-harm: a retrospective analysis. *Lancet Psychiatry* 4:759–67
100. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. 2016. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. *Heart* 102:1009–16
101. van der Pol TM, Hoeve M, Noom MJ, Stams G, Doreleijers TAH, et al. 2017. Research review: The effectiveness of multidimensional family therapy in treating adolescents with multiple behavior problems—a meta-analysis. *J. Child Psychol. Psychiatry* 58:532–45
102. Van't Veer-Tazelaar P, Smit F, van Hout H, van Oppen P, van der Horst H, et al. 2010. Cost-effectiveness of a stepped care intervention to prevent depression and anxiety in late life: randomised trial. *Br. J. Psychiatry* 196:319–25
103. van't Veer-Tazelaar PJ, van Marwijk HW, van Oppen P, van der Horst HE, Smit F, et al. 2011. Prevention of late-life anxiety and depression has sustained effects over 24 months: a pragmatic randomized trial. *Am. J. Geriatr. Psychiatry* 19:230–39
104. Vasiliadis HM, Lesage A, Latimer E, Seguin M. 2015. Implementing suicide prevention programs: costs and potential life years saved in Canada. *J. Ment. Health Policy Econ.* 18:147–55
105. Waddell C, Schwartz C, Andres C, Barican JL, Yung D. 2018. Fifty years of preventing and treating childhood behaviour disorders: a systematic review to inform policy and practice. *Evid.-Based Ment. Health* 21:45–52
106. Wahlbeck K, Cresswell-Smith J, Haaramo P, Parkkonen J. 2017. Interventions to mitigate the effects of poverty and inequality on mental health. *Soc. Psychiatry Psychiatr. Epidemiol.* 52:505–14
107. Wahlbeck K, McDaid D. 2012. Actions to alleviate the mental health impact of the economic crisis. *World Psychiatry* 11:139–45
108. Walker SC, Lyon AR, Aos S, Trupin EW. 2017. The consistencies and vagaries of the Washington state inventory of evidence-based practice: the definition of “evidence-based” in a policy context. *Adm. Policy Ment. Health* 44:42–54
109. Wash. State Inst. Public Policy. 2017. Benefit-cost results. *Washington State Institute for Public Policy*. http://www.wsipp.wa.gov/BenefitCost/WsippBenefitCost_AllPrograms
110. Wild B, Herzog W, Schellberg D, Lechner S, Niehoff D, et al. 2012. Association between the prevalence of depression and age in a large representative German sample of people aged 53 to 80 years. *Int. J. Geriatr. Psychiatry* 27:375–81
111. Williford A, Elledge LC, Boulton AJ, DePaolis KJ, Little TD, Salmivalli C. 2013. Effects of the KiVa antibullying program on cyberbullying and cybervictimization frequency among Finnish youth. *J. Clin. Child Adolesc. Psychol.* 42:820–33
112. Wykes T, Haro JM, Belli SR, Obradors-Tarragó C, Arango C, et al. 2015. Mental health research priorities for Europe. *Lancet Psychiatry* 2:1036–42
113. Zalsman G, Hawton K, Wasserman D, van Heeringen K, Arensman E, et al. 2016. Suicide prevention strategies revisited: 10-year systematic review. *Lancet Psychiatry* 3:646–59
114. Zechmeister I, Kilian R, McDaid D. 2008. Is it worth investing in mental health promotion and prevention of mental illness? A systematic review of the evidence from economic evaluations. *BMC Public Health* 8:20