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Major Depression Can Be Prevented

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Abstract

The 2009 Institute of Medicine (IOM) report on prevention of mental, emotional, and behavioral disorders (National Research Council & Institute of Medicine, 2009a [NRC/IOM, 2009a]) presented evidence that major depression can be prevented. In this article, we highlight the implications of the report for public policy and research. Randomized controlled trials have shown that incidence of major depressive episodes can be significantly reduced. Meta-analyses suggest that 22% to 38% of major depressive episodes could be prevented with currently available methods. We argue that, if major depressive episodes can be prevented, the health care system should provide routine access to evidence-based depression prevention interventions, just as it provides inoculations for other common and debilitating health problems. At the same time, researchers should pursue the major directions advocated by the IOM report to increase the enduring effectiveness of future prevention interventions. These directions include taking a developmental perspective, learning to identify groups at high risk, and testing evidence-based interventions that are likely to have the widest reach. Scientific evidence has shown that clinical depression can be averted. Our societies must take action to reduce clinical depression to the lowest possible level.

Keywords

prevention; major depression; Institute of Medicine; prevention interventions; incidence

This paper is an elaboration on an important theme for prevention science that was developed by the recent landmark report of the National Research Council and Institute of Medicine (NRC/IOM, 2009a). That report summarized the impressive progress in prevention research with children and young people that has occurred over the past two

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Drs. Muñoz and Beardslee were members of the Institute of Medicine (IOM) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions 2007-2009, and also members of the IOM Committee on Prevention of Mental Disorders, 1992-1994, which produced the first IOM report on prevention in the field of mental health.

decades with children and youth. The report also presented recommendations for the next generation of research and policy initiatives to translate this progress into true improvements in the mental health of America's children and youth. One theme in the report concerns the power of positive aspects of the social environment to promote positive development and to prevent the development of disorder. The current article focuses on the advances made in the prevention of major depression. The other two articles in this special section elaborate on two other themes in the NRC & IOM report, one of which concerns the preventive impact of early nurturing environments (Biglan, Flay, Embry, & Sandler, 2012) and the other of which concerns the salient role of poverty as a pervasive risk factor (Aber, Yoshikawa, & Beardslee, 2012).

In 1984, a National Institute of Mental Health public information pamphlet titled *Depression: What We Know* stated, “In general, the onset of a clinical depression cannot be prevented” (Lobel & Hirschfeld, 1984, pp. 4). This is no longer the case. And it is essential that the health care system take notice. The 2009 IOM report, *Preventing Mental, Emotional, and Behavioral Disorders Among Young People* (NRC/IOM, 2009a), listed several randomized trials in which the proportion of new cases of major depressive episodes was significantly reduced in participants randomly assigned to a preventive intervention compared with a control group. *As the beginning of the 21st Century, major depression can be prevented* (Muñoz, Cuijpers, Smit, Barrera, & Leykin, 2010). This is a major scientific advance. It requires a reappraisal of the resources allocated by the mental health field to prevention research, practice, and training. It calls for a review of health care policies to reduce what has now clearly been identified as a source of *unnecessary* suffering for humanity.

In this article, we expand on the sections of the report that addressed the prevention of depression, highlight the differences between prevention and treatment, and discuss relevant studies that have appeared since then that provide additional evidence that major depressive episodes can be prevented. The 2009 IOM report (NRC/IOM, 2009a) was a 15-year update of a 1994 IOM report on prevention of mental disorders (Institute of Medicine, 1994; Muñoz, Mrazek, & Haggerty, 1996). Two of the present authors (Muñoz and Beardslee) participated on both IOM committees and witnessed the major advances made in the intervening 15 years. In part on the basis of this experience, we ask the reader to imagine that the IOM convenes a new prevention committee 10 years from now, in 2022, which publishes its updated prevention report in 2024, 15 years after the 2009 report. What advances might such a report present? What can practitioners and researchers do in the next decade to ensure that the large individual and societal costs of major depression are substantially prevented nationally and worldwide?

Key Concepts of the 2009 Institute of Medicine Report

The mental health intervention spectrum

The 2009 IOM report reinforced the 1994 IOM report's definitional boundaries between prevention and treatment: *Prevention* occurs prior to the onset of the target disorder, *treatment* occurs after the onset of the target disorder. The third major segment of the mental health intervention spectrum is *maintenance*, which refers to interventions provided after the

acute clinical phase to reduce relapse or recurrence of the disorder. The 2009 report added a fourth segment: the *promotion* of positive mental health, which includes the capacity to accomplish age-appropriate tasks, the capacity to have a sense of mastery or control, and the strengthening of the individual's ability to deal with adversity. Promotion focuses on increasing individuals' ability to enjoy life, contribute to their families and communities, and cope with stress. (NRC/IOM, 2009a, Figure 3-1, pp. 67).

