

Fostering Healthy Mental, Emotional, and Behavioral Development in Children and Youth

A NATIONAL AGENDA

Committee on Fostering Healthy Mental, Emotional, and
Behavioral Development Among Children and Youth

Board on Children, Youth, and Families

Division of Behavioral and Social Sciences and Education

A Consensus Study Report of

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W. THOMAS BOYCE, School of Medicine, University of California, San
Francisco (*until March 2018*)
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MYRNA M. WEISSMAN, Mailman School of Public Health, New York State
Psychiatric Institute, Vagelos College of Physicians and Surgeons,
Columbia University

TARA LYNN MAINERO, *Study Director (until February 2019)*
ALEXANDRA BEATTY, *Study Director (from February 2019)*
ERIN KELLOGG, *Research Associate (beginning September 2018)*
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Preface

This report is the third in a series of reports from the National Academies of Sciences, Engineering, and Medicine targeting improvement of mental, emotional, and behavioral (MEB) development and health through promotion and prevention activities. The first two reports, *Reducing Risks for Mental Disorders* (1994) and *Preventing Mental, Emotional, and Behavioral Disorders Among Children and Youth* (2009), focused on prevention. They were widely read and used to advance children's MEB outcomes. The current report includes greater focus on measures to promote MEB development and health, with increased emphasis on achieving population-level effects. This emphasis reflects the fact that despite the development of programs that are effective in supporting healthy MEB development in individuals and groups of children and youth, successful population-based efforts that can broadly counter adverse environments and experiences that threaten healthy MEB development for so many of the nation's young people have not materialized.

This study was made possible through the sponsorship of the Centers for Disease Control and Prevention, Division of Human Development and Disability; the National Institutes of Health, National Center for Complementary and Integrative Health; the National Institutes of Health, National Institute on Drug Abuse; and the Substance Abuse and Mental Health Services Administration, Center for Mental Health Services. These agencies recognized the value of the previous reports but also saw the need to build on them.

The statement of task for this committee was broad: It emphasized public health and population-based outcomes, cross-sector mobilization to improve children's MEB development, advancement of program implementation, the intergenerational origins of many adverse outcomes, and the need to further probe the biological as well as environmental antecedents of both healthy and adverse outcomes and their interactions. The statement of task also called for exploration of research conducted in practice (real-world) settings and signaled that the new committee should consider a broad spectrum of research strategies, greater cross-sector integration for program development and research, and ways of countering neighborhood and community disparities as overarching factors in the rising

prevalence of adverse MEB outcomes for children and youth. The committee regarded the charge as an invitation to explore many sources of concern about the MEB health of U.S. children and youth, and to consider policy issues that either impede or support healthy MEB development. In particular, the committee viewed the community settings in which children are raised as an essential target for integrated improvement efforts.

The breadth of the committee's task was apparent early as we considered the multiplicity of inputs that affect children's MEB development; the changing needs for supports across the developmental sequence from preconception to adulthood; and the array of community, state, and national sectors that must be mobilized to realize improved outcomes. This report addresses ideas for building child support programs using existing infrastructure across sectors, such as education, health care, the workplace, community agencies, and policy—each a promising focus for separate as well as collective action. This charge also required us to consider a voluminous and rapidly expanding body of literature. We continually noted new information as we deliberated and put together this report. We hope that our findings and recommendations will stimulate continued attention to developing research: updates of this report at shorter intervals may be helpful in this rapidly growing and maturing field.

The committee was well equipped by virtue of the expertise of its members in an array of complementary disciplines as scientists, educators, practitioners, and administrators. Members were most generous with their time, collegiality, and attention, and were passionate about realistically assessing the current state of MEB development for children and youth, as well as exploring ways to make better use of what has been learned to enhance healthy child development. We recognized the importance of identifying common active and effective components of evidence-based intervention, understanding their application to the scaling of interventions using a spectrum of adaptations to local contexts, and ensuring the capacity to sustain and continuously improve program implementation if the goal of substantially improving MEB health across diverse populations is to be achieved. We also concluded that the magnitude of the effort required to accomplish this goal would require commitments to partnership from every sector of society. We did not shy away from thinking boldly and creatively about what the future could hold for generations to come if the nation prioritizes children's MEB development and health.

The committee was also aided in its work by experts in topics beyond the expertise of its members, who generously contributed to the content of this report through presentations in public sessions, commissioned papers, and phone interviews. All have earned our sincere appreciation: Julie Sweetland, Vice President for Strategy and Innovation, The FrameWorks Institute; Byron Powell, Assistant Professor, University of North Carolina Gillings School of Global Public Health, and Fellow at the Cecil G. Sheps Center for Health Services Research and the Frank Porter Graham Child Development Institute; Laura Damschroder, Research Investigator, Department of Veterans Affairs Ann Arbor Center for Clinical Management Research; Hendricks Brown, Professor,

Departments of Psychiatry and Behavioral Sciences, Preventive Medicine, and Medical Social Sciences, Northwestern University (*virtual*); Elyse Cohen, Senior Director of Food, Health, and Wellness Programs, U.S. Chamber of Commerce Foundation; Christina Bethell, Professor, Johns Hopkins Bloomberg School of Public Health, and Director, Child and Adolescent Health Measurement Initiative; Linda Collins, Director, The Methodology Center, and Distinguished Professor, Department of Human Development and Family Studies, Department of Statistics, Pennsylvania State University; Katie McLaughlin, Lab Director, Stress and Development Laboratory, University of Washington; Ken Warner, Avedis Donabedian Distinguished University Professor Emeritus of Public Health, Professor Emeritus of Health Management & Policy, and Dean Emeritus of Public Health, University of Michigan School of Public Health; Kimberly Schonert-Reichl, Director, Human Early Learning Partnership; and David M. Murray, Associate Director for Prevention and Director, Office of Disease Prevention, National Institutes of Health.

The committee notes in this report that a number of recent studies and workshops of the National Academies' Board on Children, Youth, and Families (BCYF), as well as other National Academies' boards, have addressed specific areas related to this committee's task. These contributions are cataloged in this report. We encourage readers to further explore the perspectives offered in these reports. It is our hope that this report will be helpful to the many and diverse individuals, programs, agencies, and policy makers dedicated to improving the productivity and quality of life of all who will constitute the next generations of adults in the United States.

The committee wishes to thank the staff of BCYF who diligently and effectively guided our deliberations and contributions to this report. Great appreciation goes to the study director for the initial phases of the project, Tara Lynn Mainero, as well as Erin Kellogg, Sarah Tracey, Rebekah Hutton, Margaret Kelly, and Laiah Factor, who supported and guided our efforts. Special appreciation goes to Alexandra Beatty, study director for the final phases of the project, who took our input and masterfully shaped this report to reflect our intent while ensuring that it would speak to a wide range of audiences. Working with all of these individuals has been a pleasure. The committee also wishes to acknowledge the guidance provided by leaders of BCYF and the Division of Behavioral and Social Sciences and Education. Finally, we note with appreciation the contributions of Thomas Boyce who was unable to continue as a member of the committee.

This Consensus Study Report was reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the National Academies in making each published report as sound as possible and to ensure that it meets the institutional standards for quality, objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process.

We thank the following individuals for their review of this report: Christina Bethell, Child and Adolescent Health Measurement Initiative, Bloomberg School of Public Health, Johns Hopkins University; Felesia R. Bowen, Undergraduate Programs, College of Nursing, Medical University of South Carolina; C. Hendricks Brown, Preventive Medicine, Feinberg School of Medicine, Northwestern University; Janet Currie, Center for Health and Wellbeing, Princeton University; Iheoma U. Iruka, Center for Early Education Research and Evaluation, HighScope Educational Research Foundation; Benjamin F. Miller, Chief Strategy Officer, Well Being Trust; Bernice A. Pescosolido, Department of Sociology, Indiana University; and Heather J. Risser, Mental Health Services and Policy Program, Northwestern University.

Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations of this report nor did they see the final draft before its release. The review of this report was overseen by Richard G. Frank, Department of Health Care Policy, Harvard Medical School, and Alan F. Schatzberg, Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine. They were responsible for making certain that an independent examination of this report was carried out in accordance with the standards of the National Academies and that all review comments were carefully considered. Responsibility for the final content rests entirely with the authoring committee and the National Academies.

Thomas F. Boat, *Chair*
Committee on Fostering Healthy
Mental, Emotional, and Behavioral
Development Among Children and
Youth

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Summary

Healthy mental, emotional, and behavioral (MEB) development is a critical foundation for a productive adulthood. Much is known about strategies to support families and communities in strengthening the MEB development of children and youth, by promoting healthy development and also by preventing and mitigating disorder, so that young people reach adulthood ready to thrive and contribute to society. In a 2009 report, *Preventing Mental, Emotional, and Behavioral Disorders Among Young People*, the National Research Council and Institute of Medicine argued that existing research made the case for support of both prevention and promotion interventions.

In the decade since that report was issued, a growing body of research has significantly strengthened understanding of healthy MEB development and the factors that influence it, as well as how it can be fostered. Yet the United States has not taken full advantage of this growing knowledge base. Ten years later, the nation still is not effectively mitigating risks for poor MEB health outcomes; these risks remain prevalent, and available data show no significant reductions in their prevalence. Indeed, rates of depression, suicide, and self-harm among young people have actually been increasing: In 2015, suicide was the second most common cause of death among young people ages 15 to 24, and between 2005 and 2014, the proportion of adolescents experiencing a major depressive episode increased from 8.7 percent to 11.3 percent.

MEB disorders frequently manifest during childhood or adolescence. They impose significant burdens for individuals and their families, hindering young people's development into healthy and productive adults. They are also costly to society, accounting for the highest rates of disability in the U.S. population in 2015 and contributing to rates of school dropout, incarceration, and homelessness. The economic burden is great not only in terms of direct spending but also because of lost earnings, reduced productivity, and other indirect costs. The nation's economic and civic well-being depends on a healthy adult population capable of productive work and stable relationships. Therefore, investment in the healthy MEB development of the next generation promises not only benefits for individuals, families, and communities, but economic benefits as well.

To address the critical gap between achievable goals for both promoting MEB health and reducing the prevalence of MEB disorders, and actual progress

in healthy MEB development, the Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services (HHS), together with the Centers for Disease Control and Prevention and the National Institutes of Health, asked the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to assess progress and make recommendations for fostering MEB health in the coming decade. The Committee on Fostering Healthy Mental, Emotional, and Behavioral Development Among Children and Youth—whose members have expertise in behavioral research, child development, child and adolescent psychiatry, education, epidemiology, evaluation research, health care services, implementation science, neuroscience, pediatrics, prevention research, program development, public health, and public policy—was asked to synthesize scientific advances achieved in this area in the past decade and recommend ways in which public and private agencies and organizations can lead efforts to apply this body of knowledge.

APPROACH TO THE CHARGE

Several perspectives affected the committee's thinking about the topics we would cover and the evidence we would seek.

First, we took a life-course approach, examining influences whose effects begin before conception, continue into young adulthood, and extend across generations. We also recognized the importance of risk and protective factors both at various developmental phases and at the individual, family, community, and societal levels.

Second, our life-course approach dovetailed with a shift in focus since the 2009 report was published from intervening with the individual child to intervening at the societal and community levels so as to influence the environments that affect population health. Thus, we broadened our inquiry beyond prevention strategies that may help the individual child or groups of children, emphasized in the 2009 report, to health promotion and community wellness approaches with greater potential to benefit children across populations. Accordingly, this report is framed to emphasize the importance of integrating promotion efforts to maximize their impact across all children and youth. That is, we took a public health approach focused on programs, policies, practices, and venues that have potential to affect the well-being of children and youth at the population level, including efforts to promote changes in salient values and norms.

Third, we recognized that public health measures are essential to achieving population-level impacts on MEB health outcomes, but cannot by themselves address broader influences on young people's health and development, such as poverty, systemic racism and discrimination, or health and educational disparities. We therefore took a community approach, one that acknowledges the essential role of the support of county, state, and federal agencies; public education systems; service sectors, such as those for primary health care and behavioral health; businesses; and other local partners in implementing strategies and

effecting changes in communities that can support positive MEB outcomes for children and adolescents.

Building on the 2009 report, this report offers an expanded view of the nature of healthy MEB development and an updated review of strategies for promoting healthy MEB development and preventing MEB disorders. It describes recent progress in understanding what is necessary to implement effective strategies—those for which there is evidence of benefit from multiple trials—at large scales. It also offers our recommendations regarding a national agenda for fostering healthy MEB development among children and youth, and outlines research needed to address remaining gaps in the understanding of MEB development and how it can be strengthened.

INFLUENCES ON MEB HEALTH

In 2009, strong evidence had already established a long list of influences on MEB health in children and youth, including biological, environmental, familial, and societal factors. Since that time, continued work on both biological and environmental influences has demonstrated that MEB development is more complex and interactive than was understood a decade ago.

MEB development is known today to be a product of complex neurobiological processes that interact with characteristics of the physical and social environment, beginning before conception and continuing through and beyond adolescence. Healthy MEB development is shaped by experiences and circumstances that cross generations within families and affect entire communities. Cause-and-effect linkages that shape MEB development have been identified among

- characteristics of the individual's environment that modulate gene expression and shape neurodevelopment;
- physical, social, and other experiences that affect conception, gestation, and childbirth;
- individual influences, including sleep, nutrition, and physical activity;
- characteristics of the family and surrounding community, including parent characteristics, peer behavior, and school characteristics; and
- characteristics of the broader society in which the individual, family, and community are situated, such as poverty and economic inequality, systemic racism and discrimination, law- and policy-driven factors, and the marketing of unhealthy products.

In effect, children's social and physical environments literally shape their brains and, consequently, the behaviors and emotions they learn.

PROMOTION AND PREVENTION STRATEGIES

Growing evidence of the interplay among biological, social, and environmental influences on MEB development, beginning before a child is even conceived, has profound implications for the design of interventions to promote healthy MEB development. Researchers have documented evidence for strategies that effectively target risk and protective factors and influence multiple MEB outcomes, and can be implemented universally in health care and education settings. These findings provide the basis for the development of policy and program tools for improving MEB outcomes. Coordinating strategies found to be effective in supporting individuals and families, populations, and multiple generations to address clearly articulated needs is critical to achieving significant benefits relative to the use of ad hoc interventions. Examples include the following:

- **Strategies designed to support the mental health of parents and affect the behavior and attitudes of parents and other caregivers and thereby improve outcomes for children and youth, both by enhancing parenting skills and by promoting caregivers' MEB health.** These strategies include screening for caregiver risks and programs to promote healthy parenting and family bonding; screening of women of reproductive age, pregnant women, and mothers for depression (and providing depression treatment); the provision of substance use counseling and treatment for parents; and parent education programs, such as for building awareness of sexual abuse risks.
- **Programs delivered in school settings.** Examples are programs to teach children in preschool and grades K–12 social and emotional skills, including mindful awareness practices; to promote a positive school environment; to promote access to services for low-resourced populations and communities; and to help young people develop resilience to manage multiple health risks, such as bullying, substance use, and suicidal thoughts.
- **Use of primary health care settings to promote healthy MEB development for children and prevent risks for MEB disorders.** Strategies include preconception and prenatal care that mitigates risks for unhealthy fetal development, such as exposure to tobacco and alcohol; parenting education and guidance and screening for signs of risks to MEB development; multidisciplinary care, in which nurses and nurse practitioners, social workers, and behaviorally trained practitioners collaborate with physicians to provide care in a single setting; and preventive and therapeutic attention to the behavioral needs of children with serious chronic disorders.

Evidence for the effectiveness of local, state, and federal policies for promoting healthy MEB development in children and youth at a population level

is incomplete. Evidence of benefits for children and families exists for some long-standing programs, such as Medicaid and the Earned Income Tax Credit. Additional research is needed, however, to provide a basis for directing current policies and developing new policies so as to support healthy MEB development in children and youth more effectively.

IMPLEMENTATION AT THE POPULATION LEVEL

Research has also significantly expanded understanding of what is required for effective implementation and scaling of strategies such as those detailed above. These findings align with evidence about the influences on development, highlighting the importance of systematic and integrated approaches and sustained partnerships. Effective implementation of such strategies is facilitated by research focused on identifying the core components of an intervention or policy, as well as the optimal ways to adapt those components for diverse settings. While research has not answered every question about how to implement effective interventions at the population level, it does strongly indicate that a successful process depends on an interactive system with the capacity to support, track the outcomes of, and continuously improve an intervention. Key elements of such a system include

- active engagement of stakeholders (community members, service providers, funders, policy makers, purveyors, and researchers);
- a well-trained community workforce that is provided with ongoing professional development opportunities;
- active leadership within organizations responsible for delivering the intervention;
- the development of strong community coalitions that can muster sustained support for the intervention and provide community-level leadership;
- a system for monitoring the quality and outcomes of implementation efforts, barriers to successful implementation, trends in risk and protective factors and other influences on MEB development, and other relevant data;
- learning through evaluation, including which interventions work for whom, and sharing what is learned among networked programs; and
- multiple methods of communication to publicize and share the intervention objectives with stakeholders and the community at large.

A COMPREHENSIVE NATIONAL AGENDA FOR PROMOTING MEB HEALTH

From the body of work summarized above, it is clear that achieving meaningful improvements in MEB development and health will require a

comprehensive, integrated approach that takes advantage of the full range of research findings about salient influences, effective strategies, and what is required for their successful implementation. Meaningful improvements in MEB health are within reach if such approaches are supported and sustained; if available resources are coordinated around carefully defined shared goals; and if concerted attention is paid to identifying or creating scalable health promotion and prevention interventions, as well as the challenges of implementing these promising interventions at scale.

MEB health will not become a national priority by happenstance. A broad-based effort to improve MEB health—which could be organized under the rubric Decade of Children and Youth and led by HHS—could build awareness of the social and economic gains associated with healthy child development and engage multiple sectors of society in working toward that goal. To support this effort, we offer recommendations in three areas: federal leadership and partnership for a national agenda; implementation and scale-up of effective interventions; and monitoring to support needs assessment, scale-up, program improvement, and outcomes research.

Federal Leadership and Partnership for a National Agenda

Federal agencies are in the best position to articulate why MEB health deserves national attention and the nature of the effort needed. The relevant agencies of the federal government—led by HHS—are well positioned to lead an effort that leverages the potential benefits of a comprehensive, integrated strategy.

RECOMMENDATION 1: Relevant federal agencies should lead and collaborate with agencies at the state and local levels, as well as private partners, including national and local foundations and the business community, in coordinating a highly visible national effort to make the promotion of healthy mental, emotional, and behavioral (MEB) development a national priority, such as by designating a Decade of Children and Youth. These agencies should

- **articulate specific national goals and objectives in support of healthy MEB development throughout the life cycle, encompassing health promotion and disorder prevention;**
- **develop an integrated plan for longitudinal data collection and coordination and analysis of federal surveys, administrative data, and vital statistics that provides a comprehensive approach to measuring and tracking child and adolescent MEB health; and**
- **encourage and support the integration and coordination of new and existing efforts to pursue those goals and objectives at the federal, state, and local levels, using coordinating and convening**

capacities, pooling of resources, funding of outcomes analyses, regulatory options, and other powers and incentives.

