
NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD
NATIONAL FORUM ON EARLY CHILDHOOD PROGRAM EVALUATION

Maternal Depression Can Undermine the Development of Young Children

WORKING PAPER 8



Center on the Developing Child  HARVARD UNIVERSITY

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The Issue

SERIOUS DEPRESSION IN PARENTS AND CAREGIVERS CAN AFFECT FAR MORE THAN THE ADULTS WHO are ill. It also influences the well-being of the children in their care. Because chronic and severe maternal depression has potentially far-reaching harmful effects on families and children, its widespread occurrence can undermine the future prosperity and well-being of society as a whole. When children grow up in an environment of mental illness, the development of their brains may be seriously weakened, with implications for their ability to learn as well as for their own later physical and mental health. When interventions are not available to ensure mothers' well-being and children's healthy development, the missed opportunities can be substantial.

Healthy development depends on the interactive influences of genes and experiences, which shape the architecture of the developing brain. The active ingredient of those experiences can be described as mutual responsiveness or the “serve and return” of young children's interactions with adult caregivers.¹ For example, when an infant babbles and an adult responds appropriately with attention, gestures, or speech, this builds and strengthens connections in the child's brain that support the development of communication and social skills. When caregivers are sensitive and responsive to a young child's signals, they provide an environment rich in serve and return experiences, like a good game of tennis or Ping-Pong. However, if depression interferes with the caregiver's ability to regularly provide such experiences, these connections in the child's brain may not form as they should. The difference between a child who grows up in a responsive environment and one who does not can be the difference between the development of strong or weak brain architecture, which serves as a foundation for the learning, behavior, and health that follow.

Maternal depression is particularly worrisome because of its prevalence. An estimated 10 to 20 percent of mothers will be depressed at some time during their lives.^{2,3,4,5} About one in eleven infants will experience their mothers' major depression in their first year of life, and the rates are even higher for mothers with previous histories of depression or those

experiencing other stressors, such as financial hardship or social isolation.^{6,7} Depression and depressive symptoms are particularly common in disadvantaged populations. Recent data indicate that, in households below the federal poverty threshold, one in four mothers of infants is experiencing moderate-to-severe levels

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of depressive symptoms. (See graph, page 2.)

Although it is all the same underlying disorder, mothers' *experiences* of depression may differ in timing, severity, and duration.^{8,9} For a substantial proportion of mothers, depression comes in spells that may last just a few months; but, for others, depression is more chronic.^{9,10,11} Some mothers may experience depression primarily during their children's infant and toddler years; others endure depression that is prolonged or recurs over many years of a child's life.^{10,12,13} Although the greatest cause for concern arises when depression begins early and is long-lasting and severe, poor developmental outcomes have

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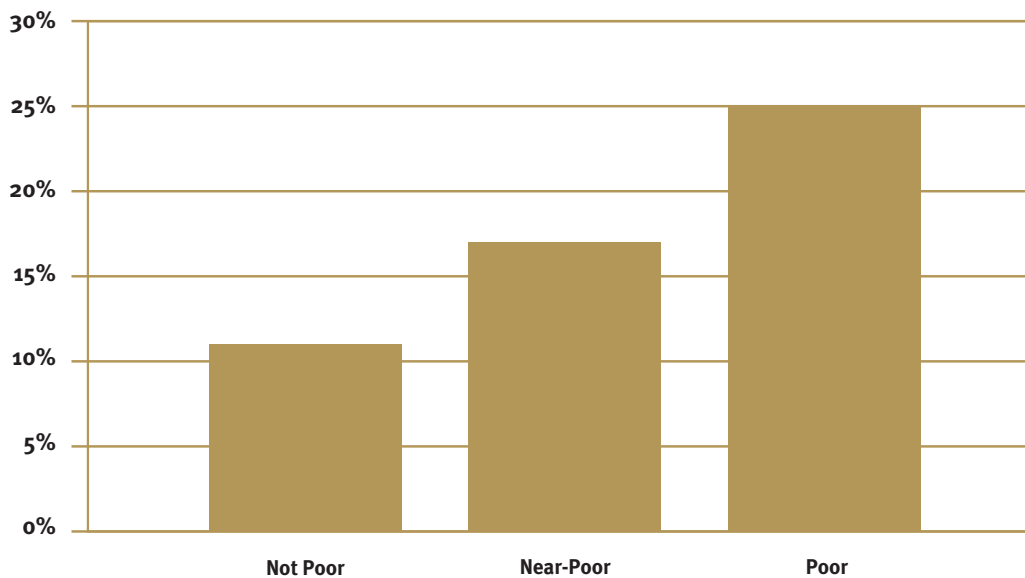
been documented for children of mothers with declining or low levels of depression, as well.^{12,14}