Depression

The term *depression* can refer to a passing mood or emotional state with elements of sadness and demoralization. As duration increases, depressed mood can become a *symptom* of an emotional disorder. Such a symptom can be part of a clinical *syndrome*, such as a Major Depressive Episode (MDE, as defined in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders [DSM-IV-TR]*; American Psychiatric Association, 2000). Finally, if the syndrome has long-enough duration, intensity, and recurrence, it can become a *disorder*, such as Major Depressive Disorder (MDD).

Prevention of depression

An intervention to prevent clinical depression would be considered successful if it reduced incidence, that is, the onset of new clinical episodes (Muñoz & Ying, 1993). To prevent MDEs, depressive symptoms must be kept below a clinical threshold. This implies reducing the intensity, duration, and frequency of depressive symptoms. Thus, important preliminary work toward the prevention of depression includes interventions focused on the prevention of symptoms and on the reduction of subthreshold symptoms (Horowitz & Garber, 2006). Preventing MDEs would prevent MDDs, by definition.

Prevention vs. delay of onset

The ideal preventive intervention would be administered once, as early in life as possible, and would last a lifetime. The mental health field should strive to reach this goal. However, lifetime prevention of MDEs with a single intervention may not be realistic with current methods. To prevent the onset of influenza, yearly inoculations are needed, partly because the strains of influenza vary each year. Similarly, the nature of specific stressors that may trigger an MDE will vary across the life span. Preventing MDEs triggered by common life transitions (e.g., leaving home after high school) may require different approaches than preventing MDEs triggered by stressful life events (e.g., loss of a spouse). A pragmatic way to think of prevention of depression at this time may be that of delaying onset of clinical depression during key developmental periods: For example, preventing or delaying onset during adolescence may promote good premorbid functioning. Then, if an MDE occurs in one's early 30s, at least one could already have completed higher education and secured gainful employment. Preventing or delaying onset of depression in mothers perinatally and during the children's preschool years would prevent the sequelae of maternal depression in children by averting the depressive episode itself in the mother, so that it can no longer have an impact on the children. This could result in long-term effects on the children's development (Patterson, DeGamo, & Forgatch, 2004). Testing these ideas should be a major focus of research efforts in the next decade (Le, Muñoz, Ippen, & Stoddard, 2003).

Risk factors

The IOM report included an extensive section on risk and protective factors (NRC/IOM, 2009a, pp. 81-91). Two classes of risk factors for depression stand out: specific and nonspecific. *Specific* factors include having first-degree relatives with a history of depression, having high symptoms of depression that do not cross the threshold for a clinical diagnosis, and exhibiting depressogenic behavioral patterns or cognitive styles. Having had a prior MDE is a known statistical risk factor for a subsequent MDE, which strongly suggests that prevention of a first episode must be a major goal (Muñoz, Le, Clarke, Barrera, & Torres, 2008).

Nonspecific risk factors lead to higher rates of depression and other disorders. Poverty, for example, is associated with a variety of poor outcomes in children (Aber, Yoshikawa & Beardslee, 2012), including an increase of lifetime risks specifically for depression (Gilman, Kawachi, Fitzmaurice & Buka, 2003). Similarly, exposure to violence and/or abuse in childhood is associated with later anxiety, posttraumatic stress disorder, and depression. In an analysis of the National Comorbidity Survey sample of more than 880 subjects, there was a significant association between childhood sexual abuse and mood and anxiety disorders in adulthood, including a twofold increase in the rate of lifetime depression among abuse victims (Molnar, Buka, & Kessler, 2001).

Strength-based approaches and resilience

Subgroups of individuals can exhibit remarkable resistance to developing pathology, even in high-risk environments, which has been called *strength in the face of adversity* or *resilience*. Although this field is complex, the IOM report on prevention presented the view that strengths and positive mental health are more than the absence of pathology and that interventions that increase strengths already have an important evidence base (NRC/IOM, 2009a, pp. 208-216). One of the first studies of strengths in the face of difficulties faced by children of depressed parents examined youngsters who were doing well despite parental depression (Beardslee, 2002; Beardslee & Podorefsky, 1988). Resilient youngsters were characterized as activists and doers, as committed to relationships within and outside the family, and as having a clear understanding of depression and its effects. Parents exhibiting resilience showed a profound commitment to effective parenting despite depression, as well as to relationships, communications, and getting help.