RECOMMENDATION 2: Relevant federal agencies should use their program creation, regulatory, and other policy capabilities to promote healthy mental, emotional, and behavioral (MEB) development and mitigate risks to MEB health by, for example,

- developing and disseminating guidance for use by states and local jurisdictions in delivering effective promotion and prevention interventions—including preconception, prenatal, and postnatal care services; two-generation (including parent MEB health and parenting) interventions; preschool and school interventions; and universal screening for risk and protective factors—and in ensuring access to affordable treatment for parents and children to reduce risk;
- developing both guidance and targeted accountability measures for use by states and local jurisdictions to identify effective ways of reducing the exposure of children and families to risks—such as lead and air particulate matter; ineffective and inequitable disciplinary practices; unsafe sex and unintended pregnancies; use of tobacco, alcohol, and other drugs; traumatic experiences; and negative living conditions, including exposure to violence, unstable housing, food insufficiency, and underemployment—that can contribute to unhealthy MEB development;
- promoting coverage of behavioral health services for children and caregivers, especially those needed during pregnancy and the postpartum period and those offered by parenting programs, in reimbursement for private health insurance and Medicaid, encompassing both behavioral health promotion and risk prevention;
- setting expectations for the adoption and evaluation of programs known to enhance social and emotional development in schools, in health care settings, and in communities;
- supporting consistent policies on accreditation, certification, and licensing requirements for a multidisciplinary workforce oriented toward healthy MEB development in children and youth; and
- supporting and collaborating with local and state initiatives that contribute to healthy MEB development.

Implementation and Scale-Up of Effective Interventions

Progress in successfully implementing interventions for which research has produced evidence of both effectiveness and scalability will be essential for improving MEB development among children and youth at the population level. Ongoing research in implementation science is providing new insights into best practices for implementing promising interventions at scale. This research deserves continuing support.

RECOMMENDATION 3: Relevant federal agencies should support rapid progress in the development and dissemination of effective mental, emotional, and behavioral (MEB) interventions for delivery to large populations by providing funding and other resources to, for example,

- **support research and demonstration projects to determine the effectiveness of promising interventions for MEB health promotion, prevention of MEB disorders, and population screening at large scales, including the implementation of effective in-person and digital interventions;**
- **support states and local jurisdictions in developing cross-sector partnerships among schools, employers, the health care system, community-based organizations, and others to advance the scale-up of effective promotion and prevention interventions;**
- **support states and local jurisdictions in developing innovative funding mechanisms that can be sustained through changes in political leadership or funding shortfalls;**
- **use economic evaluation tools and other methods to analyze factors, such as costs and availability of funding, benefit/cost ratio, level of complexity, and need for supportive infrastructure; and**
- **document needs and develop strategies for sustainability over time.**

Monitoring to Support Needs Assessment, Scale-Up, Program Improvement, and Outcomes Research

The collection of information about quality and outcomes is vital to the continuous improvement that fuels the effective implementation of interventions that can benefit large populations. On a broader scale, policy makers and the public need information about the status of the nation's young people if they are to fully understand risks to MEB development and possibilities for its improvement. A significant amount of relevant data is collected about young people and families in the United States; in particular, the National Survey of

Children's Health collects state-level data that provide a considerable amount of pertinent information. Nevertheless, the data currently available do not provide adequate information to support improvement in MEB development. Therefore, the United States needs an improved system for the regular collection and coordination of data on indicators of mental, social-emotional, and behavioral development and health at the national, state, and local levels, as well as outcomes data on efforts to promote health, prevent disorders, and address problems in these areas. The data thus collected would be used to identify patterns and trends, areas of need, and vulnerable populations, as well as to support analysis and evaluation of the impact of policies and interventions over time—on both individuals and populations.

RECOMMENDATION 4: The U.S. Department of Health and Human Services should collaborate with states and local jurisdictions to conduct a comprehensive assessment of existing sources of data useful for tracking population trends and other key data on the mental, emotional, and behavioral (MEB) health and development of children and youth, the factors that influence it, and current efforts to promote MEB health and address MEB problems. Based on the results of this assessment, the agency should develop a plan for coordinating existing data and initiating additional data collection efforts to build the capacity to track

- the status of young people's MEB development at intervals over the developmental course, including both indicators of disorder and evidence of cognitive development, social-emotional growth, and flourishing in life activities;
- children's exposure to risks for unhealthy MEB development at the family, community, and societal levels, including adverse experiences at home, such as the presence of a seriously depressed parent, or at school, or influences promoting concerning behaviors, such as the consumption of unhealthful food, the use of nicotine-delivery products and such substances as alcohol and marijuana, and exposure to entertainment media that promote social exclusion, violence, or prejudice;
- access by children, youth, and families to effective health promotion and protective interventions, including pre-conception and prenatal health care for parents and care for children and youth from infancy through young adulthood; and
- effective programs and policies, including how many such efforts are under way, what interventions are being implemented, how many people they are reaching, who

benefits and who does not, and whether they are achieving their intended impact.

RECOMMENDATION 5: The U.S. Department of Health and Human Services' plans for coordinating the monitoring of the mental, emotional, and behavioral (MEB) health of the U.S. population should include building the capacity to

- **track both key data, using (or developing) standardized indicators of positive MEB development and health, and efforts to improve MEB outcomes;**
- **collect indicator data universally at the local level and aggregate these data to the community, state, regional, and national levels;**
- **share data across all levels, encompassing both locale-specific data documenting community efforts, including those of the public education system, and national and state data, for use in formulating policy;**
- **coordinate existing data collection efforts, including community monitoring systems and public health systems for surveillance and screening, at all levels; and**
- **support regular reporting and analysis of results to identify progress toward improvement goals.**

As the committee developed our primary conclusions and recommendations, we were struck by their similarity to those of numerous other committees of the National Academies that had addressed related issues in the past decade. Past committees have underscored the importance of coordinating efforts and systems to develop an integrated approach to promoting the health and well-being of children, youth, and families, as well as the critical importance of accurate and comprehensive data collection to inform policy makers and the public about the status of populations, the services provided to them, and the outcomes of those services. The confluence of these messages both supports and amplifies the recommendations of this committee with respect to fostering healthy MEB development. To state the obvious, the risks and challenges associated with economic and other environmental disadvantages in the United States influence not only children's MEB health but also their physical health, their schooling, and their entry into the world of work.

The Decade of Children and Youth that we propose will require realistic assessments of costs and benefits but is intended to serve as a way of making optimal use of the strong existing foundation of research on the MEB health of children and youth. It is our hope that our recommendations can be considered vital components of an intensive, focused, and sustained effort to improve the currently concerning MEB outcomes experienced by many U.S. children and youth. We do not advocate waiting to pursue goals for improved MEB

development and health until there is national consensus on how to do so and all building blocks are in place. We believe the accumulated weight of the conclusions and recommendations resulting from the body of research documented in this and predecessor reports of the National Academies is now sufficient to motivate rapid and unwavering action.

DIRECTIONS FOR FUTURE RESEARCH

While a strong foundation of research on which to base the launching of the Decade of Children and Youth is in place today, ongoing support for both discovery and application research will be essential to continued progress. Federal support for research relevant to MEB health has tended to focus on diagnosis and treatment of specific disorders at the expense of investigations of the social and behavioral determinants of health and well-being and efforts to promote MEB health population-wide. Research on health promotion and risk prevention and their impact on the incidence and prevalence of MEB disorders, as well as further advances in the science of program implementation, will provide critical opportunities for ongoing progress in fostering MEB health.

The first priority is to continue building on the growing body of work about ways to promote healthy MEB development at the population level. We further recognize the importance of emerging possibilities for reaching populations through school-based interventions and the health care system. The research priorities we identified also reflect the importance of understanding macro-level influences on MEB development and the challenges of population-level implementation of effective programs. High-priority research directions include

- the design and evaluation of interventions to promote the healthy MEB development of children and youth and the well-being of families at the population level;
- assessment of the effectiveness and implementation of school-based interventions;
- the development of successful two-generation interventions in health care through exploration of the effectiveness and sustainability of program models for improving early childhood MEB development;
- research on strategies to improve MEB development through attention to social and economic disparities; and
- the design and evaluation of implementation strategies.

CLOSING THOUGHTS

A future in which the MEB health of children and adolescents is a national priority in the United States is possible. If effective programs that promote MEB health and prevent disorders are thoughtfully implemented in communities across the nation, it will be possible to achieve population-level improvements in the rates of those disorders among children and youth and to support the nation's

youth in reaching adulthood with the social and emotional skills and assets they need to thrive. This report lays out a set of actions—both policy drivers and research priorities—that, if embraced, can help the nation create this future.

Introduction

Imagine what the United States would be like if all sectors of society joined together to use current knowledge to establish policies, communities, and programs designed to ensure that all young people have an opportunity to thrive. Envision that 10 years from now, the U.S. Surgeon General can celebrate that children’s healthy development has become a foundational value, and as a result, effective programs to promote mental, emotional, and behavioral (MEB) health and development are in place. The Surgeon General is able to document decreases in rates of MEB disorders of all types and evidence that increasing proportions of young people are attaining adulthood having met key developmental milestones, and having developed the skills and attributes they need to lead meaningful, productive, and engaged lives.

The United States has far to go to achieve this vision, although scholars have produced a substantial body of research on the tools needed to do so and how to apply them. In a 2009 report on preventing MEB disorders in children and youth, the National Research Council and Institute of Medicine (NRC and IOM) ¹ concluded that “the scientific foundation has been created for the nation to begin to create a society in which young people arrive at adulthood with the skills, interests, assets, and health habits needed to live healthy, happy, and productive lives in caring relationships with others” (NRC and IOM, 2009, p. 13). The United States has not yet taken advantage of this foundational knowledge.

In the decade since the 2009 NRC and IOM report was published, a growing body of research has significantly strengthened this foundation. The scientific basis for designing and implementing programs to support healthy MEB development and prevent MEB disorders has been falling into place, and there is no reason why the United States cannot achieve the vision of a nation of healthy young people who grow up to be healthy adults.

¹National Academies of Sciences, Engineering, and Medicine reports can be downloaded for free at <https://www.nap.edu>.

CHARGE TO THE COMMITTEE

To address the critical gap between achievable goals and actual progress in MEB health and development, the Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services, joined by the Centers for Disease Control and Prevention and the National Institutes of Health, asked the National Academies to conduct a study of progress in fostering healthy MEB development among children and youth. The National Academies convened the Committee on Fostering Healthy Mental, Emotional, and Behavioral Development Among Children and Youth to carry out this work; the committee's members have expertise in behavioral research, child development, child and adolescent psychiatry, education, epidemiology, evaluation research, health care services, implementation science, neuroscience, pediatrics, prevention research, program development, public health, and public policy (see Appendix C for biographical sketches of the committee members). The committee was asked to review and synthesize the available research and data on key advances in this area since the 2009 report was published, identify key challenges to further progress, and offer recommendations for acting on the existing body of research; see Box 1-1 for the committee's charge.

This report presents the committee's response to its charge. It offers an expanded view of the nature of healthy MEB development for children and youth (from fetuses and infants through older adolescents and young adults) and an updated review of strategies for promoting healthy MEB development and preventing MEB disorders. It also describes recent progress in understanding what is necessary to implement such strategies effectively. It sets forth the committee's recommendations regarding a national agenda for fostering healthy MEB development among children and youth, and outlines research needed to address remaining gaps in the understanding of MEB development and how it can be strengthened. Box 1-2 presents key terms used in this report.

CONTEXT FOR THE STUDY

This report builds on and updates a 1994 Institute of Medicine report (IOM, 1994), as well as the 2009 report referenced above (NRC and IOM, 2009). Each of these reports highlights developments in relevant research and includes recommendations for the continued improvement of MEB health in children and youth. Nevertheless, MEB health remains a primary concern because the nation is not effectively mitigating the risks that contribute to poor MEB health outcomes; these risks are prevalent and current data do not show improvement over past years.

As our charge directed, we focus both on the promotion of healthy MEB development and the prevention of MEB disorders, and we note that there are no crisp boundaries between healthy MEB development and disorder in the lives of children and youth. Many factors contribute to positive MEB development or hinder it in ways that may be subtle and even contradictory. The experience of

most children will likely fall somewhere in the middle of a continuum from robust positive development to serious disorder, and may fluctuate with family characteristics and other life circumstances.

BOX 1-1
Charge to the Committee

An ad hoc committee under the auspices of the National Academies of Sciences, Engineering, and Medicine will conduct a consensus study on fostering healthy mental, emotional, and behavioral development among children and youth.

As background to the study, the committee will review and synthesize the available research and analysis on areas of key advances and persistent challenges since the publication of the 2009 National Research Council and Institute of Medicine report *Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities* (NRC and IOM, 2009).

The committee may consider questions such as the following:

- (1) How has the context changed since the publication of the 2009 MEB report in areas such as cross-sector partnerships, creation of infrastructures for the implementation of prevention, incidence and prevalence trends for specific conditions, integration of MEB health strategies into other health care settings, risk and protective factors, cultural and linguistic factors, and cost-saving strategies?
- (2) How has the state of the science changed since the publication of the 2009 MEB report in areas relevant to fostering MEB health among children and youth, such as the core components of evidence-based strategies (community and practice-based) essential to producing positive outcomes, implementation science, public health approaches, and utilization of data and quality improvement systems?
- (3) What interventions have been effectively implemented and what program and policy gaps must be addressed to better achieve the prevention of MEB disorders and promotion of healthy MEB development, such as workforce development and infrastructure to support implementation at scale?
- (4) What has been the progress since the 2009 report specifically on two-generation approaches to foster healthy MEB development with respect to evidence of effectiveness and dissemination for those approaches?
- (5) What has been learned since the publication of the 2009 MEB report about the influence of the environmental context on neurobiology and what are the implications for strategies to foster MEB development among children and youth?
- (6) What has been learned about increasing health equity in the context of fostering healthy MEB development of children and youth?

continued

BOX 1-1

Continued

- (7) What role does practice-based evidence, including community-defined evidence in multicultural settings, play in fostering healthy MEB development of children and youth and how do we further develop the evidence that certain community and cultural practices work?
- (8) What role do complementary (e.g., mindfulness, meditation, yoga) and integrative approaches (e.g., optimizing evidence-based interventions with mindfulness, meditation, yoga) play in fostering healthy MEB development of children and youth?

Based on the review and analysis of the information gathered and confidential deliberations, the committee will produce a consensus report with actionable recommendations for specific agencies and organizations to lead efforts into the next decade.

BOX 1-2

Key Terms Used in This Report

Dissemination: The diffusion of information about an intervention’s potential benefits to practice settings.

Maintenance: Care given to prevent relapse, recurrence, or further deterioration of mental, emotional, and behavioral (MEB) health status.

MEB disorders: This committee used the definition of MEB disorders developed by the authors of the 2009 National Academies report: “the term ‘mental, emotional, and behavioral disorders’...encompasses both disorders diagnosable using *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (DSM-IV) criteria and the problem behaviors associated with them, such as violence, aggression, and antisocial behavior. Many mental, emotional, and behavioral disorders of youth exist on a continuum...The term...encompasses mental illness and substance abuse, while including a somewhat broader range of concerns associated with problem behaviors and conditions in youth” (NRC and IOM, 2009, p. xv).

Prevention: Strategies offered prior to the onset of a disorder that are intended to prevent or reduce the risk for its development.

Program, intervention, policy, strategy, approach: These terms are all sometimes used to refer to organized plans for bringing about particular improvements in a public health or public policy context, and none are used consistently to refer to a single defined method. We use the terms interchangeably unless the context calls for a particular meaning, which we make clear through surrounding text.

continued

BOX 1-2
Continued

Promotion: Strategies used to develop skills-based positive attributes, such as self-regulation, self-efficacy, goal setting, and positive relationships, that promote MEB development.

Treatment: Care given to an individual who is demonstrating MEB health challenges or has been diagnosed with an MEB disorder.

MEB disorders often emerge during childhood or adolescence: 75 percent develop by age 24, and one-half of all adolescents have had some mental disorder.² Rates of particular disorders vary by population subgroup and also fluctuate over time, but overall they are concerning, to say the least. Nearly 20 percent of adults—approximately 46.6 million individuals—experience a mental illness in the course of 1 year, and rates of diagnosis have been steady across age groups since 2008 (Kamal, 2017). Anxiety disorders are the most common MEB disorders among children and adolescents (31.9%), followed by behavior disorders (19.1%), depression (14.3%), and substance disorders (11.4%). Approximately 40 percent of young people who meet the criteria for one of these disorders also meet the criteria for at least one of the others. And rates of depression, suicide, and self-harm among young people have been increasing (Olfson, 2018):

- College counseling centers have reported that the percentage of students seeking treatment or guidance for anxiety increased from 40.4 percent in 2010 to 50.6 percent in 2016 (though this increase could reflect increased willingness to seek help) (Olfson, 2018).
- For college students who seek treatment services, anxiety and depression are the most common primary concerns. When students seeking treatment services were asked to “check all that apply” from a list of 44 concerns, 62.2 percent checked anxiety and 49.7 percent checked depression (Center for Collegiate Mental Health, 2018).
- While there has been some overall decline in substance use rates among young people, opioid-related morbidity and mortality have been increasing (Olfson, 2018).
- In 2015, suicide was the second most common cause of death among young people aged 15 to 24 and the third most common among those aged 10 to 14 (Olfson, 2018).

²Unless otherwise noted, data in this paragraph are taken from the National Institutes of Mental Health, see <https://www.nimh.nih.gov/health/statistics/mental-illness.shtml>.

- Between 2005 and 2014, the proportion of U.S. adolescents who reported experiencing a major depressive episode in the past year increased from 8.7 percent to 11.3 percent (Mojtabai, Olfson, and Han, 2016).

MEB disorders are a growing burden for affected young people and their families. They hinder young people's development into healthy and "economically productive and engaged citizens" (Center for the Study of Social Policy, 2012, p. 4), and in 2015 accounted for the highest rates of disability in the U.S. population (Kamal, 2017). One study of high school dropouts found that almost one-quarter of the students had demonstrated depressive symptoms in the 3 months prior to leaving school (Dupéré et al., 2018). The approximately 12 percent of young people ages 16–24 who are neither in school nor employed—often referred to as disconnected or "opportunity" youth—are at particular risk for a range of negative outcomes over the life course, including chronic unemployment, poverty, future mental health issues, criminal behaviors, incarceration, poor health, and early mortality, although the data do not indicate whether they are disconnected because of their mental health problems or the reverse (Fernandes-Alcantara, 2015; Hair et al., 2009; Sissons and Jones, 2012). Among adults who are homeless or incarcerated and youth involved in the juvenile justice system, moreover, rates of mental illness are much higher than those among the general population (National Alliance on Mental Illness, 2015). Mental health issues may, of course, lead to disconnection, homelessness, and related consequences, and the stresses of these situations may trigger or exacerbate mental health and substance abuse problems. Nearly one-fourth of adults in a nationally representative survey sample reported having been exposed to at least three adverse childhood experiences, which are known as antecedents of concerning MEB outcomes (Merrick et al., 2018), and more than one-half (57.7%) of children experience at least one exposure to violence in 1 year (Finkelhor et al., 2015).