Despite the frequency of depression among new mothers, large numbers of affected individuals may not be identified as having a treatable condition, and only 15 percent obtain professional care.¹⁵ Just as it is essential to treat

children's emotional and behavioral problems within the context of their families,¹⁶ it is equally essential for treatments and programs aimed at improving maternal depression and depressive symptoms to consider, treat, and measure their impact on the children. Although depression in fathers or other important caregivers (such as grandparents) also deserves further attention, the effects on children's development are rarely studied, and the research is far less conclusive.⁴

It is not normal for women to suffer major depression after having a baby. Major depression is very different from (but sometimes confused with) the emotional swings experienced by many mothers shortly after childbirth.¹⁷ Characterized by a low mood and loss of interest in usually enjoyable activities, depressive symptoms include difficulty sleeping and

Maternal Depression Affects Children in Low-Income Families Disproportionately



Percent of mothers with a 9-month-old infant who are moderately or severely depressed

Source: Calculations based on analyses of the Early Childhood Longitudinal Study, Birth Cohort 9-month restricted-use data (NCES 2006-044) by Danielle Crosby, PhD, University of North Carolina Greensboro. Maternal Depression is measured by the 12-item version of the Center for Epidemiological Studies' Depression Scale (CES-D). Elevated symptoms of moderate to severe depression are identified by scores of 10 points or higher on a scale that ranges from 0-36. Analytic weights (W1Ro) were applied to ensure data were nationally representative of mothers with 9-month-old infants born in 2001. Poor refers to family income less than or equal to 100% Federal Poverty Threshold (FPT). Near poor refers to family income greater than 100% of FPT but less than 200% of FPT. Not poor refers to income greater than 200% of FPT.

concentrating, loss of appetite, feelings of worthlessness or guilt, and low energy. In the face of major clinical depression, the drive, energy, and enjoyment needed to build and maintain positive family relationships recedes.⁴ Especially when combined with other, related adversities, deep depression is debilitating, making it difficult for mothers to effectively carry out requisite caregiving tasks and responsibilities and to build and maintain nurturing relationships with their children. This may explain why, when raised by a chronically depressed mother, children perform lower, on average, on cognitive, emotional, and behavioral assessments than children of non-depressed caregivers, and they are at risk for later mental health problems, social adjustment difficulties, and difficulties in school.¹⁸ Such patterns may also forecast difficulties in adult life across a variety of important domains, including employment and health.

As the magnitude and societal consequences of this problem have become better understood, increasing numbers of clinicians and policymakers have begun to realize that it

is unacceptable to ignore what science tells us and have made the prevention and treatment of maternal depression an important goal. In

Children who experience maternal depression early in life may suffer lasting effects on their brain architecture and persistent disruptions of their stress response systems.

order to maximize the impact of such investments on the well-being of children as well as mothers, it's important for policymakers to start from a common understanding of what we know—and what we don't know—about the effects of maternal depression on children as well as the effectiveness of programs designed to treat or prevent this serious condition.

What Neuroscience and Developmental Research Tell Us

Chronic depression can manifest itself in two types of problematic parenting patterns that disrupt the “serve and return” interaction that is essential for healthy brain development: hostile or intrusive, and disengaged or withdrawn.¹⁹ When parents are hostile and/or intrusive, it is as if the parent is “serving” the ball in ways that make it difficult for the child to “return.” Conversely, if a parent is withdrawn or disengaged, the child may serve the ball, but the parent doesn't return it. In both cases, depressed mothers are less likely to respond to their infants' cues (i.e., vocalizations and actions) or to engage with their infants and young children in positive, harmonious interactions.^{20,21} When caregivers are hostile or withdrawn for prolonged periods of time, the game of serve and return falls apart, and the architecture of the developing brain may be affected adversely. Such patterns are particularly worrisome because, once negative parent-child interactions are established, they may persist even after a mother's depression has improved

and may make the child more likely to have negative interactions with other important adults, as well.^{22,23} When infants and young children interact with a hostile, irritable caregiver, this creates feelings of fear and anxiety in the child, which may result in the increased production of potentially harmful stress chemicals.²⁴ Such a recurring physiological reaction can affect brain development, interfere with young children's ability to learn, and increase the risk of emotional disorders.²⁵