Over the last 15 years, significant progress has been made in research on and understanding of resilience (Masten, 2001). Masten and Coatsworth (1998) and Luthar, Cicchetti, and Becker (2000) highlighted multiple sources of strength in the face of adversity, such as personal characteristics of children and the ability of parents to help children face life stressors. Preventive interventions can provide resources and strengthen families at multiple levels – the individual level, the family level, the caregiving and system level, the larger community level, and the policy level.

A developmental perspective

The IOM report emphasized a developmental perspective on risk and protective factors (NRC/IOM, 2009a, pp. 71-111). Development is a dynamic process with different risk and

protective factors exerting effects at different developmental stages. At different stages, some factors (e.g., parental bereavement, divorce, or having a serious medical illness) may increase the likelihood of a child developing difficulties, while others (e.g., presence of stable relationships, good schools, or effective vigilant parenting) may promote the development of resilience. Integrative models about the causation of depression suggest that depression is determined in part by familial and genetic factors and in part by current life adversities and emphasize that vulnerabilities may be expressed in different ways at different developmental epochs (Kendler, Gardner & Prescott, 2002).

Evidence for Prevention of Major Depressive Episodes

The most stringent test of prevention efficacy involves randomized controlled trials (RCTs). To conduct RCTs feasibly, it is important to identify populations at high risk for developing a clinical episode within the time period of the trial, because higher incidence rates require smaller sample sizes to achieve adequate statistical power. For example, to conduct a universal prevention study in a community sample (usual incidence: 1.7% per year; De Graaf et al. 2002), 17,253 participants are needed in the experimental and 17,253 in the control group, in order to show a 22% reduction in incidence (to 1.3%). An intervention that is twice as effective (i.e., incidence reduced by 44%), would need 3,933 participants per condition. With an indicated high-risk group (incidence rate: 30% per year), only 735 participants per condition are needed to detect a 22% reduction in incidence (from 30% to 23.4%), and only 176 per condition are needed to detect a reduction of 44% (from 30% to 16.8%) (Muñoz et al., 2010). The differences in the required sample sizes help explain why indicated interventions have yielded more significant results than selective or universal interventions, which require very large sample sizes to detect differences in incidence between experimental and control conditions. However, from a public health perspective, small effects with large populations can have great societal impact (Glasgow, Vogt, & Boles, 1999). Thus, although with a few exceptions (Brunwasser, Gillham, & Kim, 2009; Merry, McDowell, Wild, Bir, & Cunliffe, 2004), universal approaches have not yielded significant results, and there is more evidence to support selective and indicated approaches, it will be important to continue attempts to develop effective universal interventions.

This section provides descriptions of illustrative prevention RCTs designed to test whether incidence was reduced in the experimental condition. Unless specifically stated, in these studies participants had to be screened to ensure that they did not meet criteria for clinical depression upon entry into the study, and the key outcome consisted of a diagnostic level measure to determine who had an onset of an MDE during the trial period. Analyses had to test whether the experimental condition had a significantly lower incidence rate than the control group. Differences reported are statistically significant unless stated otherwise.

The first depression prevention RCTs were conducted in the 1980s and 1990s (Clarke et al., 1995; Gillham, Shatté, & Freres, 2000; Muñoz, Ying, Armas, Chan, & Gurza, 1987; Muñoz & Ying, 1993; Muñoz et al., 1995; Seligman, Schulman, DeRubeis, & Hollon, 1999; Vega, Valle, Kolody, & Hough, 1987). Since then, the number of depression prevention trials has increased rapidly. Cuijpers and colleagues (Cuijpers, van Straten, Smit, Mihalopoulos, & Beekman, 2008) recently conducted a meta-analysis of 19 studies that fit the prevention

paradigm (no depressive disorder according to DSM criteria at baseline). The overall incidence rate ratio (IRR) of experimental to control groups was 0.78 (95% CI: 0.65-0.93), that is, the risk of developing a depressive disorder in the next year was 22% lower in participants receiving interventions than in those in the control groups. Thus, implementing existing depression prevention methods as a routine part of health care could result in prevention of 2 out of 9 cases of major depression each year. Combining prevention and treatment services is a realistic strategy to reduce the depression burden. Since the publication of this meta-analysis, several new trials have been conducted (Muñoz et al., 2010; For a current list of RCTs reviewed in the cited article, see <http://www.preventionofdepression.org/rcts/>).