Furthermore, youth without a diagnosable MEB disorder do not necessarily experience positive mental health development. Researchers have begun to examine flourishing in children, a way of defining positive MEB development independent of the presence or absence of an MEB disorder. A recent study used data from the National Survey of Children's Health to measure an index of flourishing in U.S. children, which encompassed their interest and curiosity in learning new things, persistence in completing tasks, and capacity to regulate emotions (Bethell, Gombojav, and Whitaker, 2019). The authors estimated that fewer than one-half (40.3%) of children in the United States met the criteria for flourishing (Bethell, Gombojav, and Whitaker, 2019). They found that children who live in households with an income greater than or equal to 400 percent of the federal poverty line are more likely to meet the criteria than are children who live in households with incomes below 400 percent of the federal poverty line. They found further that children who experience no adverse childhood experiences are much more likely to meet the criteria for flourishing than are children who

experience four or more such experiences (47.9% versus 20.6%). However, there is much less variation when the data are stratified by household income: 35.6 percent of children living in households with incomes below 100 percent of the federal poverty line meet the criteria for flourishing, compared with 46.9 percent of children living at 400 percent or more of the federal poverty line.

The economic burden of MEB disorders is also great, and can be calculated in a number of ways. U.S. spending on mental illness was estimated at \$89 billion for 2013, but mental illness is also associated with loss of earnings and productivity and other indirect costs (Kamal, 2017). Investing in the healthy MEB development of the next generation therefore promises not only benefits for individuals, families, and communities but also economic savings and benefits. Indeed, the nation's economic and civic well-being depend on a healthy adult population capable of productive work and stable relationships.

There are many ways to think about what constitutes healthy MEB development, but the differences among them are subtle. The committee took a broad view that encompasses not only the absence of disorder but also the idea that all children and youth deserve to have a meaningful and engaged life. We regard MEB health as fundamental to their success in whatever they undertake. We therefore believe that the stagnant progress in fostering healthy MEB development and preventing MEB disorders is worthy of national concern and attention to issues beyond those addressed in the 1994 and 2009 studies.

The IOM (1994) and NRC and IOM (2009) reports provide a valuable foundation for addressing these challenges. The former describes approaches to the treatment of MEB disorders and emphasizes the importance of extending the spectrum of mental health interventions beyond treatment to prevention and maintenance (i.e., sustaining the effects of treatments). That report includes a half-moon figure used to depict the interventions, including those provided through the specialty care sector, such as long-term management and rehabilitation, but also prevention activities (see Figure 1-1). As shown in the figure, the 1994 report recommends that, in addition to treatment and maintenance services, the nation consider the importance of (1) universal prevention, which focuses on entire populations of children and adolescents, not just those with specific risk factors, in schools, primary care, or other community settings; (2) selective prevention, aimed at children with identified risks; and (3) indicated prevention, for those beginning to exhibit symptoms, to forestall development of full-blown clinical episodes.

The 2009 update of the 1994 report (NRC and IOM, 2009) focuses greater attention on prevention of mental disorders and recommends the implementation of interventions designed to promote MEB health. It describes evidence regarding interventions for improving the MEB outcomes of children and youth, points to the need to make those interventions available on a large scale, and emphasizes several key points:

- Prevention requires a paradigm shift.
- Mental health and physical health are inseparable.

- Successful prevention is inherently interdisciplinary.
- MEB disorders are developmental.
- Coordinated community-level systems are needed to support young people.

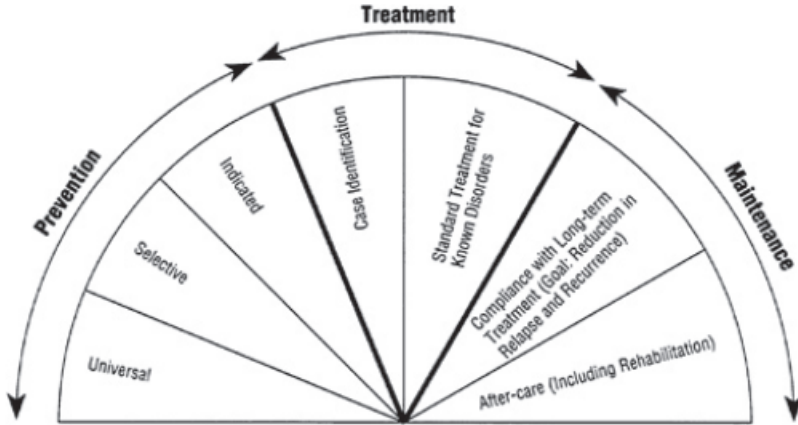


FIGURE 1-1 1994 model of the spectrum of MEB interventions.
SOURCE: IOM (1994).

The 2009 report includes an updated version of the half-moon figure from the 1994 report, reflecting the role of both promotion of MEB health and prevention of MEB disorders (see Figure 1-2).

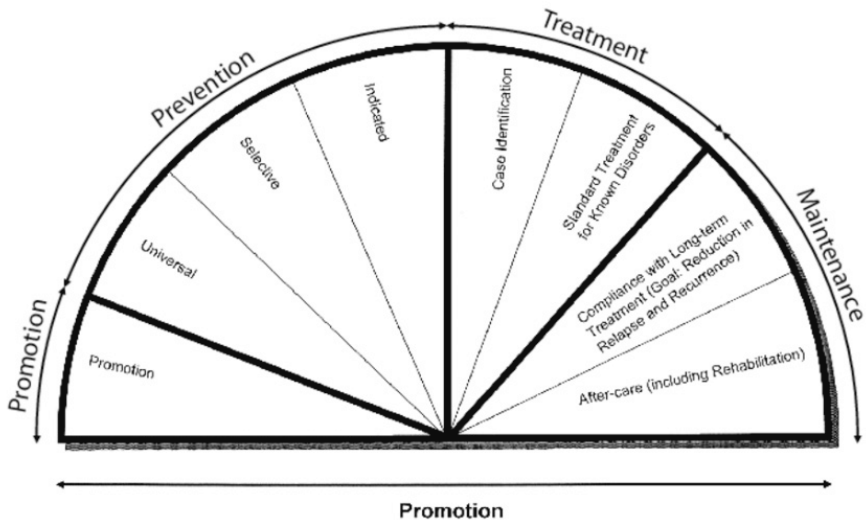


FIGURE 1-2 2009 update of the 1994 model of the spectrum of MEB interventions.
SOURCE: NRC and IOM (2009).

The present committee has again updated this figure. We have reviewed recent developments in the research related to fostering healthy MEB development and wish to highlight the critical importance of actively promoting healthy MEB development across the entire population of children and youth. In our version of the spectrum of interventions, the increased size of the promotion and prevention wedges reflects their importance (see Figure 1-3). While these updates reflect important trends in the research in this field, they also reflect the enduring importance of a spectrum of key tools for fostering MEB health. We emphasize the importance of using those tools to improve MEB development and health, a challenge that must be met if population-level adverse MEB outcomes are to be reduced.

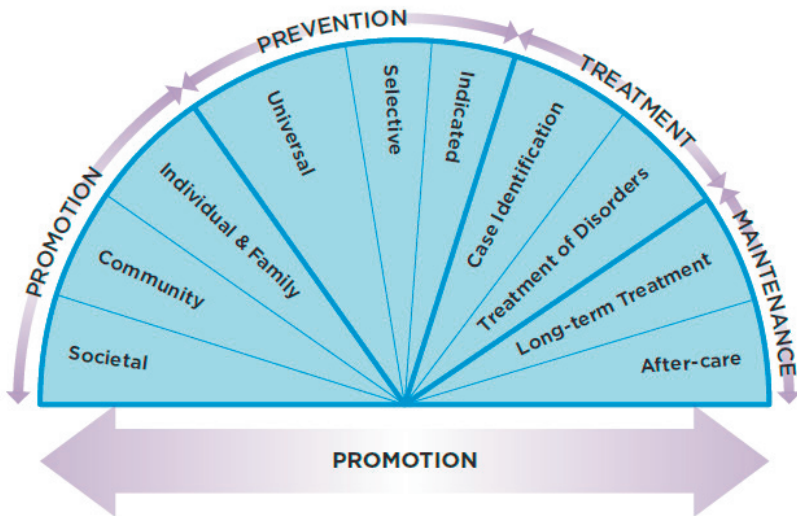


FIGURE 1-3 2019 update of the spectrum of MEB interventions.

COMMITTEE’S APPROACH TO ITS CHARGE

The 2009 NRC and IOM report focuses on the individual: on single gene influences, single risk factors, single points in development, and individual families and children. Since its release, the critical importance of promoting healthy development, in addition to preventing risks, has been underscored by growing evidence about the key conditions in families, neighborhoods, and communities that encourage or interfere with healthy MEB development, including environmental, biological, and behavioral factors. The committee was struck by the quantity and quality of new science important for understanding the determinants of MEB health and how that knowledge can be used. We highlight

here two strong new bodies of evidence and then discuss how they influenced our study process.

New Research Perspectives

Research in fields including neurobiology, epidemiology, public health, the social and behavioral sciences, implementation science, and prevention science has yielded a remarkable expansion in understanding of the interrelationships among a broad set of influences on MEB development. These insights have important implications for future efforts to foster healthy MEB development. At the same time, researchers have significantly expanded understanding of what is necessary for effective implementation of strategies to promote MEB health and prevent MEB disorders.

Integrated Understanding of Influences on MEB Health

In the past decade, strong evidence has emerged that MEB health is influenced by a dynamic interplay among influences at the biological, family, community (including schools and health care services), and societal levels, starting at preconception and extending through fetal life, infancy, childhood, adolescence, and adulthood. Previous research had identified statistical relationships between brain development and neuronal maturation on the one hand and epigenetic effects and societal influences on the other, but had not established mechanisms that would explain possible connections. New studies have made it possible for the first time to link individual, community, and societal well-being and pathology through clear epidemiological and biological research.

In addition, while prior research had pointed to the influence on development of a wide range of factors, including societal influences such as political values and racism, the period since 2009 has seen the emergence of new research on the critical role of neighborhood residence in life expectancy, income mobility, school performance, and chronic diseases. The striking disparities in outcomes for children and families across many communities based on race/ethnicity and socioeconomic status underscore the powerful influence of the neighborhood and community on children and their families.

Expanded Understanding of Implementation

Progress has occurred in research on how effective interventions can best be implemented. The 2009 NRC and IOM report notes that effective interventions were often not being made widely available or implemented faithfully. Since that time, however, significant investments have been made in research on the implementation and dissemination of strategies. This body of work has begun to yield a fuller picture of what effective implementation entails, showing that adoption of an evidence-based program and faithful adherence to the protocols for its use are necessary but not sufficient. It offers expanded guidance on how

interventions that promote well-being can be scaled and sustained in communities across the country and insights into why research-based implementation strategies have produced limited benefits in the past.

The committee was aware that significant advances in treatment have also occurred since the 2009 report was issued. For example, evidence is starting to emerge that treatment for depression administered via the Internet is effective (e.g., Buntrock et al., 2016; Karyotaki et al., 2017), as are evidence-based therapies administered by properly trained and supervised lay health workers (Chibanda et al., 2016; Dias et al., 2019). We reviewed important advances in treatment of maternal depression before, during, and after pregnancy. Some of these developments offer opportunities that are particularly relevant for promotion of MEB health and prevention of MEB disorders. Advances that can better treat milder disorders, address relapses, and prevent youth with disorders from lapsing into more serious psychoses (Fisher et al., 2013) are an important component of any effort to promote MEB health.

These developments are important, but despite this progress, the overall prevalence rates of MEB disorders have not improved; even the most effective treatments go only so far given the many chronic disorders and persistent sources of risk. We note that even where well-studied efficacious treatments are available, children and youth often do not have adequate access to providers who can accurately diagnose and treat MEB disorders. For example, of the 3.1 million children in the United States who experienced depression in 2016, just 41 percent received treatment. While addressing this gap is critical, the committee's focus was on promoting healthy MEB development; we viewed promotion and prevention efforts to reduce the need for mental health treatment as the overall directive in our statement of task (refer to Box 1-1).

Implications

The important developments summarized above made it clear that the committee would need to look beyond the evidence base for intervention strategies focused on individuals and their families, the primary focus of the 2009 report. We recognized that we would need to apply a much wider lens, and we describe here several specific perspectives that guided us in identifying the topics we would cover and the evidence we would seek.

A Life-Course Approach to Understanding Development

The idea that developmental trajectories for both individuals and populations are strongly affected by social and temporal influences, which is increasingly dominant in public health studies, may seem to be common sense. But the growing evidence of the interplay among genetic, biological, social, and environmental influences on development, beginning before a child is even

conceived, has profound implications for thinking about interventions to promote healthy MEB development.

Recognizing that we would need to look across generations, we sought evidence about multigenerational influences (the lasting effects on a developing child of experiences and exposures in their parents' and grandparents' lives); biological, social, and psychological influences with varying effects across developmental phases; and reciprocal influences at the individual, community, and societal levels.³ The complexity of the interactions among these and other influences on MEB development underscored the need to reconsider the individual-centric approach that has been typical in child care and treatment—to consider factors at multiple levels and across sectors that encourage healthy MEB development and promote resiliency.

Although measurement of resiliency and of the positive features of environments and their interactions is in its infancy, we adopted a broader view than the authors of the 2009 report had reason to take. They recognized that there are opportunities for promotion of MEB health and prevention of MEB disorders throughout childhood and adolescence, noting that some interventions work well across all developmental stages but that most have particular effects at specific stages. Research building on that understanding has highlighted the importance of the health of prospective mothers and fathers even prior to conception, as well as the community-level and policy interventions that influence people and families at every age. We therefore examined influences that have effects beginning before conception and at stages of life extending into young adulthood and across generations. That is, we took what is known as a life-course approach, recognizing the importance of risk and protective factors over time; at various developmental phases; and at the individual, community, and societal levels. Figure 1-4 illustrates this approach.

A Public Health Framework for MEB Health Promotion

Our focus on a life-course approach dovetailed with the remarkable growth in research evidence on the complexity of child development and the importance of the interaction among biological, social, and cultural influences from the molecular to the societal level, evidence that has led to an expansion in focus from intervening solely with the individual child (the organism) to intervening at the societal and community levels (the environment). This expanded understanding encouraged us to broaden our focus beyond the prevention strategies that may help the individual child, emphasized in the 2009 report, to health promotion and community wellness approaches that have greater potential to benefit populations

³For purposes of exposition, we have organized our discussion of both influences on MEB health and interventions by the individual, community, and societal levels, recognizing that these distinctions are often arbitrary and overlapping.

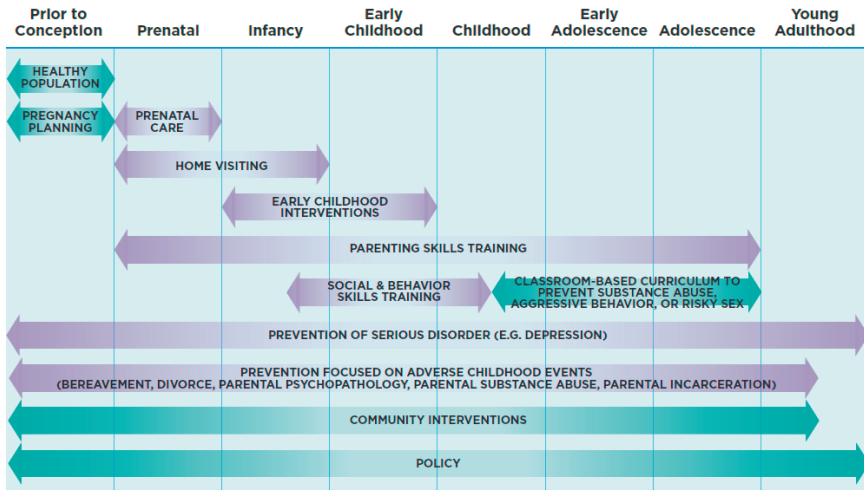


FIGURE 1-4 Interventions across the life course.

as well as individuals. Accordingly, this report is framed to emphasize the importance of integrating promotion efforts to maximize their impact across the population of children and youth.

The breadth of the dual goals of promoting healthy MEB development and reducing the incidence and prevalence of MEB disorders among all young people made it evident that a multifaceted public health strategy involving all sectors and institutions serving children and youth would be needed. A public health approach focuses on programs, policies, and practices that affect well-being in a population, including efforts to promote changes in relevant values and norms. To reach entire populations, public health measures must be efficient. Relying not just on program development and evaluation, which have been at the heart of prevention science, a comprehensive public health approach also makes use of public policy, media campaigns, and universal approaches to intervention, such as in health and education systems, because they can affect an entire population. Reducing the population prevalence of MEB disorders will require targeting of factors and settings that offer potential to affect the entire population.

One of the most important advances in public health in the 20th century—progress made in reducing cigarette smoking—provides a model for promoting the well-being of children and adolescents. There are many pharmacological and psychological programs aimed at helping smokers quit, but the large reductions in smoking rates that occurred in the second half of the 20th century (a 58.2% decline in smoking among adults from 1964 to the early 2000s; IOM, 2007) depended on a comprehensive public health movement. This movement mobilized a broad coalition of scientific, public health, and advocacy organizations to expand public understanding of the harmful effects of smoking; introduced financial and location barriers to smoking; and brought about historic changes in public opinion and public policy. Tools used in

the antismoking effort included credible scientific reports; coordination of cultural, media, and legal efforts; policy efforts at the federal, state, and local levels; and monitoring of relevant data. While problems with smoking—and vaping—have not been eradicated within the United States, similar processes hold promise for promoting healthy MEB development.

A Community Approach to Fostering Healthy MEB Development

Children are deeply embedded in communities, which in turn are integrated within the larger society. Public health approaches to promoting healthy MEB development and preventing MEB problems are essential to achieving population-level impacts on MEB health outcomes and may have significant effects on behaviors, but they lack the power to address broader influences on health and development. We recognize that some readers may regard our including consideration of broad societal issues in this report as idealistic or impractical, but the committee members were of one mind from the start that there are two strong reasons for treating these issues as critically important for effectively nurturing healthy development.

First, support at all levels—community, county, state, and federal entities and agencies; foundations; businesses; national advocacy organizations; and scientific organizations—will be required to implement strategies that can improve MEB outcomes for children and adolescents. Evidence-based strategies will achieve positive impacts on MEB health only if they affect not just individual families but also schools, neighborhoods, and communities. It will be essential for multiple service sectors, such as primary health care, behavioral health, child welfare, juvenile justice, education, child care, and other social services, to be part of the solution.

Second, evidence and practical experience both point to the importance of community and policy interventions in pursuing a more nurturing society. Growing evidence is revealing that large-scale prevention efforts implemented with fidelity in communities with high rates of poor outcomes for adolescents can have strong and consistent effects (Fagan et al., 2019). Such results support the idea that the community is an effective unit for intervention because it is small enough to marshal significant resources and large enough to show sustainable population effects; its modest scale also facilitates careful evaluation of outcomes.

In short, our initial review of the emerging research clearly suggested that achieving a society with flourishing children and lower rates of MEB disorders will require changes at every level, from improving the moment-to-moment interactions between a parent and a child to adopting policies at the federal level that affect poverty and disparities in socioeconomic status, education, and health across the nation. We return to these issues at the end of this report.