Children who experience maternal depression early in life may experience lasting effects on their brain architecture and persistent disruptions of their stress response systems. Studies of children of depressed mothers show patterns of brain activity (as observed on an electroencephalogram, or EEG) that are similar to those found in adults with depression.²⁶ These patterns are more pervasive when the mother is both depressed and withdrawn from her infant²⁷

and when deep depression occurs during the child's second and third year, the time at which the brain systems that generate the depression-associated pattern of brain waves are developing rapidly.²⁴ Living with a depressed mother may also shape the development of a child's stress biology.²⁸ Indeed, there is increasing evidence that effects on stress response systems are one mechanism linking maternal depression to the child's

research has found that prenatal depression can be linked to the silencing of a gene that controls the over-production of stress chemicals.³⁵ Thus, by the time of birth, the infant of a seriously depressed mother may have sustained effects on his or her stress response and immune systems that make the child even more vulnerable than average to irritable, intrusive, or withdrawn maternal care.

Depressed women produce higher levels of stress chemicals during pregnancy, which reduce fetal growth and are associated with an increased risk for premature labor.

own risk of developing depression and other emotional disorders.^{29,30} When mothers are depressed, both early in a child's life and later, their children tend to produce higher and more fluctuating levels of stress chemicals such as cortisol.^{31,32} Chronic maternal depression over many years of a child's life also predicts cardiovascular patterns suggestive of emergent hypertension in childhood and abnormal stress chemical patterns in response to laboratory testing.²⁹

Maternal depression may begin to affect brain development in the fetus before birth. Depressed women produce higher levels of stress chemicals during pregnancy, which reduce fetal growth and are associated with an increased risk for premature labor.³³ Depressive symptoms in an expectant mother also have been shown to be associated with altered immune functioning in her baby after birth.³⁴ Even more striking, recent

Depression often occurs in the context of other family adversities, which makes it challenging to treat successfully. When mothers have good social supports, adequate income, and environments free of stress and conflict, they are better able to provide the developmentally appropriate interactions that their children need. However, depression often coincides with a constellation of other adversities that may further undermine child development. For example, mothers experiencing depression are often also young, socially isolated, economically or educationally disadvantaged, and burdened by more family conflict and stressful life events than mothers who are not depressed.^{11,36} Mothers who experience deep or chronic depression are also more likely to have experienced intimate partner violence,³⁷ to be in poorer health, and to have problems with anxiety or substance abuse.⁴ Indeed, evidence suggests that 75 percent of adults diagnosed with major depression have at least one other mental health diagnosis.³⁸ When maternal depression co-occurs with other serious adversities, not only are standard treatments less likely to be successful in reducing depressive symptoms, but the children are at even greater risk for poor outcomes, as these related risk factors also reduce the likelihood that they will experience environments that foster healthy development.^{4,39}

What Program Evaluation Research Tells Us

GIVEN THE POTENTIAL NEGATIVE CONSEQUENCES of depression for both mothers and their children, a variety of interventions has been designed to prevent and treat it as well as to buffer children from its harmful effects. By intervening early, before these effects can accrue, we increase

the likelihood that children of depressed mothers will grow into healthy, capable, fully contributing members of society.

Although a few studies address the more general treatment of maternal depression, much of the research on prevention is focused on the