Some of the widely used preventive interventions for depression are described below.

Peter Lewinsohn's Coping with Depression (CWD) Course

This cognitive-behavioral approach to teaching individuals to manage their mood has been used for both prevention and treatment (Dimidjian et al., 2011). The efficacy of the CWD course has been examined in 25 RCTs. A meta-analysis of these studies found that the six studies aimed at the prevention of new cases of major depression reduced the risk by 38% (Cuijpers, Muñoz, Clarke, & Lewinsohn, 2009).

Gregory Clarke's Cognitive-Behavioral Prevention Intervention

Gregory Clarke and associates developed a cognitive-behavioral group approach targeting youth at risk for depression, based on the CWD. In the first successful school-based study (Clarke et al., 1995), prevention participants evidenced significantly lower total incidence of MDEs over the 12-month follow-up period (14.5% vs. 25.7% for the control group). A second study enrolled youngsters at high risk due to either parental depression, own prior depressions, or subthreshold symptoms of depression (Clarke et al., 2001). Their multisession group cognitive-behavioral intervention yielded significantly lower incidence of MDEs for the experimental condition compared to the usual care control at 14-month follow-up (9.3% vs. 28.8% cumulative MDE incidence).

In a recent extension of this line of work, Garber and colleagues (2009) mounted a four-site effectiveness replication trial. Youths aged 13-17 (N=316) were recruited at four sites and randomized to either usual care or to the experimental condition. Assessments were conducted at baseline, after the eight-week intervention, and after the six-month continuation phase. At Month 9, the cognitive-behavioral therapy (CBT) intervention resulted in reduced incidence overall (21.4% in the experimental group vs. 32.7% in usual care), and especially so for adolescents whose parents were not depressed at baseline: 11.7% incidence in the intervention, vs. 40.5% in the usual care condition.

More recently, Stice and colleagues (Stice, Rohde, Seeley, & Gau, 2008; Stice, Rohde, Gau, & Wade, 2010) used the Clarke et al. (1995) program as part of a long-term study of 341 high school students. The students were randomized into one of four conditions: a cognitive-behavioral (CB) group intervention (drawn from Clarke et al., 1995, plus a focus on pleasant activities and motivational interviewing), a supportive-expressive (S-E) group intervention,

a CB bibliotherapy intervention (using the book *Feeling Good: The New Mood Therapy*, Burns, 1980), and an educational brochure control condition. At the two-year follow-up, onset of major and minor depression was significantly lower for the group CB (14%) and CB bibliotherapy participants (3%) than for brochure controls (23%).

Focusing on parental depression: Family cognitive-behavioral and parenting skills intervention

Given the high rates of parental depression and the fact that parental depression is one of the most potent risk factors for depression, some interventions have addressed the broader public health needs of families. One of the most promising recent investigations is that of Compas and colleagues (2009). Their family-based intervention was designed for parents with history of depression and their children. Groups of four families at a time received eight sessions weekly and then four follow-up sessions monthly. The intervention provided the families information about depression, the effect of stress and depression on functioning, and ways to recognize and manage stress. Within the group format, there was also an emphasis on working with parents to improve parenting skills and with children to improve coping skills. In a randomized trial of 111 families, significant differences in child- and parent-reported anxiety and depression scores and other dimensions of functioning were found at the 24-month follow-up. Incidence was reduced in the intervention group (14.3%) compared with the control group (32.7%). This study had a high retention rate, and involved systematic implementation at two different sites with good fidelity of intervention delivery. The results suggest that this intervention has a preventive effect on depressive symptomatology and on incidence of depression. The authors offered a mediational analysis based on the 12-month findings which demonstrated that increases in children's secondary coping skills and in positive parenting were the mediators between intervention delivery and positive outcomes (Compas et al., 2010, 2011).

Preventing postpartum depression

Several studies suggest that it is possible to reduce risk for clinical depression with interventions during pregnancy or soon after delivery (Leis, Mendelson, Tandon, & Perry, 2009; Muñoz et al., 2007; Tandon et al., 2011). Brugha, Morrell, Slade, and Walters (2011) reported on a successful prevention effort aimed at helping women prevent postpartum depression, in which participants in the intervention group received a health visit from a nurse trained to recognize depressive symptoms. Data were provided by 2,241 women. At six months, 7.7% of women participating in the intervention experienced significant depression as assessed by the Edinburg Postnatal Depression Scale, compared with 10.8% of women in the treatment as usual (TAU) group; results were similar at the 12-month follow-up (6.8% vs 9.6%). Another study done outside the United States was conducted in Mexico (Lara, Navarro, & Navarette, 2010) using a classroom-based intervention with 377 women. Although the basis of the group CBT-based intervention seemed to have promise in reducing the incidence of postpartum depression compared with the control condition (10.7% vs. 25.0% among completers), differential attrition, with more participants dropping out from the intervention, made it difficult to interpret the results.