A Word about Evidence

The study charge (refer to Box 1-1) required us to review relevant evidence spanning a wide range of topics, including the integration of MEB health interventions into primary care and other health care settings; technology-based interventions aimed at preventing specific MEB conditions, such as depression; integration of strategies for the promotion of healthy MEB development into broad public health approaches; the influence of the environmental context on neurobiology; and the implications for strategies to promote healthy MEB development. We looked across stages of development and different environments, and we drew on multiple academic disciplines, ranging from those that rely primarily on laboratory-based research to those that make use of a variety of qualitative research methods.

Our goal was to synthesize the conclusions for which strong evidence exists, recognizing that standards of evidence vary across disciplines according to the types of data and analyses that are suitable for different research objectives and contexts. In the chapters that follow, we discuss the kinds of evidence available to evaluate the topics addressed, but we note here that our conclusions and recommendations reflect our collective judgment about the strength of the evidence relevant to each topic. We recognize that opinions differ as to the relative merits of different research approaches for different purposes, but resolving those differences is beyond the scope of this study. For simplicity, we use the term “effective” throughout the report to characterize those approaches we collectively judged to be supported by adequate evidence from studies in multiple settings. We also note that evidence for the benefits of interventions generated in experimental settings does not necessarily translate to the same benefits in other settings, or in broad applications.

STUDY PROCESS

The committee used a variety of strategies to examine evidence on a wide range of topics. Two open public sessions gave us the opportunity to hear multiple perspectives on objectives for promoting MEB health, effective public health messaging strategies, and advances in implementation science.⁴ We arranged teleconferences to hear from experts on topics including adverse childhood experiences, measurement tools and methodology, National Institutes of Health funding opportunities for prevention activities, public health approaches to fostering MEB health, monitoring of the social-emotional development of young children, prevention and implementation science, and the role of businesses in

⁴Videos and slideshows from these presentations are available on the study website, see <http://nas.edu/MEB-Health>.

promoting MEB health. We also commissioned two papers to gain additional insights and information:⁵

1. Laws Influencing Healthy Mental, Emotional, and Behavioral Development, by Kelli A. Komro, and
2. Recent Trends in Child, Adolescent, and Young Mental, Emotional, and Behavioral Health in the United States, by Mark Olfson.

GUIDE TO THIS REPORT

Part I of the report (Chapter 2) sets the stage with an overview of the individual, family, community, and societal influences that shape MEB development in children and youth. Part II reviews research on effective strategies for promoting healthy MEB development: strategies that address families across multiple generations (Chapter 3), those used in education and health care settings (Chapters 4 and 5, respectively), and policy strategies (Chapter 6). Part II closes with a discussion of the body of evidence regarding interventions and some methodological considerations (Chapter 7). Part III examines the challenges of implementing effective strategies at scale: Chapter 8 describes the foundations on which effective implementation rests, while Chapter 9 looks at the functioning of a robust, sustainable implementation system. Part IV turns to the question of how the nation can take full advantage of this base of knowledge. Chapter 10 briefly reviews progress made since the 2009 NRC and IOM report. Finally, Chapter 11 returns to the vision with which this introductory chapter opened—of the potential impact of a decade in which healthy MEB development for children and youth is a top priority in the United States. In that final chapter, we offer recommendations for pursuing an agenda for fostering healthy MEB development and outline priorities for research to support sustained momentum toward that vision.

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⁵These papers are available under the Resources tab for download at <https://www.nap.edu/catalog/25201>.

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Part I

Mental, Emotional, and Behavioral Development

The vision described in Chapter 1 rests on an understanding of what healthy mental, emotional, and behavioral (MEB) development is and how the risk and protective factors that influence it can be modified. Many aspects of healthy development have been well understood for decades, but research emerging since 2009 has significantly elaborated this picture. Chapter 2 offers a detailed look at the complex factors that affect development at multiple levels. We set the stage here with a brief picture of what constitutes healthy MEB development.

There are numerous frameworks for describing the skills, interests, habits, and values a young person must have to lead a productive life and have caring relationships with others. Researchers have identified developmental outcomes in domains that include cognitive development, psychological and behavioral health, and social and emotional competence.

Cognitive development refers to the emergence of verbal and reasoning skills that are involved in academic success, as well as the accumulation of knowledge in specific subject areas. Executive functioning skills, such as planning, impulse control, and the capacity to delay gratification, are other examples of higher-level cognitive skills. Current measures of cognitive ability are predictive of academic progress and success, which in turn is an important factor in resilience. Milestones have been established for executive function, literacy, abstract reasoning, and critical thinking for stages from infancy through adolescence.

A primary goal for **psychological and behavioral health** is psychological flexibility—the ability of a person to pursue her goals and values effectively by persisting or altering her behavior as the situation demands (Kashdan and Rottenberg, 2010).

While there is no precise definition of what constitutes healthy MEB development, ways to measure core features of **social and emotional competence** have been the focus of attention in the last few decades, as educators in particular have sought ways to assess and teach particular competencies (Stecher and Hamilton, 2018). The Collaborative for Academic, Social, and Emotional

Learning has developed a five-component framework for understanding “students’ capacity to integrate skills, attitudes, and behaviors to deal effectively and ethically with daily tasks and challenges,” which provides a reasonable summary of the attributes of healthy development;¹ see Box Part I-1.

BOX PART I-1
**Core Competencies Defined by the Collaborative for Academic, Social,
 and Emotional Learning**

1. **Self-awareness:** The ability to accurately recognize one’s own emotions, thoughts, and values and how they influence behavior. The ability to accurately assess one’s strengths and limitations, with a well-grounded sense of confidence, optimism, and a “growth mindset.”
 - Identifying emotions
 - Accurate self-perception
 - Recognizing strengths
 - Self-confidence
 - Self-efficacy

2. **Self-management:** The ability to successfully regulate one’s emotions, thoughts, and behaviors in different situations—effectively managing stress, controlling impulses, and motivating oneself. The ability to set and work toward personal and academic goals.
 - Impulse control
 - Stress management
 - Self-discipline
 - Self-motivation
 - Goal setting
 - Organizational skills

3. **Social Awareness:** The ability to take the perspective of and empathize with others, including those from diverse backgrounds and cultures. The ability to understand social and ethical norms for behavior and to recognize family, school, and community resources and supports.
 - Perspective-taking
 - Empathy
 - Appreciating diversity
 - Respect for others

4. **Relationship Skills:** The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. The ability to

continued

¹For more information, see <https://casel.org/core-competencies>.

BOX PART I-1

Continued

communicate clearly, listen well, cooperate with others, resist inappropriate social pressure, negotiate conflict constructively, and seek and offer help when needed.

- Communication
- Social engagement
- Relationship building
- Teamwork

5. Responsible Decision-making: The ability to make constructive choices about personal behavior and social interactions based on ethical standards, safety concerns, and social norms. The realistic evaluation of consequences of various actions, and a consideration of the well-being of oneself and others.

- Identifying problems
- Analyzing situations
- Solving problems
- Evaluating
- Reflecting
- Ethical responsibility

SOURCE: Reprinted with permission from <https://casel.org/core-competencies> (CASEL, 2019).

Many factors contribute to the development of healthy MEB attributes, hamper their development, or contribute to the development of risk behaviors or MEB disorders. The 2009 National Research Council and Institute of Medicine report notes that “individual competencies, family resources, school quality, and community-level characteristics” are among the influences on MEB health, and that the more negative influences a growing child experiences, the greater is the likelihood of negative outcomes (National Research Council and Institute of Medicine, 2009, p. 16). That report also takes note of interactions between genes and the environment and points to emerging research on how genes may influence processes that may play a part in MEB disorders and help explain individual differences in their occurrences. Researchers continue to explore the components of healthy MEB development and the myriad factors that influence it.

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2

Influences on Mental, Emotional, and Behavioral Development

As discussed in Chapter 1, a growing body of work has significantly strengthened understanding of the factors that influence mental, emotional, and behavioral (MEB) development from well before a child is born through adolescence, the mechanisms through which they exert that influence, and the complex interactions among them. It has long been understood that factors at the individual, family, community (including school and health care systems), and societal levels have profound effects on children's development. Nor is it news that the ratio of positive, supportive influences to negative ones is likely worse for children born into lower socioeconomic circumstances. There is, however, growing evidence of *how* and *when* these influences, which begin before conception, promote or impede positive MEB development, and how they play out across communities and generations. This chapter first explores new perspectives on how the myriad influences on MEB development interact. It then looks in detail at the neurobiological basis for MEB development and at individual-, community-, and society-level influences.

It is important to note that this emerging picture of influences on MEB development has resulted from weaving together different sources of evidence. Both evidence collected in the laboratory about biological processes that occur at the microscopic level and sophisticated statistical analysis of large volumes of data (big data)¹ have played a part. More challenging has been establishing how policies (including governmental, legal, and administrative actions, as well as the efforts of foundations and other entities) and the environments in which child development occurs are associated with outcomes for individual young people or populations.

¹The term “big data” is loosely used to refer to extremely large sets of digital data that are analyzed using computer analytics, such as, in this context, population-level surveys, birth cohort studies, and data from electronic health records that are available in large volume. The importance of these new types of data is discussed in Chapter 11 and in Appendix B.

AN INTEGRATIVE PERSPECTIVE ON MEB DEVELOPMENT

The 2009 National Research Council and Institute of Medicine (NRC and IOM) report gives careful consideration to the individual risk and protective factors that affect healthy MEB development in children and adolescents (NRC and IOM, 2009). These factors are considered within a model in which the child is at the center of concentric rings of influences, beginning with the family and moving outward to encompass school, community, and broader social influences. Subsequent developments in the science of child development have brought updates to this model, showing more clearly the interdependency among individual-level factors and the broader context in which those factors operate.

First, as we discussed in Chapter 1, models of the life course have been updated to account for the ways in which these risk and protective influences interact over time, and to reflect their importance for both individuals and populations more precisely. Second, research has produced an emerging picture of how environmental influences act at the molecular level—beginning before a child is even conceived—to generate a dynamic pathway to MEB development. Third, developing research has expanded understanding of the fundamental impact of nurturing and attachment in the earliest years and elaborated the significant concrete impacts of community- and society-level factors across developmental stages and for a range of outcomes. Finally, there is growing recognition that a child’s vulnerability, strengths, and resilience—to which biological and environmental processes contribute—also play an important role that varies over time and across family, community, and physical environments. Together, these new understandings, along with research that has harnessed large-scale datasets to investigate multiple sites and large numbers of participants across the United States, have yielded a significantly more sophisticated picture of the influences on healthy MEB development.

Figure 2-1 is a contextual schema showing healthy child and youth MEB development. It depicts the types of risk and protective factors that influence MEB development across the life cycle at each level (the individual child through the broader society). The horizontal arrows on each side of the figure emphasize cross-generational influences that operate at every life-cycle stage, including effects that are important even before a child is conceived and effects on the parenting of the next generation.

Since the 2009 report was published, research on the biological and environmental influences on children’s MEB health has typically focused on factors at the individual level. While this approach has identified potential contributors to the process of MEB development, it has not adequately described the process whereby a developing child is both influenced by and interacts with her socially and physically complex environment, and the ways in which both she

and her world are continuously changing.² Although these are challenging concepts to model, researchers have developed integrative approaches that support more robust predictions of MEB outcomes and theoretical models that can be applied across contexts and populations (Martin and Martin, 2002). These models describe biological and environmental integration and the ways in which the two interact.

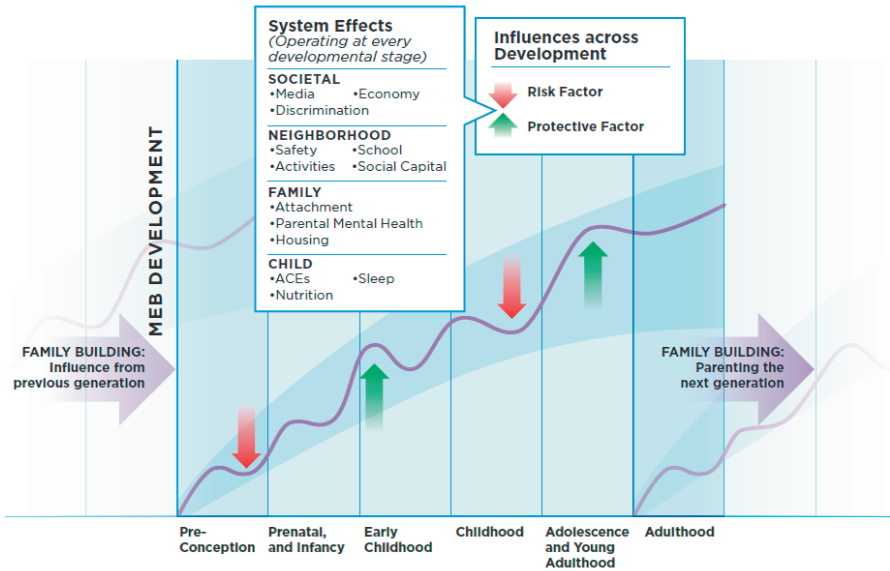


FIGURE 2-1 Influences on MEB development across the life cycle.

Biological Integration

Although neurobiological mechanisms are a central focus of research on MEB outcomes, it is important to note that these mechanisms are the downstream consequence of complex cellular and molecular variation that emerges in response to the interplay between genes and environments. Genes and environments both operate to create variation, and the interplay between these variables is the foundation for the emergence of individual variation. Moreover, there is statistical evidence for gene–environment interactions, in which genetic variations are predictive of an outcome only in the presence of specific environmental conditions, or alternatively, environmental influences on an outcome are apparent only among individuals carrying a particular genetic variant.

²The committee recognizes that there are important questions about the use of gendered personal pronouns but that style on this issue is in flux; for clarity, we have used both “he” and “she” in this report when referring to hypothetical individuals.

Advances in molecular biology provide new insights into the nature of these interactions. Epigenetics—the environmental alteration of the genome structure through chemical processes—is an evolving field of study for researchers in child development. Epigenetics describes the chemical and molecular changes to chromatin, which include DNA methylation, histone modifications, and noncoding RNA, and how these changes influence the ways genes are expressed and shape physical and behavioral phenotypes (characteristics). These mechanisms may be modified by a broad range of environmental cues. It has been estimated that a substantial proportion of the variation in DNA methylation that occurs during the first month of life, as well as obstetric outcomes such as infant birthweight and gestational age, and even some childhood behaviors, can be explained by interactions between DNA sequence variation and aspects of prenatal environments, such as maternal smoking, depression, and body mass index (Teh et al., 2014).

Although integration of epigenetics within the framework of gene–environment interaction has broadened the biological perspective relevant to MEB health, there are still other factors to consider. The roles of epigenetic factors in neurodevelopment are also being modulated by the activity of multiple other biological systems. For example, the interactions between the immune system and the brain are critical to predicting mood, stress reactivity, and behavior. Exposure to circulating hormones has a significant role developmentally in shaping the brain and continues to influence cognition, mood, and social behavior across the life span (Engler-Chiurazzi et al., 2017; McEwen and Milner, 2017; Sisk and Zehr, 2005). Brain–gut interactions have also emerged as a developmentally important signal (influence) with potential to shape MEB health (Borre et al., 2014).

Unlike the stable and static genome, these biological systems are dynamic, which means developments in these systems are potentially reversible. Studies in rodents, for example, suggest that the microbiome (the array of bacteria found in an organ, often the intestinal tract) can be used as a target for reversing the effects of early life adversity on behavioral outcomes (Cowan, Callaghan, and Richardson, 2016), further highlighting the complex interactions among mental and physical systems and the environment. Epigenetic changes induced by adversity can also be reversed (Brody et al., 2016), which provides some hope that effective interventions can have a biological and lasting as well as immediate influence on behavioral development and behaviors.

Figure 2-2 depicts the interactions among these biological factors that occur at every developmental stage. These factors may operate at the genomic level through variation in DNA sequence (the inner ring of the model in Figure 2-2), or at the molecular level through changes in how genes are expressed (the epigenetic changes represented by the purple ring). They may be reflected in chemical processes, such as hormonal changes, changes in the pathways of neurotransmitters, or changes in metabolites. Or they may occur at the cellular level through changes in the functioning of neurons, lymphocytes, microbiota, or endocrine

cells (the red ring), or changes within the networks of cells in each system, shown in the green, outermost ring.

Adopting an integrated perspective on the biology of a developing child—a perspective suggesting that a broad array of experiences shape MEB outcomes and should be evaluated—has implications for promoting MEB health. For example, research integrating health measures into the study of the development of social and academic achievement has revealed the phenomenon of “skin-deep resilience,” the idea that the occurrence of surface-level improvements in functioning (resilience) can be accompanied by a long-term biological cost, such as impaired health and biological aging (Brody et al., 2013; Miller et al., 2015). These findings further highlight the interactive influence of environment, behavior, and biology and the importance of careful consideration of how influences on MEB development affect health more broadly.

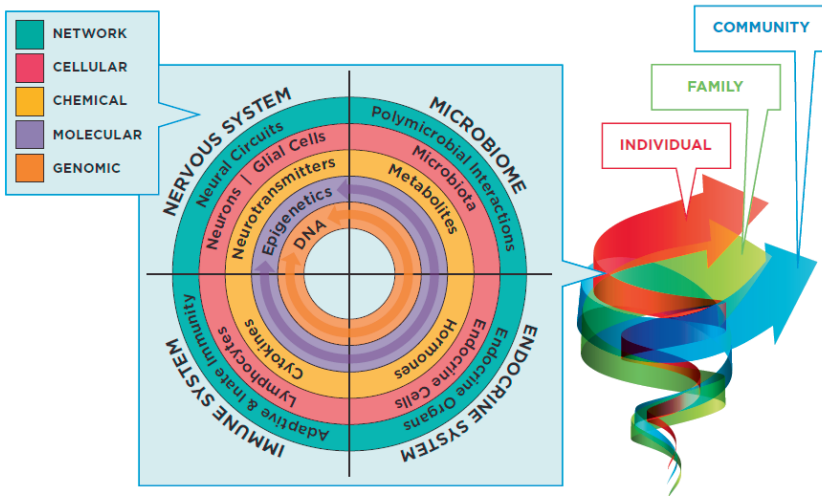


FIGURE 2-2 Environmental and biological factors operating at every developmental stage.

Environmental Integration

A further complexity is the influence of environmental experiences on these multilayered and interacting biological systems. Though these biological systems exist at the individual level and can be affected by the individual’s experiences, the family and the community context also shape these individual-level experiences by altering the development and functioning of biological systems, and hence MEB outcomes.

Integrative approaches are beginning to incorporate larger-scale environmental variables that may influence MEB health outcomes, although disentangling particular influences is complex. Generally, environmental factors

are conceptualized as consisting of multiple levels (i.e., individual, family, community, society) and multiple domains (i.e., social, physical), and integration of these levels and domains has typically been limited. It is possible to measure such factors, but researchers have not yet developed models of how outcomes are influenced by the interplay among proximal (e.g., family) and distal (e.g., societal) environments. This methodological limitation may in some cases lead to an overemphasis on proximal environmental cues at the expense of considering the contextual factors embedded within the community and society. This failure to address contextual factors may compromise the effectiveness of interventions targeted at the individual or family level. For example, interventions focused on individual-level anxiety may have limited effect if they do not also take into account family conflict or neighborhood violence.