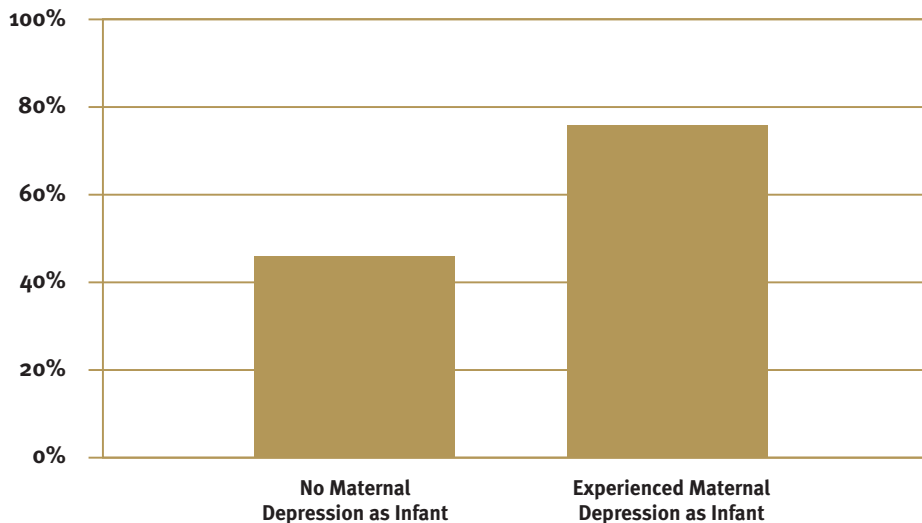
specific condition of postpartum depression (PPD). Interventions that have been employed differ as to whether they take a biological approach, such as the prescription of antidepressant medications, or a psychosocial approach grounded in therapeutic and psycho-educational strategies. In cases of PPD, the use of medication for preventive purposes has been limited because of concerns about the potentially harmful effects of antidepressants that can pass directly into the fetus through the placenta or into the infant through breast milk.⁴⁰ Alternatively, the range of psychosocial interventions that have been employed includes strategies directed either solely to mothers or to the mother-child dyad.

Intensive intervention efforts that focus specifically on mother-child interactions have shown promising results in several recent studies. One program of weekly toddler-parent

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psychotherapy that lasted over a year produced improved cognitive development among children of depressed mothers.⁴⁶ Another successful intervention targeted young, economically disadvantaged mothers of infants and provided a comprehensive set of daily supports, including education opportunities for the mothers, massage therapy for both mothers and infants, and mother-infant interaction coaching.⁴⁷ Several recent studies have shown improvements in important dimensions of mother-child

Exposure to Maternal Depression in Infancy Causes Stress Hormone Levels to Become More Extreme in Adolescence



Percentage of Adolescents with Extremely High Cortisol Levels
(Above 90th percentile for gender) on 1 or more days out of 10 measured

Source: Halligan, Herbert, Goodyer, and Murray (2004).

interaction.^{40,48} Collectively, these examples demonstrate that intensive, well-designed interventions for depressed mothers and their children can improve both parenting behaviors in the mothers and developmental outcomes in the children. What these studies cannot tease

Interventions with families and older children also provide suggestive evidence that programs that explicitly promote positive parenting practices among depressed parents may have benefits for children and families.

apart, however, is whether the key ingredient in the program's success was its focus on the mother-child dyad or the intensity of the treatment. Nevertheless, interventions with families and older children also provide suggestive evidence that programs that explicitly promote positive parenting practices among depressed parents may have benefits for children and families.^{4,49} Yet, the high cost of intensive interventions and the fact that most studies have been conducted on relatively small samples present serious challenges to the task of replicating successful models and taking them to scale.

Research indicates that various combinations of psychotherapy and educational treatments that are focused exclusively on adults can be effective in reducing depressive symptoms in mothers but appear to have limited impacts on the development of their young children.^{41,42,43,44} A few good studies of therapeutic interventions

have demonstrated reductions in maternal depression after treatment, but no differences were documented in long-term child outcomes, such as cognitive functioning and behavior. These findings have led several researchers to argue that therapies should not only treat the mother but should also focus on the mother-child relationship.⁴⁵

Successful efforts to prevent maternal depression before it develops have thus far been more elusive than effective treatments. Several models of educational and psychological interventions to prevent postpartum depression have shown promise.^{41,50,51} These programs are diverse in terms of when services are initiated, how and by whom services are delivered, and the likelihood of depression in the population they serve. Most of these prevention programs, however, are short-term, often delivered through a small number of individual or group educational sessions or psychotherapy, midwife care, or home visits. The documented success of a program in which poor women participated in four prenatal sessions of group psychotherapy suggests that preventing PPD may be possible.⁵² Yet, the small, voluntary, and select nature of the sample, as well as the lack of child outcome measures, indicate that more research is necessary. Biological approaches to preventing PPD also have been studied, but successful results are rare,^{41,53} and, as noted previously, biological prevention approaches are often not well received by mothers because of concerns about the pass-through effects of medication on fetuses or infants. The extent to which maternal depression often coexists with other mental health problems (e.g., anxiety disorders or substance abuse) further complicates the challenge of designing effective prevention programs.