Preventing depression in the elderly and/or seriously ill individuals

Depression among seriously ill individuals is highly prevalent and may contribute to poor outcomes. De Jonge and colleagues (2009) aimed to prevent the incidence of depression among rheumatology inpatients and diabetes outpatients. Participants were randomized to either usual care or to a consultation with a psychiatric liaison nurse, who could refer the patient to more intensive psychiatric care. At 12 months post-randomization, 63.2% of participants in the usual care group were diagnosed with depression, compared with 36.4% of those in the intervention group, which suggests that primary-care or hospital-based interventions may be very successful.

Elderly individuals, especially those residing in nursing homes, are at significant risk for depression. Konnert, Dobson, and Stelmach (2009) adapted the Clark et al (1995) Coping with Stress program to the elderly population and tested it in a sample of 64 nursing home residents. Though completion rates were low (for health reasons, among others), at six months, intervention participants were significantly more likely to have lower depressive symptoms than participants in the TAU group. Over the course of the study, no participants in the intervention group became depressed, whereas two participants in the TAU group met criteria for depression. A stepped care study showed that elderly participants benefitted from an intervention comprising assessment and waiting, followed by bibliotherapy, followed by CBT and problem-solving therapy, followed by a primary care clinic referral (van't Veer-Tazelaar et al, 2009, 2011). Participants (N=170) aged 75 or older were randomized to either the intervention or the assessment-only control. After one year, 7% of participants in the intervention condition developed a depressive disorder, compared with 18% in the control condition. At the two-year follow-up, 10.5% of the intervention group developed depression, compared with 26.2% of the control group.

Evidence of Reduction in Depressive Symptomatology

Cognitive behavioral preventive interventions aimed at reducing depressive symptoms have been widely studied, under the assumption that keeping symptoms below a clinical threshold will reduce onset of clinical episodes of depression. A meta-analysis by Horowitz & Garber (2006) found an overall mild to moderate effect size across studies. Most often, these interventions have been delivered to groups of children with increased depressive symptomatology and other risk factors in school and community settings and has been compared with either no intervention or usual care. This raises the conceptual issue of whether interventions should be evaluated on their ability to *prevent* increases in depressive symptoms or to *reduce* subthreshold symptoms.

Penn Resiliency Program

The Penn Resiliency Program (PRP) (Jaycox, Reivich, Gillham & Seligman, 1994), part of the larger body of work by Seligman and colleagues, has been widely used in a variety of settings. PRP began primarily as a school-based program to teach students the relationships among life events, their beliefs about those events, and the consequences. It is delivered in 1.5 to 2 hour group sessions, usually for 12 sessions in total. In both universal and targeted prevention studies, participants in PRP have reduced depressive symptoms relative to

controls over follow-up intervals ranging from six months to two years. It has been adapted and studied with Latino and African-American children (Cardemil, Reivich, Beevers, Seligman, & James, 2007). A recent meta-analysis evaluating 17 controlled studies confirmed that at follow-up, there were fewer depressive symptoms at post-intervention and follow-up assessments among PRP participants than among those receiving no intervention (Brunwasser et al, 2009).

Public health interventions: Strength in parenting and reduced symptomatology.

Beardslee and colleagues developed two public health interventions for parental depression that build strengths within families and offer psychoeducation. The first intervention was Family Talk, a six-session intervention that offered family-specific psychoeducational material and helped families have conversations about depression; the other intervention presented the same material via public health lectures. A randomized trial examining 100 families over 4.5 years demonstrated significant, positive increases in behaviors and attitudes towards the illness and increases in understanding in the children, with a greater increase in those receiving Family Talk (Beardslee, Wright, Gladstone & Forces, 2008). Both groups demonstrated significant improvements on the Family Relations Inventory and decreases in depressive symptomatology in the children.