The impacts of an individual's physical environment (e.g., toxins, pollution, air quality, climate) and social environment (e.g., safety, nurturance, peer relationships, policies) are often considered separately. These qualities of the environment act on the individual organism to shift epigenetic variation and can alter neurodevelopment and the network of biological systems that interact with the brain. These exposures are also likely to co-occur, such as when a poor-quality physical environment (e.g., high pollution) is associated with low socioeconomic status. Thus, this is another area in which an integrative approach that takes such interactions and their timing into account is important. Indeed, studies of the genome or microbiome increasingly suggest that environmental factors operate not singularly but as part of a complex web of environmental and social factors that interact with child and adolescent biology and the genome, most likely through common socioemotional or biological pathways, to increase or decrease risks for unhealthy development in children.

The web of environmental variables acting at the broad societal level and the proximate social or physical levels has been termed the “exposome” to signify parallels with the genome, the proteome, the microbiome, and others (Guloksuz, van Os, and Rutten, 2018). The study of environmental variables as networks or webs of risk and protective factors will be complicated, but such research will be essential to the understanding of variation in MEB outcomes.

THE NEUROBIOLOGICAL BASIS OF MEB OUTCOMES

The development of the human brain occurs over a lengthy developmental window, starting early in fetal life and with continued structural and functional refinement being observed into young adulthood. Since the 2009 report was issued, the expanded use of neuroimaging technologies to examine brain changes from infancy through adulthood has yielded a number of important findings related to MEB development.

Developmental Acceleration

Development accelerates in response to environmental threat. For example, girls who encounter several types of challenges experience the onset of puberty earlier than girls who do not. The challenges for which these connections have been established include an absent father, maternal depression, family conflict, and low ratio of income to needs, but these effects can be buffered by secure childhood attachment (Deardorff et al., 2011; Ellis and Garber, 2000; Sung et al., 2016). Neuroimaging studies suggest that the acceleration of development is also evident in brain systems, such as those that regulate fear and learning (Gee et al., 2013), and in the connectivity between cortical and subcortical brain structures that have implications for emotional regulation (Callaghan and Tottenham, 2016). The “stress-acceleration” hypothesis collectively supported by these findings is also consistent with research showing cellular and molecular indications of accelerated biological aging including telomere length (Drury et al., 2012) and epigenetic age (Lawn et al., 2018)—biological indices of senescence that may be predictive of longevity and disease risk in children who have experienced adversity.

Differential Susceptibility and Sex Differences

Genetic, environmental, neurobiological, and behavioral characteristics account for differences in the ways individuals respond to influences such as stress or adversity. This phenomenon, known as differential susceptibility, provides a framework for thinking about ways to account for both healthy MEB development and the development of MEB disorders, a framework that focuses not on the relative vulnerability or resilience in distinct subtypes of individuals but on the degree of plasticity an individual exhibits. Cortical sensory processing capacity and the ability of the prefrontal cortex to filter emotional stimuli have been suggested as potential neural mechanisms accounting for differential susceptibility (Boyce, 2018). Increasing understanding of such mechanisms has been the basis for the development of pharmacological treatments, such as drug therapies used for depression.

One of the primary sources of variability in an individual’s developmental trajectory and response to genetic and environmental factors is biological sex. MEB outcomes are expressed differentially in males and females in response to chromosomal, hormonal, social, and broader environmental variables, and this variation is manifest in structural and functional neurobiological sex differences. These sex differences emerge early in fetal development and persist into adulthood. The interaction between sex and a broad range of influences occurring across the life span has been observed in MEB development. Accounting for the unique way in which males and females respond to these influences will be critical to predicting vulnerability or resilience to risk (Adams, Mrug, and Knight, 2018; Molenaar et al., 2019; Stroud et al., 2018). Individual vulnerability based on

gender identity has also emerged as a critical variable, as transgender and nonbinary youth are a growing proportion of the population and experience high rates of significant stressors, including bullying and lack of family support (Aparicio-García et al., 2018; Becerra-Culqui et al., 2018).

Genetic and Epigenetic Variation

The brain serves as a critical mediator of genetic and epigenetic variation in MEB development. Consistent with the move toward biological integration, establishing the impact of genetic variation on the brain's anatomical microstructure, circuitry, and functional activation patterns will help researchers assess the mediating role of biology in MEB development. Progress is being made toward the development of a complex conceptualization of genetic influences on neurobiology that goes beyond the identification of individual genes that may account for particular phenomena by incorporating genome-wide data and more robust analytic approaches (Hibar et al., 2015). Although it is currently not possible to determine the epigenetic characteristics of genes involved in these neural phenotypes in the living brain, better understanding of the potential utility of peripheral epigenetic biomarkers (e.g., those measured in blood cells) for predicting neural epigenetic states may make predicting such characteristics and accounting for individual differences in brain and behavior trajectories feasible.

Sensitive Periods

Sensitive periods—times during which an individual's neural development is particularly active and vulnerable—have been a key focus of research on MEB development and influences. While a cascade of neurodevelopmental events occurs from conception through adolescence, that stretch of time includes periods of intense neural plasticity during which key sensory, social, emotional, and cognitive capacities are established. Evidence that the period from birth to age 3 is one such sensitive period has been the basis for strong arguments that early intervention is important both for fostering healthy development and for preventing or delaying the onset of disorders that may disrupt subsequent sensitive periods. The period of puberty and adolescence is another time of rapid biological change, and another window for especially effective interventions. Although the importance of sensitive periods was recognized before the 2009 report was issued, recent research has shed light on the molecular pathways through which sensitive or critical periods are created (Kobayashi, Ye, and Hensch, 2015; Takesian et al., 2018). This line of research has identified strategies for reopening critical periods by increasing neural plasticity, which can result in improved sensory and behavioral outcomes. The potential to foster reversibility of deficits in MEB health through these molecular pathways may provide important insights into the mechanisms of effective interventions.

INDIVIDUAL INFLUENCES

Given the essential interconnected nature of environmental influences and neurobiological development, it is useful to examine the mechanisms through which physical, social, and other experiential factors influence development for individuals. These factors range from parents' exposures to toxins before they even conceive a child to stresses or depression in adolescence that carry over into the individual's later experience of conception and childbirth.

Preconception and Prenatal Factors and Premature Birth

The literature concerning parents' influences on their children's birth and MEB developmental outcomes is extensive but has not yet settled many important questions. Researchers have provided a clear picture of prenatal and postnatal influences on MEB outcomes, but much more work is needed to fully explain how preconception factors shape those outcomes. It is clear that these factors exert both direct and indirect influences. Direct exposure to preconception and prenatal influences, such as toxins or diet during pregnancy, may affect MEB health and development. Similarly, birth outcomes such as gestational age and weight at birth, which may be the consequence of preconception and prenatal factors, are also known to influence later MEB outcomes.

Preconception

There is strong reason to believe that both men's and women's exposures to a broad range of factors both physical (e.g., toxins, drugs) and social (e.g., stress)—even before they conceive a child—can affect that child's MEB development. While such exposures have been associated with undesirable outcomes for children, the links have not been strongly established, and little is known about the pathogenic mechanisms involved. However, there is evidence that events occurring before pregnancy, such as high-level stress, influence pregnancy outcomes such as preterm birth, which in turn affect MEB development (Cheng et al., 2016).

Since the 2009 report was issued, research has increasingly focused on the preconception period. Epidemiological data support the hypothesis that maternal and paternal preconception exposures and experiences have important influences on the child later conceived (Stephenson et al., 2018; Witt et al., 2016). Perinatal depression often occurs in women who had mental health problems prior to conception (Patton et al., 2015). Similarly, for women there is an association between self-harm during young adulthood and both future perinatal mental health concerns and difficulties with mother–infant bonding (Borschmann et al., 2018). Although women often modify behaviors that could harm their fetus once they learn they are pregnant, the fetus may still have been exposed during an especially vulnerable time.

Studies of both animals and humans have indicated that the epigenetic effects of parental preconception exposures that influence neurodevelopmental and behavioral traits in offspring may persist across generations, and that parental exposure to a broad range of substances and psychosocial stressors can be associated with adverse neurodevelopmental outcomes (Knezovich and Ramsay, 2012; Zuccolo et al., 2016). Another clue is provided by research on the degree to which a pregnancy was planned, which may coincide with other parental socioemotional and physical contextual factors during preconception and beyond (Saleem and Surkan, 2014). Growing evidence of the concerning effects of events occurring prior to conception has led the Centers for Disease Control and Prevention to issue recommendations regarding the planning of parenthood following potentially risky exposures (Knezovich and Ramsay, 2012).

The Prenatal Period

Gestation is a period of rapid neurodevelopmental change in the fetus, during which all of the fundamental processes of brain development that build the foundations of the adult brain are taking place. The plasticity occurring during this developmental window makes it a period of heightened risk for neurodevelopmental disruption, which can have implications for neurocognitive and neurobehavioral outcomes. Risk factors associated with adverse development include in utero exposure to cigarette smoke, alcohol, illicit drugs, some prescription drugs, and toxins; poor nutrition; maternal immune activation; maternal psychopathology; and maternal exposure to stress. For example, emerging evidence suggests that maternal depression and anxiety may be associated with the development of brain white matter microstructure in infancy, although how this phenomenon affects the child's MEB outcomes is yet to be determined (Dean et al., 2018).

These factors may affect MEB development through multiple routes, including direct exposure-related interactions with the developing fetal brain and exposure effects on the placenta that affect the transfer of oxygen and nutritional resources and hormonal gatekeeping between mother and fetus (Monk, Spicer, and Champagne, 2012). These factors may also have effects on postnatal mother–infant interactions. Since the 2009 report was issued, understanding of the mechanistic pathways through which a broad range of prenatal influences affect child and adolescent MEB outcomes has expanded to include epigenetic changes within the placenta and in offspring, immune dysregulation, and structural and functional neurobiology.

These prenatal effects may serve as predictors of aspects of MEB development, such as cortisol reactivity, self-regulation (Conradt et al., 2015), and cognitive development (Tilley et al., 2018). Researchers have used the ability to monitor and image the brain during the prenatal period to develop new insights into the timing of the neurodevelopmental cascade that contributes to MEB vulnerability and resilience.

There have been increasing concerns about the influence of pharmacological treatments given during pregnancy on fetal and infant outcomes. Depression medications taken by mothers may be associated with changes in fetal brain development, although further research is needed to trace the potential influences on MEB development (Lugo-Candelas et al., 2018; Malm et al., 2016). However, untreated maternal depression can also be a serious risk factor for the health of both mother and child, and treatment with psychotropic medications during pregnancy can be indicated when other approaches (nutritional, behavioral, or psychotherapy-based preventive interventions) are not effective on their own or when women do not have access to those alternatives (Vigod et al., 2016). Optimal means of promoting maternal physical and psychological health before and during pregnancy will be an important direction to explore in future work (see Chapter 3 for further discussion of these issues [Bramante, Spiller, and Landa, 2018]).

Preterm Birth

Perhaps the most pernicious risk factor associated with the perinatal period (the time from earliest viability of the fetus through the first 4 weeks after birth) is preterm birth, defined as delivery before 37 weeks of gestation. This outcome occurs in almost 10 percent of pregnancies in the United States, with black mothers having higher rates (14%) than their white counterparts (9% [Martin and Osterman, 2018]). The frequency and severity of adverse MEB outcomes increase with decreasing gestational age and birthweight. Extremely premature babies have the highest incidence of undesirable outcomes, such as periventricular hemorrhage, strokes, and other catastrophic brain injuries. These children are at higher risk for manifesting cognitive deficits, impaired executive functioning, depression, anxiety, autism spectrum disorders, and attention deficit-hyperactivity disorder (ADHD) (Hack et al., 2009; Singh et al., 2013). Although the frequency and severity of adverse MEB outcomes are generally higher the lower the baby's gestational age and birthweight, neurodevelopmental disorders that may be more subtle are also observed among infants born early but closer to term (Franz et al., 2018).

The prevalence of premature birth in the United States had been steadily declining from 2007 to 2014, coinciding with public health campaigns to decrease teen birth rates (Ferré et al., 2016). Since 2014, however, its prevalence has been on the rise, particularly among non-Hispanic black women (Martin and Osterman, 2018). Other factors have been associated with preterm birth,² but relatively little progress has been made in reducing the likelihood of this outcome.

²For more on causes of preterm birth, see <https://www.nap.edu/catalog/11622> (IOM, 2007).

Infancy and Childhood

Infancy and childhood are a period of continued neuroplasticity and behavioral development, and the first 3 years of life are a time of particularly rapid neurodevelopment. Advances in neuroimaging techniques and applications have provided more in-depth insights into the changes that characterize children's developmental trajectories and the ways in which these trajectories are altered by a broad range of genetic, physiological, and experiential factors. During this period, the experiences of the infant and child are shaped predominantly by the quality of interactions with caregivers; researchers have recently focused on how sensory and socioemotional interactions with parents can affect MEB development.

Research has shown that mothers affected by postpartum depression have fewer positive interactions with their babies and more negative ones (including both over- and understimulation), compared with those not affected by this condition (Beebe et al., 2011; Field, 2010; Hummel, Kiel, and Zvirblyte, 2016; Mantis et al., 2019). Research also has shown that infants of mothers with postpartum depression demonstrate greater incidence of a number of problems, including slower cognitive development; problems with secure attachment; increased risk of behavioral difficulties; and more depressive interaction styles, including more crying and gaze avoidance, compared with infants of non-depressed mothers (Bigelow et al., 2018; Granat et al., 2017; Liu et al., 2017; Priel et al., 1995, 2019). Moreover, infants and children of depressed mothers are at higher lifetime risk for major depression and other mental disorders (Hammen, 2018; Netsi et al., 2018; Shen et al., 2016; Weissman et al., 2016).

Nurturing interactions may be particularly important for infants and children who have experienced adversity during earlier developmental stages. For example, preterm infants exposed to increased caregiver interactions exhibit improved neurodevelopmental and behavioral outcomes (Welch et al., 2015, 2017). Likewise, infants that have experienced severe social deprivation through institutional rearing can show significant cognitive and socioemotional improvements following adoption (Nelson, Zeanah, and Fox, 2019), and there is evidence that the quality of parent-child interactions is a significant mediator of improved MEB outcomes in previously institutionalized children (Harwood et al., 2013). Neglect or institutional rearing can induce epigenetic and neurodevelopmental changes that coincide with other broad biological changes in immune, hormonal, and microbiome systems that influence MEB development (McLaughlin, Sheridan, and Nelson, 2017). Evidence of changes to these systems following interventions involving improved caregiver-child interactions (Bick et al., 2019; Naumova et al., 2019) illustrates potential opportunities to reduce the likelihood of MEB disorders.

Adverse Childhood Experiences

The term adverse childhood experiences (ACEs) encompasses a variety of traumatic experiences, such as physical, sexual, and emotional abuse and neglect (including peer bullying), that occur before a child turns 18. In a measurement of nine ACEs, the 2016–2017 National Survey of Children’s Health found that 20.5 percent of children had experienced at least two of them. For children with special emotional, behavioral, or developmental health care needs, that proportion increases to 46.2 percent (Child and Adolescent Health Measurement Initiative, n.d.).

ACEs have been studied extensively over several decades and have been correlated with negative MEB outcomes, such as depression, suicide, substance use, and risky sexual behavior (Hillberg, Hamilton-Giachritsis, and Dixon, 2011; Norman et al., 2012). They are also correlated with poor social relationships, social rejection, and association with deviant peers. Furthermore, substantial evidence points to the critical importance of secure attachment relationships with caregivers and peers that promote warmth and provide consistent social interactions (see below). The absence of warmth and stability and the presence of disruptive and unrelenting (toxic) stress-inducing interactions are sources of lasting biological and behavioral changes. These changes are evident in heightened stress reactivity, biological aging (decreased telomere length and increased epigenetic age), neurodevelopmental disruption, and impairments in all of the domains of functioning necessary for healthy MEB development (Britto et al., 2017; Garg et al., 2018; Ridout, Khan, and Ridout, 2018).

Researchers have not conclusively identified causal relationships between ACEs and such effects, and it is possible that the same factors that cause poor mental health also contribute to ACEs. Experiences with parental psychopathology and substance use (discussed above), for example, have been linked to increased rates of psychiatric disorders and subsequent poor social functioning in offspring (Field, 2010; Goodman et al., 2011; Gureje et al., 2011; Stein et al., 2014). In a meta-analysis of 114 studies examining the effects of childhood exposure to violence, posttraumatic stress symptoms were equally associated with direct victimization and with witnessing or hearing about violence (Fowler et al., 2009). ACEs in early childhood have been associated with a cascade of immediate and long-term effects that manifest in problem behaviors in school and peer contexts. Parents’ own ACEs also have a negative effect on the neurobehavioral development of their own children (Folger et al., 2018).

ACEs are associated with adverse outcomes that last into adulthood. Adults who have had such experiences as children (including maltreatment, parental mental illness or substance use, and household disruptions such as parental incarceration and divorce) have an increased risk of psychological, behavioral, and physical health conditions, although it is possible that these conditions have an inherited component (Bethell et al., 2014; Felitti et al., 1998). The early work in this area has been confirmed by a recent meta-analysis of 37 studies demonstrating the relationship between adverse experiences and health (Hughes

et al., 2017). This work has shown that stressful childhood experiences are associated with an increased likelihood in adulthood of inflammatory processes, stress reactivity, cardiovascular disease, autoimmune disorders, and premature death, as well as depression, antisocial behavior, and substance abuse (Schilling, Aseltine, and Gore, 2007).

There is some evidence that the adverse outcomes associated with ACEs can be mitigated by promoting healthy MEB development in children and youth. For example, interventions that support parents and schools in preventing traumatic events such as child abuse and bullying can promote resiliency (Bethell et al., 2016; NASEM, 2016a, 2016b). Resiliency, defined as “staying calm and in control when faced with a challenge,” is associated with higher rates of school engagement among children with adverse childhood experiences (Bethell et al., 2014).

Peer Influence

Negative peer influence has been well established as a risk factor for the development of multiple MEB disorders, including antisocial behavior; use of tobacco, alcohol, and other drugs; risky sexual behavior; and academic failure (Ary et al., 1999; Biglan et al., 2004; Duncan et al., 1998). At the same time, peers also influence the development of normative behaviors (Laninga-Wijnen et al., 2016). Indeed, some experimental evidence indicates that when adolescents receive encouragement to engage in specific prosocial behaviors from an unfamiliar peer, they are more likely to engage in those behaviors, especially if the peer has high social status (Choukas-Bradley et al., 2015). Young people’s development of self-control skills is also associated with greater peer support (Orkibi et al., 2015). Still other evidence has shown that peers can buffer the effects of harsh parenting on adolescent depression (Rusby et al., 2016; Tang et al., 2017).