Correcting Common Misconceptions

Contrary to popular belief, professional treatment is needed to help mothers overcome major depression. Although many mothers experience emotional adjustments and mood swings in the immediate period following childbirth—sometimes known as the “baby blues”—this is very

different from major depression, which is much more severe and can be long-lasting.¹⁷ Major depression should be understood as a serious medical condition that affects brain functioning and typically limits one's ability to carry out everyday activities. Mothers of infants are

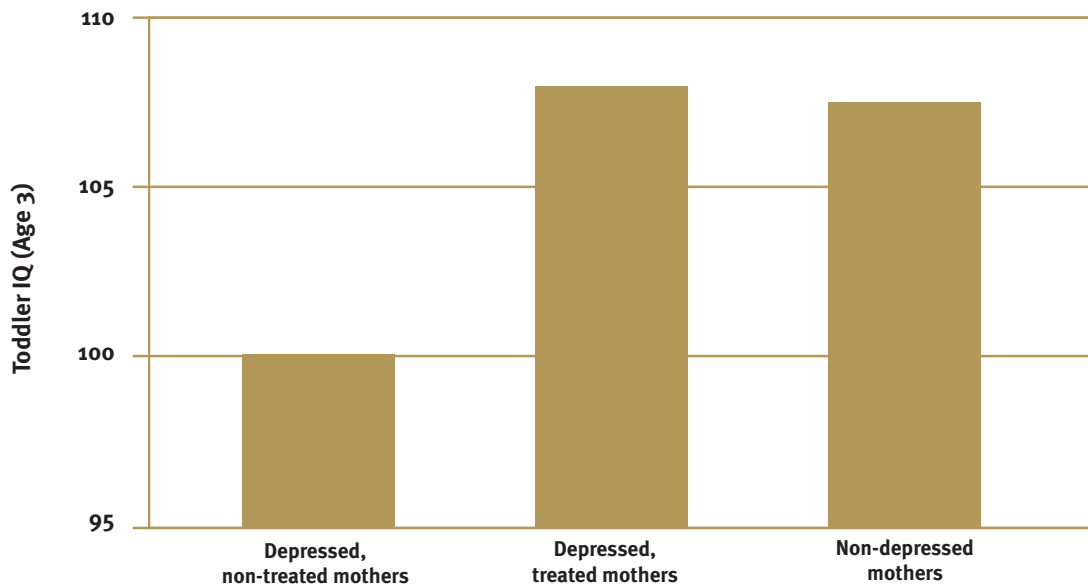
more likely than other women to experience such depression, particularly as they experience high caregiving demands, yet they are less likely to get professional help.¹⁵ This is most unfortunate, because there is evidence that a range of treatment approaches may reduce depressive symptoms among these mothers.⁵⁴

It is not commonly understood that even very young children are likely to be affected by their mother's depression and these effects may be lasting. Adverse effects may even begin during pregnancy. As noted earlier, maternal depression in the prenatal period is linked to alterations in the stress response and immune systems of the fetus, which can increase the chance that an infant will be more vulnerable to irritable, intrusive, or withdrawn maternal care than the average baby.^{34,35} Moreover, ongoing depression

after childbirth is linked to patterns of parenting that may disrupt the normal “serve and return” interactions between an infant and mother, thus potentially harming the child’s developing brain architecture and emerging skills.¹⁹ Finally, hostile or withdrawn parenting has been linked to patterns of child brain activity associated with anxious and withdrawn emotions, which may persist over time.²⁴

Contrary to what is frequently assumed, reducing mothers' depressive symptoms alone does not necessarily lead to improvements in parenting and children's development. This erroneous assumption has been called into question by treatments that have improved mothers' depressive symptoms but have not had measurable effects on children's development.^{42,43,44} Even when successful, short-term treatments that focus only

Toddler-Parent Therapy Improves Cognitive Development



Mothers with a major depressive disorder were randomly selected to participate in Toddler-Parent Psychotherapy as a preventive intervention for their children, age 20 months at entry to program. Children's scores on Bayley Mental Development index did not differ at age of entry, but significant differences appeared in IQ tests given at age 3.