As with Seligman's program, Family Talk was also adapted for other groups of families and tested in randomized trials. The first of these was a randomized trial with single-parent African American participants; the results showed similar or greater positive behaviors and attitudes by the parents. (Podorefsky, McDonald-Dowdell & Beardslee, 2001). Countrywide programs in Europe for children of the mentally ill, especially those with parental depression, provide a different set of challenges in adaptation as they represent different cultures, languages, and health care systems. Solantaus and colleagues developed such a program in Finland (Solantaus & Toikka, 2006; Solantaus, Toikka, Alasuutari, Beardslee, & Paavonen, 2009) and conducted a randomized trial of the Family Talk intervention and a less intensive public health intervention, Let's Talk About It, and showed that both were safe, feasible and led to positive gains in families.

Other Prevention Efforts

Below we present additional illustrative depression prevention efforts, provided in a variety of settings, to different populations, and using a number of preventive approaches.

Interventions to improve functioning in the face of stressful life events: Illustrative programs

The death of a parent is a stressful event that increases the risk for depression in both children (Brent, Melhem, Donohue & Walker, 2009) and the surviving parent (Lin, Sandler, Ayers, Wolchik, & Leucken, 2004; Stroebe, Schut, & Stroebe, 2007). Sandler et al. (2003) developed a multi-component intervention, the Family Bereavement Program (FBP), directed at strengthening children's coping, strengthening the quality of parenting by the surviving parent, and promoting the surviving parent's own adjustment. Evaluation of the program in a randomized experimental trial found a reduction in girls' level of depressive

symptomatology 11 months following the intervention (Schmiege, Khoo, Sandler, Ayers, & Wolchik., 2006) and a reduction in parents' depressive symptomatology up to six years after participation (Sandler et al., 2010). At the six-year follow-up, the odds of the bereaved spouse having a moderate or higher level of depression were 2.38 times higher in the control group than in the FBP group after controlling for the baseline level of depressive symptoms. The New Beginnings Program, also developed at Arizona State University, addressed the stress of divorce. This line of research is of interest in part because it is one of the few prevention programs with long-term follow-ups, currently up to 15 years. The intervention consists of 11 group social learning and cognitive-behavioral sessions provided either to the mother alone or concurrently to the children. The focus is on improving mother-child relationship quality and effective discipline, and reducing interparental conflict. This type of approach emphasizes that interventions devised to deal with specific stressors known to be related to depression may have the effect of reducing depression even though their primary target is different. For example, Price and colleagues (Price, Van Ryn, & Vinokur, 1992) demonstrated significantly fewer cases of serious depression symptoms following a program to help recently unemployed men be re-employed rapidly.

Nontraditional interventions: novel delivery mechanisms and new treatment targets

Internet interventions promoting behavior change are gaining popularity and an evidence base. Callear, Christensen, Mackinnon, Griffith, and O'Kearney (2009) have used MoodGYM, an automated CBT-based Internet program designed to reduce and prevent symptoms of depression and anxiety in adolescents. In a school-based sample of 1,477 teens, MoodGYM was effective at reducing depressive symptoms and preventing the onset of significant depressive symptoms in male, but not female, participants. Promising results were also obtained in reducing relapse in a sample of adults with remitted depression (Holländare et al, 2011). Participants were randomized to an Internet CBT intervention with minimal email guidance by a live therapist or to a control group. At six months, 10.5% of Internet CBT participants experienced relapse, versus 37.8% in the control group. Internet interventions are low-cost, highly scalable, and convenient for participants, which makes them prime candidates for worldwide prevention efforts (Muñoz, 2010).

Shaping the Future: What Could the Mental Health Field Do to Produce the Greatest Progress in the State of Prevention Science in the Next Ten Years?

At the start of this article, we asked readers to imagine that 10 years hence, a new prevention committee is empanelled, and the committee publishes its report two years later, in 2024. What could practitioners and researchers accomplish in the next ten years to increase the likelihood that the new committee would find substantial progress in the published literature in terms of both research and practice? To guide the reader in this exercise, we first describe the broader principles of the IOM report as they apply to the prevention of depression, and then we present a road map with specific recommendations.

The fundamental prevention perspective is a population-based, public health approach. Applying this approach to depression would mean (a) setting the goal to have significantly

fewer cases of MDEs in given populations (a neighborhood, a school, a health plan), (b) implementing strategies that have evidence for reducing new episodes of depression as the highest priority, and (c) implementing strategies that reduce symptoms of depression in high-risk groups.

Epidemiologic data to chart progress

The 2009 IOM report (NRC/IOM, 2009a, pp. 36-42) emphasized the need for epidemiologic studies to benchmark the prevalence of major depression and other mental disorders and to estimate the incidence of major depression longitudinally. Such data are necessary both to direct interventions to those at highest need and properly assess the overall outcome (changes in rates of depression in a given population).