Another way in which peers influence each other’s behavior is through bullying and harassment. More than 20 percent of students ages 12–18 have experienced bullying at school (e.g., mockery; insults; name calling; or physical actions such as shoving, tripping, or spitting), and of those who report being bullied, 33 percent say it occurs at least once or twice per month (PACER’s National Bullying Prevention Center, 2017).³ Nearly 60 percent of teens report that they have experienced some form of cyberbullying, such as name calling, spreading of false rumors, and physical threats (Anderson, 2018). Youth who bully have been shown to be more likely to use drugs later in life (Ttofi et al., 2016), while victims of bullying are at increased risk of behavioral and mental health problems and also have poorer school attendance and lower academic performance (Gardella, Fisher, and Teurbe-Tolon, 2017; PACER’s National Bullying Prevention Center, 2017).⁴ There is an association as well between both

³See <https://www.pacer.org/bullying/resources/stats.asp>.

⁴See <https://www.pacer.org/bullying/resources/stats.asp>.

bullying and being bullied and other adverse childhood experiences (Forster et al., 2017). A longitudinal study of students who reported exposure to harassment in middle school found that this harassment predicted association with deviant peers, more aggressive and antisocial behavior, and more cigarette smoking in high school (Rusby et al., 2016). Further investigation of the interplay among the social and emotional roots of these issues will be valuable.

Adolescence

Adolescence is a time of numerous physiological, cognitive, and emotional developmental changes that occur in the context of rapid physical growth. These changes do not always occur in sync. For example, many teens develop physically and sexually by their midteens while brain development is continuing; maturation occurs earlier for females than for males, but for males it continues until about age 25. This gap between brain development and other aspects of development creates a window in which MEB disorders, such as depression, can emerge. In addition, inadequate development of self-control skills can lead to hypersensitivity to reward- and risk-seeking behaviors.

In the past decade, there has been considerable progress in understanding of the neurocognitive development that occurs during adolescence. Research has identified a number of neurobiological markers that predict the onset and escalation of mental health disorders, as well as treatment outcomes. For example, volumetric alterations in frontal, limbic, and white matter structure detected through magnetic resonance imaging are predictive of the onset of adolescent depression (Pagliaccio et al., 2014; Whittle et al., 2011). Additionally, social determinants are critical during adolescent development. Recent reviews provide compelling evidence that poverty (Yoshikawa, Aber, and Beardslee, 2012), racism and discrimination (Priest et al., 2013), and other social determinants affect the health and well-being of these young people.

Protective Factors in Adolescence

While the IOM 1994 and NRC and IOM 2009 reports focused on risk factors and pathology, many researchers in the past decade have pivoted to focus on the factors that promote positive mental health and support adolescents in overcoming disadvantage or adversity (Dray et al., 2017; Lee and Stewart, 2013). This work has identified a number of protective factors for fostering healthy MEB development, including strong attachment to family; high levels of prosocial behavior in family, school, and community; high social skills/competence; strong moral beliefs; high levels of religiosity; a positive personal disposition; positive social support; and strong family cohesion (see <https://www.cdc.gov/healthyyouth/protective/resources.htm>). These factors are associated with lower levels of anxiety symptoms, depressive symptoms, stress, and obsessive-compulsive disorder in children and adolescents (Bond et al., 2005; Hjemdal et al., 2007, 2011).

These factors appear to be protective across racial/ethnic groups and socioeconomic status. A recent review found that for at least one racial/ethnic group and in at least one risk context, the following factors were protective: employment, extracurricular activities, father–adolescent closeness, familism (priority of the family’s needs over the needs of any one member), maternal support, attending predominately minority schools, neighborhood composition, nonparent support, parental inductive reasoning, religiosity, self-esteem, social activities, and positive early teacher relationships (Scott, Wallander, and Cameron, 2015).

Sexual Orientation and Gender Identity

For many young people, questions about their sexual orientation and gender identity become a focus as they are undergoing puberty, and for some, they arise even earlier. Those who identify as lesbian, gay, bisexual, transgender, or queer or are nonbinary (LGBTQ+) can be vulnerable for a variety of reasons that may have significant implications for their mental and emotional health.⁵ The process of recognizing and understanding sexual orientation and gender identity may be stressful for adolescents if they are not supported, and bias-based bullying or victimization also harm MEB health (Russell and Fish, 2016).

Existing research offers insights into both risk factors for adolescents who self-identify as LGBTQ+ and factors that tend to offer protection. A recent systematic review of the psychosocial risk and protective factors for depression among LGBTQ+ adolescents found that among the sexual orientation and gender identity stressors reported by adolescents, the most prominent risk was an association between internalizing negative societal attitudes and beliefs and depression (Hall, 2018). The adolescents studied also cited stress related to managing, hiding, and disclosing their LGBTQ+ identity (coming out). Other work has suggested that, relative to non-LGBTQ+ youth, LGBTQ+ adolescents are more likely to experience depression, consider suicide, and experience bullying (Elamé, 2013; Hall, 2018; Kann et al., 2016; Peguero, 2012; Russell and Fish, 2016; Toomey, Syvertsen, and Shramko, 2018).

A number of protective factors for MEB disorders among LGBTQ+ youth have also been identified. Strong evidence indicates that feeling connected, particularly with a parent, but also with nonparental adults and a positive school environment, confers protection against such risks as nonsuicidal self-injury, suicide attempts, and suicidal ideation (Taliaferro, McMorris, and Eisenberg, 2018). A systematic review of protective factors for depression among LGBTQ+ adolescents, for example, found positive relationships with family and friends to

⁵We note that categories of gender and sexual identity continually evolve and that existing studies of the relationship between sexual orientation and gender identity and MEB health have focused on varying populations. For more on sexual orientation and gender identity, see <https://gaycenter.org/about/lgbtq>.

be important in mitigating depression and promoting mental health (Hall, 2018). This research suggests that feelings of connection and safety within the adolescent's social ecology likely support and facilitate strategies for coping with stressors and negative experiences. A few studies have examined the interaction between racial/ethnic identity and gender/sexual identity among adolescents (see, e.g., Burns et al., 2015; Kertzner et al., 2009; Mustanski and Liu, 2013), but this work has not yet supported consistent conclusions, and this is another area warranting further study.

Lifestyle Factors

An individual's immediate environment is characterized by behavioral and lifestyle factors that influence physical health at all ages. Health and lifestyle are interdependent, an integrative biological–environmental unit that is shaped by the individual's household and the lifestyles of close peers. Lifestyle factors linked to MEB health include sleep, exercise, nutrition, relaxation, recreation, and relationships (Walsh, 2011). There is reason to believe, however, that a significant proportion of young people are not benefiting from these lifestyle factors. For example, a survey of U.S. 8- to 11-year-olds showed that just one-half or fewer were meeting such targets as engaging in 60 minutes of physical activity per day, limiting screen time to less than 2 hours per day, and getting 9 to 11 hours of sleep per night (Walsh et al., 2018).

Lifestyle factors have the potential to influence MEB outcomes at a population level across ages, genders, geographic locations, and socioeconomic strata, as well as at a family level. These factors are also interdependent: improvement (or decline) in one lifestyle factor can influence another and amplify effects on MEB development (Chennaoui et al., 2015; Miller, Lumeng, and LeBourgeois, 2015). The evidence for specific claims about lifestyle factors is mixed, as reviewed below.

Physical Activity and Nutrition

While there is evidence supporting the association between physical activity and depression in adults (Morres et al., 2019; Schuch et al., 2016), the evidence is less conclusive for children and youth (Biddle et al., 2019). A recent review found support for a causal association between physical activity and cognitive functioning, but only partial support for a link between physical activity and depression in young people (Biddle et al., 2019). Associations between physical activity and mental health in both young and older people are repeatedly reported in the literature, but the research designs of such studies are frequently weak, and reported effects are generally modest. The most consistent associations occur between sedentary screen time and poorer mental health, especially anxiety and depression (Biddle and Asare, 2011). The overall grade on a report card on physical activity for U.S. children and youth was a D– (Katzmarzyk et al., 2016).

A rich literature addresses the relationship between nutrition and neurobehavioral development, primarily but not exclusively consisting of studies conducted with animals (Smith and Reyes, 2017). This research suggests that maternal and early childhood nutritional effects may manifest in epigenetic changes that persist across the life span (Liu, Zhao, and Reyes, 2015). Food scarcity and diets consisting of unhealthy foods may both be risk factors for suboptimal MEB development (Kimbrow and Denney, 2015; McLaughlin et al., 2012).

Likewise, obesity—a problem for a large segment of children and adolescents, as well as young adults—is associated with an array of behavioral disorders in childhood (Small and Aplasca, 2016), and some antipsychotic medications may induce weight gain (Dayabandara et al., 2017). Whether obesity contributes to unhealthy MEB development or is the result of behavioral dysfunction, the association is strong, and reducing obesity is likely to foster healthier MEB development.

Sleep

Sleep quality and quantity are both influenced by environmental factors and associated with MEB health outcomes across the life span. Sleep insufficiency in childhood is the result of both individual factors, such as obstructive sleep apnea, and environmental factors, including chaotic households, lack of a bedtime routine, and nighttime engagement with electronic devices. Sleep serves a number of critical roles, supporting processes including memory consolidation (Feld and Born, 2017) and emotional processing (Altena et al., 2016), and promoting neural plasticity (Abel et al., 2013). Bidirectional effects of sleep on MEB health are also suggested by the high comorbidity of neurodevelopmental and psychiatric disorders and sleep disruption. Examples include children with obstructive sleep apnea, who experience more ADHD and mood disorders, and children with autism spectrum disorder, for whom sleep is often a major challenge. Concern is also increasing that physical and social environments that include high levels of noise (Halperin, 2014) and light exposure (including from electronic devices) may disrupt sleep, with consequences for metabolism, stress physiology, neurobiological function, and the emergence of cognitive and emotional disorders (Cain and Gradisar, 2010).

Technology Use and Screen Time

A significant development since publication of the 2009 report has been the increase in access to social media among children and youth. Young people are much more involved in unmonitored social interactions on the Internet and social media than ever before (or than adults are). The Pew Research Internet Project found that 95 percent of 13- to 17-year-olds had a smartphone or access to one, and 45 percent said they were online on a near-constant basis (Anderson and Jiang, 2018). Ninety-seven percent of online teens reported using some sort of

social media: YouTube (85%), Instagram (72%), Snapchat (69%), Facebook (51%), and Twitter (32%) (Anderson and Jiang, 2018). Social media can be socially isolating for some children and adolescents or create a forum for negative social interactions, though it also can facilitate contact with peers (Adams, Daly, and Williford, 2013; Lee and Horsley, 2017).

Research on connections between social media and MEB health is relatively sparse. A 2014 literature review highlights some concerning signs, such as bullying on social media and social media's capacity to foster risky behaviors, such as suicidal thinking, self-harm, and drug and alcohol abuse (Patton et al., 2014). A few other studies have indicated that exposure to bullying on social media is linked to adolescent suicides, internalizing symptoms, concurrent and later depression, and social anxiety (Landoll, 2012). On the other hand, one study suggests potential benefits of young people's social media interactions, such as the availability of anonymous contact with nonjudgmental peers and the possibility that others may intervene in response to such warning signs as suicidal ideation (Robinson et al., 2016). This is an important area for further study.

Interaction with technology (which can be defined as the quality and quantity of time spent viewing digital programming or using a computer or mobile device) is a lifestyle factor that can either enhance or interfere with healthy MEB development among children and youth, and is another area in which research is emerging (Radesky and Christakis, 2016). While access to high-quality digital content or information available online has benefits, excessive exposure and exposure to inappropriate content have potential negative effects. For example, negative behavioral effects of extended or inappropriate exposure have been observed at all childhood and adolescent ages (American College of Pediatricians, 2016). The possible consequences for MEB health of excessive screen time and exposure to media violence may include increased calorie intake (snacking) and decreased physical activity, both of which contribute to overweight and obesity; sleep insufficiency; social isolation; and addiction to video games (American College of Pediatricians, 2016; Anderson et al., 2017; Busch, Manders, and de Leeuw, 2013; Carter et al., 2016; Glover and Fritsch, 2018).

FAMILY INFLUENCES

The quality of parenting or caregiving within the home or family is a strong determinant of MEB outcomes. It is also within the family that intergenerational factors influencing children's MEB development play out. Thus, a better understanding of the features of a family and the family processes that shape the quality of this environment is essential.

It is important to consider how a family is defined. The traditional definition of parents as a child's biological mother and father has evolved to include heterosexual, gay, and lesbian parents; single individuals; caretaking family members; and parents who use assisted reproductive technologies such as in vitro fertilization, egg donation, sperm donation, embryo donation, or surrogacy (Golombok, 2017). Moreover, the concept of a family now encompasses

- the biological parents who carry the child’s genes;
- the environmental family, that is, the biological and nonbiological relatives or cohabitants with whom the child lives; and
- the caretaking family, who may or may not overlap with the above individuals and may or may not live with the child (Weissman, 2016).

Family factors are the most well-studied and most proximal influences on a child, especially the child’s early development. Researchers have focused on familial breakdown and negative parenting that result in frequent disputes, neglect, parental coldness, and physical aggression—all of which appear to have negative consequences for children’s MEB development (Golombok et al., 2017). However, it is important to distinguish between modern families that exemplify new configurations and families whose structure has been shaped by the breakdown of relationships or parental distress. We discuss three areas in which research has provided a relatively clear picture of connections between attributes of family life and MEB development: parenting and family stability, substance use, and effects of chronic illness and severe health problems in children and youth.

Parenting and Family Stability

Parents play a pivotal role in shaping the MEB health of their offspring from infancy through young adulthood and beyond. Parenting practices, including how children are disciplined, praised, monitored, engaged in verbal interactions, and provided with a secure environment, are key risk and protective factors for children’s MEB functioning, helping to develop their self-concept, their capacity to identify and evaluate stressful events, and their coping strategies. Further, consistent interactions and secure attachment between parents and children have promotive and protective effects on children’s MEB development (Bethell, Gombojav, and Whitaker, 2019; Bowlby, 1988; Brumariu and Kerns, 2010; Kerns and Brumariu, 2014; NASEM, 2016b; Sonuga-Barke et al., 2017).

Researchers have established both that positive parenting is important to healthy MEB development and that it can be taught (e.g., Office of Adolescent Health, 2019; Ryan, O’Farrelly, and Ramchandani, 2017; Stafford et al., 2016). At the same time, research has associated coercive family processes (interactions characterized by hostility or those in which some family members are demeaned or controlled through punitive behavior) with the development of aggressive behavior, and also with a developmental trajectory that makes academic failure, delinquency, violent behavior, depression, and substance use more likely (Dishion and Snyder, 2016; Patterson, Forgatch, and Degarmo, 2010). Coercive family processes are also associated with marital discord and maternal depression (Del Vecchio et al., 2016). Similar evidence indicates that reducing punitive practices in schools is associated with improved academic performance and increased prosocial behavior and the prevention of diverse behavioral problems (Beets et

al., 2009; Durlak et al., 2007; Flannery et al., 2003; Horner et al., 2009; Snyder et al., 2010).

Given the key role of the family in promoting healthy MEB development and preventing MEB disorders, it is important to observe that research from the past 10 years suggests that the family may be under greater threat than in the past (AEI/Brookings Working Group on Poverty, 2015). The disruption of parental relationships may result in lower family income and reduced psychological and social support for children's development. Social stress in the family is also associated with an increased risk of academic failure, school dropout, teenage pregnancy, drug and alcohol use, and psychological disorders, as well as with earlier onset of puberty in girls (Webster et al., 2014).

Substance Use

Substance use disorder is a major public health concern. The use of substances and their detrimental effects can start during adolescence or earlier and have lifetime as well as intergenerational sequelae. About 12.3 percent of children under 17 live in households with at least one parent with a substance use disorder (predominantly alcohol), and parents' substance use has major impacts on their children's MEB development (Lipari, 2017; Smith et al., 2016). These parents have an increased likelihood of financial difficulties and elevated risks for unstable living conditions and frequent moves, legal problems, and parental conflict (Barnard and McKeganey, 2004; Keller et al., 2002). Children born to mothers who are actively abusing substances are at risk for lower birthweight, feeding difficulties, increased irritability as infants, and stunted cognitive and physical development (Behnke and Smith, 2013). Children whose parents or caregivers have substance use disorder are also at higher risk for less secure attachment, physical abuse, and poor emotional development (Osborne and Berger, 2009).

The children of parents with substance use disorder also are at increased risk of having substance use problems and other mental health disorders. These children experience increased rates of family conflict and poor parenting practices, including failure to set guidelines, monitor children's behavior, and provide appropriate consequences, in affected families (Accornero et al., 2002; Brook, Brook, and Whiteman, 2003; Fals-Stewart et al., 2004; Teti et al., 1995). A longitudinal study of nearly 5,000 children born between 1998 and 2000 that examined several questions about families at risk demonstrated that children of parents with a substance use disorder, especially when both parents had the disorder, were more likely to have increased symptoms of aggressive, oppositional defiant conduct, and anxiety/depression disorders (Osborne and Berger, 2009).⁶

⁶For more about this study, see <https://fragilefamilies.princeton.edu/publications>.

Effects of Chronic Illness and Severe Health Problems

The prevalence of chronic health conditions and disabilities among children and youth has increased over the past century, primarily because of four conditions: asthma, obesity, mental health conditions, and neurodevelopmental disorders (Perrin, Anderson, and Van Cleave, 2014). While there have been reductions in the impact of other conditions, severe ongoing health problems are also increasing, and have been estimated as affecting approximately 1 in 20 children and youth (Boat, Filigno, and Amin, 2017). These increases reflect improved treatments and decreased mortality rates, and may also reflect changes in diagnostic standards and screening, such as those that have resulted from research on ADHD.⁷

Chronic disorders can have adverse consequences for the MEB health of those affected and the functioning of their families. Anxiety, depression, and symptoms of posttraumatic stress disorder (PTSD) are more prevalent in these young people than in the population of children and youth at large (Bethell, Gombojav, and Whitaker, 2019; Wilcox et al., 2016). Life-threatening and disabling chronic disorders also are a frequent factor in parental anxiety and depression, which pose a major risk to parenting adequacy (Boat, Filigno, and Amin, 2017). Caring for children with such a disorder is a challenge that affects the entire family. A study of families with children affected by cystic fibrosis, type 1 diabetes mellitus, juvenile rheumatoid arthritis, and sickle cell disease found that, in general, parents had less time to engage in activities with their children, more family conflict, and less problem solving compared with control parents who did not have a child with a complex medical condition (McClellan and Cohen, 2007). Another study (Spieth, 2001) found that families with a child with cystic fibrosis scored lower on the domains of family communication, involvement, affect management, and behavior control. Parental separation, distancing, and disengagement are common. Mental disorders such as depression, anxiety, and PTSD symptoms are frequent in parents of affected children, often surfacing soon after the child's diagnosis (Quittner et al., 2014). All of these findings reinforce the relationships between physical and mental health, as well as the key role of family functioning.