Source: Cicchetti, Rogosch, and Toth (2000).

on reducing mothers' depression may miss the opportunity to also improve their parenting skills and their view of their children.⁴³ Limited but promising evidence suggests that treatments designed to improve child well-being must

attend both to relieving mothers' depression and to focusing on parenting behavior and interactions with the child as central dimensions of the intervention.⁹

The Science-Policy Gap

Postpartum depression has several characteristics that make it a particularly compelling target for preventive intervention, yet little has been done in the U.S. to determine which interventions work. These characteristics include a clear time of onset (childbirth), a distinct risk period (up to six months postdelivery), and an identifiable population of at-risk women (expectant mothers).⁵¹ Despite this striking opportunity, most studies of programs designed to prevent PPD have been conducted outside of the United States, where differences in health service delivery systems may make their findings less applicable to the U.S. context. In view of the fact that maternal depression can set in motion detrimental patterns of parenting and developmental processes that may be difficult to change as time passes, the limited availability of effective prevention programs in the United States represents an important missed opportunity to improve children's development.

Enhanced treatment programs for mental health problems in parents need to address adult behavior toward young children as well as the programs' impacts on children's developmental outcomes. This presents a major challenge, as very few studies to date have measured the impacts of interventions for maternal depression on either mother-child interaction or child well-being. Evidence that depression interferes with a mother's ability to engage in and benefit from a variety of services adds to that challenge, particularly for disadvantaged populations.⁴ Several settings have been identified as promising vehicles through which prevention, screening, and treatment services for maternal depression might be embedded, including primary health care, home visiting, and early care and education.^{4,55} Each of these types of programs provides an underutilized opportunity to identify and engage depressed mothers, yet they all face distinctive challenges in developing and implementing effective services.^{4,56}

Implications for Policy and Programs

Maternal depression matters for children, families, and society. Maternal depression affects a large number of families and can have potentially far-reaching, adverse effects on parenting and the development of children. These consequences have implications for society as a whole, as children who are affected adversely become the next generation of parents and workers. Untreated maternal depression may lead to more hostile or withdrawn parenting, which can, in turn, have harmful effects on young children's developing brains, leaving them at higher risk for later cognitive and socio-emotional problems. Insensitive, hostile, or withdrawn parenting is associated with the development of

patterns of brain activity associated with anxious, withdrawn emotions in children and adults. Depressed mothers engage in less stimulation of their children, potentially reducing the strength of brain circuits involved in learning and memory. It is therefore important for the well-being of society to find effective ways to prevent and treat this disorder.

Evidence suggests that intensive therapies that focus on both mothers and their young children together can improve child outcomes. Not only are access and use of mental health services by mothers important, but equally important is the need for policymakers and clinicians to work

together to establish and support a model of care that simultaneously addresses mothers' own mental health needs as well as their caregiving roles and their children's healthy development. Because healthy brain architecture is built by positive interactions with responsive caregivers over time, short-term therapies of low intensity that focus solely on mothers may be effective at reducing their depressive symptoms, but they are unlikely to improve child outcomes. In view of the magnitude of the problem, creative policymaking would be well served by support for promising pilot projects that focus on mothers' interactions with their infants and are linked to strong evaluation designs.

Innovation, evaluation, and continuous improvement are needed to better understand what works for both children and their mothers and to bring such interventions to scale. Findings from program evaluations indicate that the challenge of treating maternal depression is not simply a matter of increased funding. Because there is still much to be learned, two kinds of investments are important for policymakers to consider. The first would focus on replication and expansion of interventions that have been evaluated and shown to have positive effects on young children. The second and equally important kind of investment would provide support for innovative program models that focus on the needs of mothers and their children, guided by advances in neuroscience and developmental research and committed to rigorous evaluations. In short, the prevalence of maternal depression, the growing evidence of its potential adverse impacts on young children, and the lack of interventions that focus on the well-being of the young children of affected mothers all call for increased investment in the design, testing, and continuous improvement of more effective two-generation interventions.

The development and testing of more successful models for prevention of maternal depression, particularly for women who are at increased risk for the disorder, should be an important policy priority. Evaluations of prevention programs for maternal depression thus far have been disappointing. This does not mean that prevention cannot work, but it does indicate that we still

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have much to learn. The magnitude of risk facing affected mothers and young children from all social classes, particularly those who have low incomes and limited education, underscores the need for policymakers, neuroscientists, doctors, program developers, and evaluation specialists to work together in the search for new and more effective prevention strategies.

IN SUMMARY, THE PREVALENCE AND MULTIPLE costs of maternal depression and the growing development of conceptual and practical approaches for protecting children whose mothers have the disorder all provide a compelling rationale for testing and evaluating promising practices and new intervention strategies. The continuing failure to address the consequences of depression for large numbers of vulnerable, young children presents a missed opportunity to help families and children in a way that could have far-reaching implications for the productivity, health, and well-being of the next generation.

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