Measuring the impact of depression on human life and our societies

The IOM report pointed out that the costs of depression affect much more than the mental health system (NRC/IOM, 2009a, pp. 15-16). We need to build on existing evidence for the association between depression and major societal problems, and to provide precise estimates of how depression increases their risk. The impact of depression on physical health, such as on morbidity and mortality related to heart disease (Sher, Lolak, & Maldonado, 2010) and greater rates of smoking, drinking, and other substance abuse in individuals with depression and other mental disorders (Hall & Prochaska, 2009), should be studied in more depth. The economic impact of depression is well documented: Depression is the number one cause of disability worldwide (Murray & Lopez, 1996), and has costs related to its treatment as well as to reduced productivity (Kessler et al., 2008).

Social and biological factors

The 2009 IOM report made strong recommendations regarding the need to make environmental interventions that address social and community factors, such as nurturing personal environments (Biglan et al., 2012; NRC/IOM, 2009a, pp. 157-190). The report also highlighted the role of biology, such as the development of the nervous system, and the contributions of genetic traits as contributors to risk or good functioning under difficult circumstances. The report advocated that basic science, which includes understanding both child neurodevelopment as well as social and psychological development, be used for developing prevention approaches (NRC/IOM, 2009a, pp. 113-149).

Improvement in outcome trials

As depression prevention trials improve, they should offer documentation of what works most effectively in diverse populations. To accomplish this, we must improve our ability to identify populations prior to onset of MDEs (Le & Boyd, 2006). Interventions should be well defined, with manuals that are flexible and user-friendly enough to decrease the likelihood of “drift” when implemented outside of the context of a strict study. Intervention can be delivered in ways that reduce or eliminate drift, such as evidence-based Internet interventions (Muñoz, 2010). Investigators should provide clear theoretical reasons for interventions, and test whether the theorized mechanisms of change are actually modified, and whether modifying them leads to lower incidence rates (mediation analysis) (Kazdin,

2007). Studies should include diverse samples, especially those groups most at risk, and should examine whether characteristics of diverse populations moderate the impact of the interventions.

The field needs longer prevention trials to examine how long preventive effects endure. To date, few trials have followed participants beyond 4 years, and the majority do not follow participants for longer than two years. Some notable exceptions include the trials by Bockting and colleagues (2009), with a 5.5 year follow-up; Fava, Ruini, Rafanelli, Finos, Conti, and Grandi (2004), who reported preventive effects for CBT after six years, and the Arizona State University studies, which have published six-year follow-ups (Sandler et al., 2010) and have now completed 15-year follow-ups.

Implementation and dissemination research

Developing efficacious interventions is necessary but not sufficient (NRC/IOM, 2009a, pp. 297-336). We must ensure that interventions can be used effectively in the diverse cultures found in this country and the world. An example of this might be evidence-based Internet interventions, which could be offered to communities that do not have the resources to launch their own prevention programs (Christensen & Griffiths, 2002).

Impact on public policy

To have an impact on public policy, it may be necessary to conduct studies that compare communities in which the preventive interventions are implemented with similar settings (ideally randomly chosen) in which they are not. Such studies will need to obtain cost data that include the cost attributable to depression in sectors other than the health sector, such as the educational and justice sectors. Australia has developed promising methods to quantify the cost-effectiveness of prevention (Mihalopoulos, Vos, Pirkis, and Carter, 2011).

A Road Map: Priorities for the Prevention of Depression

The meta-analyses showing that 22% to 38% of MDEs could be prevented with currently available interventions (Cuijpers et al., 2008, 2009) should be a call to action. Preventing a quarter to a third of cases of major depression would have a substantial impact on individual and societal well-being. It could dramatically reduce the cost of treatment for depression.

On the basis of our reading of the literature and the findings of the two IOM reports, we offer a road map for the next decade of work on the prevention of depression in Table 1.

Closing Comments

The 2009 IOM report describes a vision for the future if prevention services are fully implemented (NRC/IOM, 2009a, pp. 387-390). Prevention of depression would figure prominently in such a vision. It would require a well-functioning infrastructure that was readily available in schools, neighborhoods, and health centers. It would require cultural competence such that the prevention programs were available in the languages, locations, and cultures in which families lived, and it would require easy access with no barriers both for families known to be at high risk for depression and for those facing other adversities.