COMMUNITY- AND SOCIETY-LEVEL INFLUENCES

The majority of prevention science research over the past 40 years has focused on identifying individual and proximal risk and protective factors that influence MEB development, with an eye to devising interventions that may alter these factors. Researchers have also been interested, however, in how the

⁷Estimates of prevalence vary depending on definitions (Perrin et al., 2012 [<https://pedsinreview.aappublications.org/content/33/3/99>]). For discussion of means of identifying children with chronic or special health care needs, see Bethell et al. (2015; [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4778422/>]).

characteristics of local communities and the broader society influence outcomes for young people. This emphasis, as discussed in Chapter 1, has grown in recent years and is an important focus of this report. Indeed, it only makes sense that healthy communities play a key role in shaping the social, economic, and environmental conditions in which children and families live, learn, work, and play, and that in turn have a major influence on young people's MEB health. As the authors of a recent economic assessment of the links between early life experiences and long-term outcomes put it, "relatively mild shocks early in life can have substantial negative impacts," though the effects are heterogeneous, reflecting the myriad differences among individuals, families, and social circumstances (Almond, Currie, and Duque, 2018, p. 1360).

The sorts of evidence that have established associations between the characteristics of communities and society and outcomes for children and youth are somewhat different from those regarding influences at the individual and family levels because the connections are more distal. That is, associations between exposure to toxins and neurological development or between parenting practices and MEB health are fairly direct (proximal), whereas associations between the characteristics of a neighborhood or city and outcomes for the young people who live there are more indirect (distal), requiring different research approaches. We look briefly here at the research that has explored community- and society-level influences on MEB development.

Community Influences

To illustrate how the community environment can affect child development, we explore evidence on three elements of community: neighborhood attributes, school organization and characteristics, and foster care.

Neighborhood Attributes

Researchers in fields including public health and economics explore population-level connections between social determinants of health—the conditions in which people are born, grow, live, work, and age, including health systems—and how long and how well they live. When children and families have access to social, economic, and physical resources that promote health and well-being (e.g., safe and affordable housing, quality education, public safety, availability of healthy foods, and safe play spaces), they have more opportunities to thrive (National League of Cities, 2009). Conversely, children growing up in communities that lack these positive environmental conditions tend to suffer poorer health outcomes relative to their peers (National League of Cities, 2009).

Researchers have pointed to the overpowering risk for developmental, cognitive, and affective problems among children whose families have lived in impoverished urban neighborhoods or isolated rural areas across multiple generations (Collins et al., 2009; Wodtke, Harding, and Elwert, 2011). In addition,

longer residence in such neighborhoods is associated with multigenerational epigenetic changes and multiplicative education and health problems for children (McEwen, 2017; Sharkey and Faber, 2014).

Policies at the local and federal governance levels have contributed to multigenerational poverty in inner-city neighborhoods. Research has documented structural racism in employment and housing policies, such as the redlining (discriminatory lending practices) in African American neighborhoods by federal housing authorities, which continued into the 1970s and later was practiced by commercial banks (Greene, Turner, and Gourevitch, 2017; Hall, Crowder, and Spring, 2015). Similar discrimination has been identified in veterans' home loan programs and employment programs (Sampson and Wilson, 2013), as well as city services and investments in minority communities (Reece et al., 2015). Data from Cleveland, Ohio, illustrate this connection. In a small number of neighborhoods that were affected by discriminatory policies during the mid-20th century, rates of black infant mortality, gun deaths, and school dropout are three times higher than city averages. No single risk factor accounts for these differences other than residence in one of these neighborhoods (Reece et al., 2015). Similar associations between policy and MEB disorders have been documented in some rural areas (Kelleher and Gardner, 2017).

School Organization and Characteristics

School plays an important role in children's development, beginning in the earliest years. For example, work in the past decade has suggested that students in school environments characterized by supportive and nurturing relationships among teachers, staff, and students; a sense of physical and emotional safety; and shared learning goals across multiple school stakeholders tend to have fewer mental and emotional problems and greater academic success than their peers in school settings that lack some or all of these attributes (Cohen and Geier, 2010; Lee, 2012; Wang, 2009; Yang et al., 2018). Other work has shown that peer support and school safety are associated with reductions in bullying behavior (Konishi et al., 2017). A positive school climate has also been shown to moderate the negative outcomes and foster better outcomes for LGBTQ+ students (Birkett, Espelage, and Koenig, 2009). Likewise, research on the school characteristics that yield the greatest improvement for students, based on longitudinal data, has shown the power of the school community, including parent engagement and a student-centered learning climate (Bryk et al., 2010).

Other research has examined what is called an authoritative school climate, one characterized by a strict but fair disciplinary structure and students' perception that school staff treat them with respect and genuinely want them to succeed. This type of climate has been found to support students' motivation to achieve by fostering their engagement with school and reducing peer victimization (Cornell, Shukla, and Konold, 2015; Wang and Eccles, 2013). It is important to note here the racial/ethnic disparities in students' perceptions of school climate. Black students report fewer positive school experiences than white

students, regardless of socioeconomic status and diversity within the school (Bottiani, Bradshaw, and Mendelson, 2014, 2016).

The role of teachers' social and emotional competence and well-being and the working conditions that support their job satisfaction and well-being have also been studied (Greenberg, Brown, and Abenavoli, 2016; Kraft and Papay, 2014). Teachers report the highest stress levels of all occupational groups (45% [Gallup, 2014]), and in a recent survey of K–12 public school teachers, 59 percent reported regularly experiencing great stress, an increase from 35 percent of teachers who did so in 1985 (Markow, Macia, and Lee, 2013). This survey also showed a significant decrease in job satisfaction among teachers, from 62 percent in 2008 to 39 percent in 2012.

When teachers regularly experience high levels of stress and negative emotions, it can have a negative impact on their students' behavior and academic performance as well as their own performance (Greenberg, Brown, and Abenavoli, 2016). A longitudinal study of elementary school teachers found that those experiencing greater stress and more symptoms of depression were less able to create and maintain classroom environments conducive to learning, leading to poorer academic performance among their students (Bottiani, Bradshaw, and Mendelson, 2016).

Contributors to teacher stress may include school factors, such as a lack of leadership on the part of principals and of support from colleagues, poor school climates, poor salaries, and insufficient materials and supplies. The perception of a lack of autonomy, reported by many teachers, may also play a role, as do teachers' own competencies for managing stress (Greenberg, Brown, and Abenavoli, 2016). When schools provide needed supports and teachers develop the social and emotional competencies required to manage the demands of their work, teachers can better regulate their emotions (Hoglund, Klinge, and Hosan, 2015; McLean and McDonald Connor, 2015). Strategies for reducing teacher stress are discussed in Chapter 4.

One area of growing concern has been the negative effects of out-of-school discipline, such as suspension and expulsion, on the MEB development of young people, especially minority children and youth. African American students are suspended three times more frequently than their white peers, a disparity that begins as early as preschool (U.S. Department of Education Office for Civil Rights, 2014). Black preschool children, for example, receive 48 percent of out-of-school suspensions from preschool, although they make up only 29 percent of preschool enrollment; students with disabilities, English learners, and boys also receive harsh discipline at rates that exceed their representation in school populations (U.S. Department of Education Office for Civil Rights, 2014).⁸ Teachers' implicit racial biases may play a role in such disparities (Girvan et al., 2017). The problem is serious enough to have been termed the “preschool to prison pipeline,” and the trauma for young children of receiving severe punishments has been associated with negative MEB outcomes (Meek and

⁸See <https://ocrdata.ed.gov/Downloads/CRDC-School-Discipline-Snapshot.pdf>.

Gilliam, 2016). Students who receive school suspensions, for example, are more likely to show later antisocial behavior, such as criminal activity and violence, as well as to experience incarceration and victimization in adulthood (Hemphill et al., 2006; Lamont, 2013; Wolf and Kupchik, 2016).

Foster Care

As noted above, trauma such as child abuse and neglect can have serious and long-lasting effects on a child's MEB development. Despite being necessary for the safety and well-being of a child, however, the removal of a child from the home can also be devastating and confusing.⁹ Once children enter foster care, moreover, they may experience prolonged stays and numerous moves, experiences that can have lifelong impacts. Of the 238,230 children who exited foster care nationally in fiscal year 2014, 53 percent had been in care 12 months or longer (Children's Bureau, 2016). The longer a child is in placement, the greater the likelihood that he will move from one foster placement to another, putting him at increased risk of negative social and emotional outcomes (Sudol, 2009). It has been estimated that 80 percent of young people involved with the child welfare system require mental health intervention and services to address developmental, behavioral, or emotional issues, including complex and secondary trauma (McCue Horwitz et al., 2012; Pecora et al., 2009). The child welfare system has also been critically affected by the ongoing opioid epidemic, which has greatly increased foster care placements and added stress to an overburdened system. In the 5-year period of 2012 to 2016, the number of children in foster care nationally rose by 10 percent, from 397,600 to 437,500 (Assistant Secretary for Planning and Evaluation, 2019).

Young people experiencing frequent moves in foster care face continual disruption of relationships with friends, siblings, and other relatives; coaches, teachers, and classmates; religious leaders; and others. Partly as a result of this disruption, children and youth in foster care have high levels of mental health needs, and those needs often are not being met (Szilagyi et al., 2015; Turney and Wildeman, 2016). Children in foster care also may be given psychotropic medication without proper treatment planning and medication management (Levinson, 2018).

Some state policy makers understand that children and youth in foster care face long-term risks from their exposure to violence, maltreatment, and other adverse experiences, and have pursued opportunities for states to identify and implement strategies for minimizing the long-term consequences of these experiences and reducing the associated costs (Williams-Mbengue, 2016).

⁹Kinship care, in which children are cared for by relatives when their parents are unable to carry out that role, is widely preferred to foster care, in which the state identifies households in which to place children. Kinship care may minimize trauma and have other benefits as well (<https://www.childwelfare.gov/topics/outofhome/kinship/about>), but there is less research on this form of care than on foster care.

Recently, the National Council of State Legislators reviewed state policy and legislative initiatives from 2008 to 2015 to identify areas in which state legislatures have been active. These efforts include convening child and family system leaders, promoting the coordination of mental and physical health care and child welfare, encouraging comprehensive screening and assessment, implementing evidence-based services, and encouraging the use of Medicaid to improve the social and emotional well-being of children in foster care (Williams-Mbengue, 2016).

Societal Influences

A growing body of evidence is revealing the ways in which characteristics of the more distal social environment affect development. These factors include poverty and inequality, discrimination and racism, marketing of unhealthy products, and effects of involvement with the criminal justice system. These more distal influences on MEB development place distinct limits on society's ability to foster healthy MEB development and prevent MEB health disorders at a population level.

Early childhood is a time of high plasticity that affords opportunities to foster healthy MEB development. Healthy early development (physical, social, emotional, and cognitive) strongly influences a wide range of later outcomes, including mental health, heart disease, literacy and numeracy, criminality, and economic participation across the life span. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic status; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion (Healthy People, 2015). A meta-analysis of nearly 50 studies showed that almost 20 percent of deaths in a single year for people over age 25 were associated with social factors, such as poverty, racial segregation, and low social support (Galea et al., 2011). The antecedents of many of these outcomes are found in the early years of life.

The committee was asked to consider not only the prevention of MEB disorders but also the promotion of healthy MEB development. For this reason, we address the impact of society-level factors on a broad range of undesirable outcomes, including not only MEB disorders, such as depression, antisocial behavior, and drug abuse, but also obesity, diabetes, and metabolic syndrome; academic failure; and other chronic disorders and disabilities that in turn influence MEB development. For example, childhood poverty appears to be a risk factor for a wide variety of psychological and behavioral problems (Yoshikawa, Aber, and Beardslee, 2012), as well as all-cause mortality (Galobardes, Lynch, and Smith, 2008). Changing these outcomes will require higher levels of health promotion at a societal level, including the promotion of childhood well-being.

One important example is the social determinants of health. By one estimate the United States spends \$3.5 trillion per year on health care (Centers for Medicare

& Medicaid Services, 2018), which is 18 percent of the nation's gross domestic product (Squires and Anderson, 2015). Health care costs per person in the United States exceed those found in any other member of the Organisation for Economic Co-operation and Development (Sawyer and Cox, 2018). Yet, this spending does little to address some of the most important factors affecting health: social determinants of well-being such as housing, food insecurity, poverty, and discrimination.

Poverty and Inequality

There is strong evidence that poorer families have greater levels of child and adolescent MEB problems; there is currently more limited evidence that when poverty is reduced, those problems are prevented, although some income intervention trials are ongoing (NASEM, 2019). Poverty in childhood is associated with a wide variety of deleterious outcomes, including high rates of MEB disorders (Yoshikawa, Aber, and Beardslee, 2012), higher rates of cardiovascular disease in adulthood (Miller, Chen, and Parker, 2011), and cortical thinning associated with cognitive deficits (Noble et al., 2015). The negative impacts of poverty on MEB development are also mediated by adverse environmental exposures and social environments, particularly in the family (Evans, 2004; Van Ryzin et al., 2016). As noted earlier, families in poverty are more likely to have high levels of conflict (Bank et al., 1993; Dishion and Snyder, 2016) and to undergo multiple adverse experiences (Halfon et al., 2017). A recent study of the participants in a federal program that provided assistance with rent (vouchers) and counseling about housing to support low-income families in moving out of high-poverty neighborhoods, *Moving To Opportunity*,¹⁰ found significant results. Voucher-induced moves to a lower-poverty neighborhood during childhood are associated with higher adult earnings and the magnitude of this effect declines with age, eventually flattening out to no effect among those who were adolescents at the time of moving (Chetty, Hendren, and Katz, 2016).

A related question is whether economic inequality in itself, irrespective of poverty, might have its own effect on MEB health. Researchers have explored this question, and have suggested connections between economic inequality and such outcomes as reduced life expectancy, educational attainment, and social mobility and increased rates of mental illness (depression), obesity, infant mortality, teenage births, homicides, imprisonment, and violence (Melgar and Rossi, 2010; Messias, Eaton, and Grooms, 2011). However, other work has challenged the idea that the effects of economic inequality can be disentangled from the effects of poverty (Rowlingson, 2011) and pointed to stronger evidence of broader societal harms of economic inequality (Keeley, 2015). The impact of poverty on children's health and well-being is discussed in the recent National Academies report *A Roadmap to Reducing Child Poverty* (NASEM, 2019).

¹⁰For more information about the program, see <https://www.hud.gov/programdescription/mta>.

Discrimination and Racism

Discrimination experienced by members of racial/ethnic groups is a pervasive and significant public health problem in the United States that has been associated with psychological distress, depression, and anxiety disorders (Braveman et al., 2009; Kessler, Mickelson, and Williams, 1999). A 2009 meta-analysis showed that exposure to discrimination was associated with higher rates of depression, anxiety, and schizophrenia, as well as poorer physical health and unhealthy behaviors, such as smoking and excessive drinking (Pascoe and Smart Richman, 2009).¹¹ More recently, a 2015 meta-analysis of 293 studies carried out between 1983 and 2013 showed that experiencing racism has been associated with deficits in both physical and mental health, including depression, anxiety, and psychological stress (Paradies et al., 2015). The effects on children have also been studied. Children as young as age 7 can recognize racism, and negative effects on children and adolescents including substance use, risky sexual behavior, and depression have been identified (Marcelo and Yates, 2019). Research is needed to trace links between racism and the MEB health of children and youth more conclusively, as well as to identify ways to support the MEB health of children who experience it.

Marketing of Unhealthy Products

The marketing of some products can encourage risky behaviors and lead to impaired health, and thus is an important aspect of the societal-level context that shapes MEB development.

Cigarettes

The harmful impact of marketing of cigarettes on youth is well established. Not only is use of tobacco products associated with a range of serious medical disorders, but tobacco use disorder has been identified as a disorder in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (American Psychiatric Association, 2013).¹² The proportion of youth who initiate smoking declined from 25 percent of 12th graders in 1997 to 5 percent in 2016 (U.S. Department of Health and Human Services, n.d.). Nonetheless, 4.7 million middle school and high school students were current smokers in 2015, and about 1 in every 13 children younger than 18 will eventually die of smoking-related illness (Centers for Disease Control and Prevention, 2019). Controlling for peer and parental influences, exposure to cigarette advertising predicts later smoking (National Cancer Institute, 2008). The vast majority of smokers begin smoking before the age of 18, and youth who are exposed to more cigarette advertising are more likely to take up smoking (McClure et al., 2013; Sargent, Dalton, and Beach,

¹¹See also <https://www.apa.org/news/press/releases/stress/2015/impact>.

¹²See <https://www.psychiatry.org/patients-families/addiction/what-is-addiction>.

2000). In *U.S. vs. Philip Morris et al.*,¹³ the federal district court ruled that cigarette advertising is a causal factor in the initiation of smoking.

E-cigarettes and other nicotine delivery systems are also a threat to the health of young people. Youth use of these devices has increased dramatically in the last 10 years, from 2 percent in 2011 to 16 percent in 2016 (Barrington-Trimis and Leventhal, 2018). Youth who use e-cigarettes are at risk for mood and attention problems (NASEM, 2018) and are significantly more likely to take up smoking conventional cigarettes (Barrington-Trimis and Leventhal, 2018). There is correlational evidence that young people who are exposed to more e-cigarette marketing are more likely to initiate tobacco use. The U.S. Food and Drug Administration recently restricted marketing of flavored e-cigarettes to minors and is actively enforcing restrictions for retail and online sales to minors, small steps in the direction of protecting youth from the risks of smoking and limiting portals to cigarette smoking for youth (Barrington-Trimis and Leventhal, 2018).

Alcohol

Youth who begin drinking before age 15 are more likely to have poor academic performance, to be involved in violence, and to die or be injured in alcohol-related car crashes (Hingson and Zha, 2009; Marshall, 2014; World Health Organization, 2014). Between 2001 and 2009, youth exposure to televised alcohol advertising increased by 71 percent (Centers for Disease Control and Prevention, 2013). Evidence regarding the impact of advertising on young people's use of alcohol includes studies showing that those exposed to ads for specific brands of alcohol are more likely to consume that brand (Ross et al., 2014). Experimental evidence on the impact of alcohol advertising on use by youth or predictors of their use remains limited, however.

Unhealthful Food

The marketing of unhealthful food plays an important role in the eating habits and health of young people, which in turn can influence their MEB health (National Research Council, 2006). Advertising influences children and youth to prefer and request high-calorie, low-nutrient foods and beverages, which affects their food consumption and weight. The advent of the Internet has increased the number of ways in which children and adolescents can be reached by advertising for unhealthful foods. Across all of these harmful marketing initiatives, it is clear that young people's exposure to such advertising can be harmful, but few trials of limiting the marketing of unhealthful food have been conducted.

¹³*United States of America v. Philip Morris USA, Inc.* (2006).

The Criminal Justice System

The criminal justice system affects children's MEB health in several ways. The incarceration of parents or family members tends to reduce family income and stability, and children who see their parents arrested, visit them in prison, or are separated from them may be traumatized (The Annie E. Casey Foundation, 2016).