It must be acknowledged that disparities in access and outcome for medical illness are also present for depression. Current passage of national health insurance is one attempt to narrow at least the health care disparity. Attention also needs to be directed to narrowing economic disparities, as is suggested in a companion article (Aber et al., 2012), and to ensuring that all children and parents have access to good schools and safe neighborhoods and feel a membership within the communities and societies in which they find themselves.

Think globally, Act locally... and then share globally

Creating interventions that address the major contributors to the global burden of disease, starting in one's own community, is very important. Depression clearly is one of these contributors (Costello, Egger, & Angold, 2005). But sharing these interventions widely is also essential. We must prioritize interventions that can be shared as widely as possible. Interventions that can only be used in a unique environment will not reduce the global burden of disease.

The IOM is mandated to focus on the nation's health. This is clearly an important goal. However, just as we are becoming more conscious that national boundaries are irrelevant to most of the major issues facing our communities, so, also, should the mental health field begin thinking globally (Collins et al., 2011). Efforts to prevent depression should involve mental health experts throughout the world. We must develop interventions that can be shared widely without taking resources away from local populations. The use of mass media, such as radio, television, the Internet, cell phones and other mobile devices, provides us with invaluable tools that we must learn to use to disseminate evidence-based preventive interventions worldwide (Muñoz, 2010).

Depression affects all of humanity. Now that there is scientific evidence that it can be prevented, that the suffering it produces can be averted, and thus that this suffering is unnecessary, the world community must collaborate to reduce the global impact of depression.

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Table 1**Road Map for the Next Decade of Work on the Prevention of Depression**

Starting Point: State of the Science, 2012

- **Identifying high-risk individuals:** We can reliably identify individuals with risk for one-year incidence in the range of 25% to 40%.
 - **Reducing incidence:** We can reliably reduce the proportion of new episodes of major depression by an average of 22% to 38% in high-risk individuals.
-

Proposed Destination: What we need to accomplish in the next ten years

Long-term goals:

- **Increasing our ability to identify high-risk individuals:** Developing methods to identify those with over 50% chance of developing MDEs within a year will help conduct prevention trials with smaller sample sizes and to use our prevention resources more efficiently.
- **Increasing our ability to reduce incidence:** We know this can be done because some of the most successful studies have reduced annual incidence by 50% or even 80%.
- **Increasing duration of preventive effects:** We must try to approximate the goal of interventions that provide life-long preventive effects, perhaps by increasing resilience and self-efficacy.
- **Measuring the true cost of depression.** To motivate communities to invest in the prevention of depression, we need to measure the impact of depression on education outcomes, productivity, the general health system, and the justice system.
- **Vision for the future.** The impact of substantially reducing the incidence of depression will highlight the massive role of depression on human life. As this evidence mounts, the motivation to prevent depression and thus reduce unnecessary suffering will spread widely.

Short-term goals:

• **Implement intervention approaches with strong evidence of reducing incidence:**

- Interventions using cognitive behavioral or interpersonal psychotherapy methods to help individuals manage their mood (Cuijpers et al., 2008).
- Interventions focused on children with depressed parents:
 - prevention of depression in at-risk adolescents (Clarke et al., 2001; Garber et al., 2009; Compas et al., 2009).
 - prevention of maternal depression during pregnancy and postpartum using home-based interventions (Tandon et al., 2011; Olds, 2006).
- Interventions focused on ameliorating the effect of stressful life events in children, (Molnar et al., 2001) or in parents and children (Sandler et al., 2010).

• **Implement and test interventions with growing evidence of effectiveness:**

- School-focused interventions addressing both academic and emotional factors that lead to good, long-term outcomes (Cutuli et al., 2006; Poduska et al., 2008; Kellam et al., 2008).

• **Implement interventions that have been shown to reduce symptoms but have not yet been tested in large scale trials designed to test reduction in incidence of depression:**

- Family strengthening interventions that enhance functioning and family strengths to counteract parental depression and associated risks (Ammerman et al., 2010; Beardslee, Wright, Gladstone & Forbes, 2008; Luthar, 2003; NRC/IOM, 2009b).

• **Implement interventions focused on creating nurturing environments.** The impact of community interventions that substantially change the living conditions of families should be examined for their effect on depression (Biglan et al., 2012).

- **Develop infrastructure and funding.** Developing an infrastructure to deliver evidence-based preventive interventions, finding funding mechanisms for prevention programs, and training a workforce capable of delivering interventions for the prevention of depression (NRC/IOM, 2009a, pp. 337-376).