Children who themselves enter the juvenile justice system are also at increased risk of negative MEB outcomes. Approximately 53,000 youths under age 18 are incarcerated in some way, including in detention centers, long-term secure facilities, adult prisons and jails, residential treatment facilities, and group homes (Sawyer, 2018). Approximately 500 of those youth are age 12 or younger. Youth of color are far more likely than their white peers to be incarcerated. It is estimated that black youth are approximately five times as likely to be detained or incarcerated as their white peers, and in some states the disparity is much greater (The Sentencing Project, 2017).¹⁴

Juvenile incarceration is also associated with an increased likelihood of incarceration in adulthood (Aizer and Doyle, 2015). Approximately 65 to 70 percent of youth entering the juvenile justice system have a mental disorder, and one-quarter of these youth have severe conditions that impair their daily functioning (National Conference of State Legislatures, n.d.). The majority of these youth have substance abuse disorders and behavioral conditions. Although some innovative facilities conduct early screening and referral before diversion to treatment facilities, most incarceration systems struggle with underfunded mental health services that are poorly coordinated with outside treatment services.

¹⁴See <https://www.sentencingproject.org/wp-content/uploads/2017/09/Black-Disparities-in-Youth-Incarceration.pdf>.

SUMMARY

Both the promotion of healthy MEB development and effective intervention to mitigate and prevent MEB disorders depend on a clear understanding of the influences involved. Research conducted in the past decade—including genetic and neuroimaging research; epidemiological studies; study of neurocognitive development and the trajectory of disorders; and field studies of parenting and attachment, school climate, and more—has significantly expanded understanding of the interactive nature of influences on MEB health by characterizing mechanisms driving many of the associations between those influences and MEB outcomes. There is growing evidence of associations among characteristics of the world around a child and his family—from characteristics of his community and school to economic disadvantage and racism—and negative outcomes for his health and development. While this body of work leaves many questions still unanswered, it has demonstrated that the influences on MEB development are diverse and complex.

CONCLUSION 2-1: Mental, emotional, and behavioral (MEB) development is a product of complex neurobiological processes that interact with characteristics of the physical and social environment, beginning before conception and continuing beyond adolescence. Healthy development is shaped by experiences and circumstances that cross generations within families and affect entire neighborhoods and communities. Therefore, understanding of MEB development must be based on an integrated appreciation of connections that have been identified among

- biological processes, including brain development and the expression of genes as individual characteristics;
- physical, social, behavioral, and intergenerational experiences that affect conception, gestation, and childbirth;
- characteristics of the individual's physical and social environment and how they affect both behavior and gene expression;
- individual influences including sleep, nutrition, and physical activity;
- characteristics of the family and surrounding community, including safety, nurturing interactions, peer behavior, and social-emotional support in school; and
- characteristics of the broader society in which the individual, family, and community are situated, such as poverty and economic inequality, systemic racism and discrimination, law- and policy-driven factors, and the marketing of unhealthful products.

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Part II

Strategies for Fostering Healthy Mental, Emotional, and Behavioral Development in Children and Youth

Part I of this report focuses on the influences on healthy mental, emotional, and behavioral (MEB) development, including those at the individual, family, community, and societal levels. We turn next to strategies based on understanding of these influences with the potential to foster healthy MEB development and outcomes. These strategies may be interventions intended to promote well-being by developing positive attributes (promotive) or to prevent harm to well-being by addressing particular issues (preventive). They also may be either universal (offered to an entire population rather than only to groups identified as at risk for particular negative outcomes), selective (targeted to individuals or groups identified as having a higher-than-average risk for the outcomes addressed), or indicated (targeted to individuals showing signs of the outcomes of concern).

The discussion in Part II is structured around the different points of access for such strategies. In Chapter 3, we first look at strategies for targeting MEB development at the family level and addressing issues that persist across generations. We then examine universal or near-universal touch points for children and families and opportunities they provide to introduce approaches and programs with the potential to improve parent, child, adolescent, and family outcomes. In Chapter 4, we look at opportunities in schools, while in Chapter 5 we turn to primary and other health care settings. Finally, in Chapter 6 we examine strategies and policies that affect populations at the local, state, and national levels.

These chapters build on ideas presented in the 2009 National Research Council and Institute of Medicine report. Many of the interventions discussed here, such as the Incredible Years, Triple P (Positive Parenting Program), the Perry Preschool Program, and the Good Behavior Game, are also discussed in that earlier report. We examine current evidence about these programs and how they and other approaches are increasingly focused on MEB health promotion as well as prevention of disorders.

Generational Strategies

Interventions that take a generational approach are designed to provide supports to parents and other caregivers that strengthen both their understanding of what children and youth need and their capacity to provide it. Such interventions may influence more than one generation by improving outcomes for children and thereby improving outcomes for the children they will care for in the future. These interventions often target opportunities to reach parents and caregivers at critical junctures, such as before and just after a child is born, as well as reduce known risk factors for children’s healthy mental, emotional, and behavioral (MEB) development, including negative parenting practices and parental mental health problems or substance use disorders. They also increase protective factors such as parent–child attachment or bonding.

Our focus on these interventions is an acknowledgment that caregivers need assistance to promote MEB health across generations; fostering their healthy MEB development now can pay off for future generations. As noted in Chapter 2, community- and society-level factors contribute significantly to the challenges that all parents encounter as their infants grow into young adults, an issue to which we return at the end of the report. Thus, providing support at the community level for parents and caregivers is an obvious and productive way to promote healthy MEB development.

PARENTING INTERVENTIONS

Researchers have developed numerous interventions to strengthen parenting skills. Many parenting interventions target early developmental stages for two reasons: first, parents generally have the most extensive contact and exert the greatest influence while their offspring are infants, toddlers, and young children; second, early brain development is critical for MEB health outcomes. Prevention programs for parents of young infants or children include universal approaches designed to promote parents’ knowledge of child development and positive parenting (e.g., prenatal care, well-child visits); selective approaches aimed at providing support for low-income families (e.g., home visiting, Early Head Start, Head Start); and indicated approaches that teach behavioral management

techniques for improving child behaviors (e.g., Parent–Child Interaction Therapy, Child Adult Relationship Enhancement, the Incredible Years).

Programs for parents of adolescents have focused primarily on prevention of the child’s substance use or risky sexual behavior through parent education to improve parent–child communication (see Sandler et al., 2011). Fewer parent-focused interventions have addressed parents of college-age children, but those that have done so have produced promising results despite the fact that many of these emerging adults are living away from home, and their parents tend to have less contact and influence at this life stage than at earlier ones.

The literature in this area is substantial, and parenting is considered in depth in a recent National Academies of Sciences, Engineering, and Medicine (NASEM, 2016) report. That report identifies knowledge, attitudes, and practices of parents that are associated with positive developmental outcomes in children ages 0–8, and also examines universal/preventive and targeted interventions designed to support parents and caregivers in developing those attributes. Although the authors do not confine their attention to MEB outcomes, the report identifies features of parenting interventions that “appear to influence success in engaging parents and increasing their use of effective parenting practices” (p. 8):

- viewing parents as equal partners in determining the types of services that would most benefit them and their children;
- tailoring interventions to meet the specific needs of families;
- integrating and collaborating in services for families with multiple service needs;
- creating opportunities for parents to receive support from peers to encourage engagement, reduce stigma, and increase the sense of connection to other parents with similar circumstances;
- addressing trauma, which affects a high percentage of individuals in some communities and can interfere with parenting and healthy child development;
- making programs culturally relevant to improve their effectiveness and participation across diverse families; and
- enhancing efforts to involve fathers, who are underrepresented in parenting research.

Recent work in this area includes studies of links between low birthweight and the probability of later development of mental health disorders such as depression and attention deficit-hyperactivity disorder (Nigg and Song, 2018; Pettersson, Larsson, and D’Onofrio, 2019). Other research includes studies of programs for parents of older children and adolescents. Two examples illustrate ways that interventions can support positive parenting for older children: Triple P (Positive Parenting Program) and Parent–Child Interaction Therapy (see Boxes 3-1 and 3-2, respectively). These two programs have been studied in randomized controlled trials (RCTs), which demonstrated effects including improved

parenting practices and competence, parent–child interactions, and child behavior (NASEM, 2016).

Researchers have also studied interventions designed to support parents in preventing anxiety and depressive symptoms and disorders (i.e., internalizing problems) in children and youth. For example, a meta-analysis of RCTs of such parent-focused interventions showed small but significant effects on internalizing symptoms and on prevention of anxiety disorders (Yap et al., 2016). There is also evidence that parent-focused programs can reduce short- and long-term alcohol, tobacco, and illicit drug use among adolescents (Allen et al., 2016). Examples of programs with this focus include the Strengthening Families Program (see Box 3-3), Guiding Good Choices, and Familias Unidas; they emphasize family skills training and can be delivered to both high- and low-risk families.¹

Although fewer interventions have targeted parents of college-age youth, there has been some promising work in this area. For instance, Turrisi and colleagues (2009) developed a handbook to guide parents in communicating effectively with their children regarding the harms of alcohol use; use of this handbook reduced the likelihood that nondrinking students would use alcohol in their first year of college (Ichiyama et al., 2009). More recently, FITSTART, an interactive online intervention that corrects parents' alcohol-related misperceptions and provides strategies for effective communication about alcohol with their college-age children, was tested in an RCT and found to reduce college students' heavy episodic drinking (LaBrie et al., 2016). Conversely, an RCT of an intervention that provided parents of college students with online normative feedback, but not with strategies for discussing alcohol with their children, showed no such effects on student drinking (Napper, LaBrie, and Earle, 2016).

Researchers have examined parenting interventions spanning different child ages and including both promotion and prevention approaches. Overall, the large and growing literature on family-focused programs suggests that they have benefits for children and adolescents, particularly in reducing internalizing problems, behavior issues, and substance use. Research on such programs is building the case for making these interventions available to families and communities, and more can be learned as they are disseminated more widely. The intervention mechanisms that produce long-term program impacts are not well understood (Sandler et al., 2011; Yap et al., 2016). Further work could also explore questions about optimal parenting skills to foster at different critical stages of developmental challenge, such as entry into primary school or the transition to middle or high school, and biological transitions, such as puberty, as well as ways to optimize the use of primary care and other access points to reach parents and caregivers.

¹See U.S. Department of Health and Human Services (2016) for a list of substance abuse prevention programs and policies.

BOX 3-1
Triple P (Positive Parenting Program)

Triple P provides families with access to parent training approaches across five intensity levels (universal intervention to treatment), depending on the risk level of the parents. Study of the Triple P population-level approach in South Carolina indicates that, given adequate funding and resources for effective and sustainable implementation, the population-level approach of Triple P has potential for improving parenting behaviors and reducing child maltreatment and neglect and out-of-home placements (Prinz, 2016; Prinz et al., 2009, 2016). A variant of the program, Pathways Triple P, tailored for families with identified risk factors for abuse, can be delivered within the context of the larger program in a manner that does not stigmatize parents identified as at risk. Assessment of this approach showed evidence that it is effective in reducing risk factors for child maltreatment, including problematic parenting behaviors (e.g., Wiggins, Sofronoff, and Sanders, 2009).

BOX 3-2
Parent–Child Interaction Therapy (PCIT)

PCIT is a therapeutic approach to cultivating secure caregiver–child relationships through observation and coaching of parents (*McNeil and Hembree-Kigin, 2010; PCIT International, 2019). PCIT was originally developed to provide parents with behavior management strategies for addressing externalizing behaviors in their children, and was found to be effective in improving these behaviors (Ward, Theule, and Cheung, 2016). Other research showed effects in reducing negative parent behavior and child abuse potential in mothers with a history of maltreating their children; improvements in parent–child interactions, parent-reported child behavior problems, and parental stress, as well as in maternal sensitivity; and decreases in maternal child abuse potential and the likelihood of child welfare authority involvement (Chaffin et al., 2004; Thomas and Zimmer-Gembeck, 2011). Child–Adult Relationship Enhancement (CARE), based on similar principles but using more streamlined, less intensive, and less costly interventions and parent training, has been effective in improving parenting skills and child outcomes. CARE is more broadly applicable than PCIT to improving child outcomes across populations of families, such as those providing foster care (Messer et al., 2018).

*See <http://www.pcit.org>.

BOX 3-3**Strengthening Families Program for Parents and Youth Ages 10–14**

The Strengthening Families Program (SFP) promotes parental nurturing, limit setting, and communication skills, with the goal of improving prosocial skills and reducing substance use and other problem behaviors in youth. It is designed for families with children ages 3–17 and can be delivered either to at-risk families or with a universal approach. A version of the program (SFP 10–14) targets families with children ages 10–14, using a universal approach. SFP 10–14 is delivered in seven weekly sessions, with 1 hour being devoted to concurrent parent and youth skills groups and a second designed around family group time. A randomized controlled trial of the program in 28 rural communities showed positive impacts on family, parent, and youth outcomes with respect to promotion of protective factors and prevention of substance use (Redmond et al., 2009). SFP 10–14 has also been found to reduce sexual risk behaviors and the incidence of sexually transmitted diseases (Spoth, Clair, and Trudeau, 2014). An analysis showed that the program yielded almost \$4 in benefits for every dollar spent (Washington State Institute for Public Policy, 2018).

**ADDRESSING PARENTAL MENTAL HEALTH AND
SUBSTANCE USE DISORDERS**

Another set of interventions addresses mental health and substance use disorders in parents, which have been clearly linked to negative outcomes for infants as well as impacts on older children and adolescents, including an increased likelihood that they will develop substance use problems and other mental health disorders (see Chapter 2). The link between depression in mothers and negative outcomes for their children, as well as the benefits of intervention in this area, have been particularly well documented, but work has also shed light on ways of addressing substance use and other disorders.

Depression in Pregnant and Postpartum Women

As discussed in Chapter 2, a mother's depression during pregnancy is associated with a number of negative outcomes. Shorter-term effects include increased health problems for mothers; lower birthweight and preterm deliveries for babies; and negative child outcomes, including slower cognitive development, less secure attachment, and greater behavioral difficulties (Gelaye and Koenen, 2018; Goodman et al., 2011). When a mother's depression persists or is present when her children are older, effects can include poor school performance, depression, anxiety, substance abuse, and suicidal behavior (Netsi et al., 2018; Santavirta, Santavirta, and Gilman, 2018; Stein et al., 2018; Weissman et al.,

2018). There is also evidence that paternal depression is associated with negative outcomes, including worse school performance (Shen et al., 2016).

Because the evidence of harm caused to children by depression in parents, and particularly in pregnant women and new mothers, is so well established, prevention researchers have long held that waiting for the onset of clinical depression before intervening is not enough and that preventing major depressive episodes at any time, but particularly during pregnancy and the postpartum period, is critical (Le et al., 2003). It is also important to note that depression is a chronic illness in which remission and relapse are common, so treatment needs to be available over the life course.

Treatment and Prevention

There are two ways of preventing the sequelae of maternal depression in infants and children: (1) treatment during pregnancy or postpartum for women already suffering from clinical depression and (2) prevention interventions to forestall clinical episodes of depression. Treating and preventing prenatal and postnatal depression in mothers are developing areas of research, but several points are well established. Clinical trials have demonstrated the efficacy of psychological treatments during pregnancy and the postpartum period in reducing the mother's depressive symptoms. A review of 50 clinical trials of different approaches, adapted for women immediately before and after giving birth, showed that interpersonal therapy (IPT) and cognitive-behavioral therapy (CBT) both have the capacity to reduce depression by approximately 50 percent (Burns et al., 2013). In addition, the U.S. Preventive Services Task Force determined in 2019 that there is no need to wait until a person is suffering from a clinical depression episode to intervene (O'Connor et al., 2019; U.S. Preventive Services Task Force, 2019). It is possible to identify women at risk for the onset of a major depressive episode and offer preventive interventions (Le et al., 2003). The evidence that counseling interventions based on IPT (Grote et al., 2009; Lenze and Potts, 2017; Spinelli et al., 2016; Weissman, Markowitz, and Klerman, 2018; Zlotnick, Capezza, and Parker, 2011) or CBT, such as the Mothers and Babies Course (Muñoz et al., 2007; Sockol, Epperson, and Barber, 2011; Tandon et al., 2011), are effective in preventing perinatal depression is sufficiently strong to recommend that clinicians provide or refer patients to receive such interventions (O'Connor et al., 2019; U.S. Preventive Services Task Force, 2019).

Pregnant women with depression that is severe or is not responding to psychotherapy also may benefit from the use of antidepressant medications. Emerging evidence, however, indicates that such medications may have deleterious effects on the developing fetus (see, e.g., Gingrich et al., 2017). Research to understand the effects of selective serotonin reuptake inhibitors, the most common type of antidepressant medication, on the developing fetus is ongoing. However, maternal depression during pregnancy poses a considerable risk for negative child outcomes, and some women require medication for

depression during pregnancy. The current advice is that women's treatment options be assessed individually by their clinicians and discussed with them.

Other psychological and psychosocial approaches for treating maternal depression, such as postpartum home visits by professional staff and postpartum telephone support, physical exercise, and dietary supplements, have been less well studied, but several of them offer intriguing ideas for further study (Brugha et al., 2011; Dennis and Dowswell, 2013; Lavender et al., 2013; Morrell et al., 2016; Tandon et al., 2011). For example, mindfulness-based perinatal interventions show preliminary promise for both treatment and prevention, although the quality of studies in this area is variable (Shi and MacBeth, 2017). A prenatal program to promote parenting skills in couples has also shown improvements for outcomes associated with mother-child attachment (Feinberg et al., 2015).

The treatment of depression is complex, and numerous therapies, both medical and psychotherapeutic, are available. The relationships among the factors relevant to maternal depression and children's MEB development are also complex, and it has been suggested that interdisciplinary research including the fields of epidemiology, genomics, neuroscience, and child development is needed to build understanding of the underlying mechanisms (Gelaye and Koenen, 2018). It will also be important to learn more about when and how to intervene with different subpopulations of women. The 2019 recommendations of the U.S. Preventive Services Task Force are highlighting the need for new research to explore the impact of averting the onset of depression in the mother altogether and thereby possibly preventing the development of MEB disorders in her child and fostering healthy lifelong development. This is a major advance in the field of prevention science that needs to be underscored and built upon in the next decades.

Benefits for Infants and Older Children

Because the evidence of harm from maternal depression is so strong, it is logical to expect that effectively preventing or treating it would have identifiable benefits for both infants and older children. Researchers are still exploring questions about specific benefits, but the number of studies in this area remains small, and the available studies vary in the nature, duration, and timing of intervention approaches examined; the offspring outcomes measured; and the developmental stages assessed. Additional work is needed to develop a more detailed picture.

For example, both providing IPT to mothers and a home visiting program have been associated with greater improvements in toddler attachment, maternal perceptions of toddler temperament, and parenting efficacy than were found with enhanced community care (Handley et al., 2017; Sierau et al., 2016). Other studies, however, were unable to document impacts of such interventions on infant outcomes. Two studies of postpartum psychotherapy found that even when treatment reduced maternal depression, effects on parenting or early child

adjustment (Ammerman et al., 2015) and child development at age 7 (Maselko et al., 2015) could not be established. A pilot RCT study of an individual mother–infant dyad approach (in which the pair are treated as a unit whose relationship is critical) to reducing maternal depression and improving parent–child interaction found no significant differences in maternal outcomes or mother–infant interaction (Goodman et al., 2015).

However, while this work points to questions for further research, the authors of a meta-analysis of studies of the effects of treating depression during and after pregnancy concluded that there are promising findings for psychological interventions delivered during pregnancy and postpartum on a range of indicators relevant to parenting and child development (Letourneau et al., 2017). Furthermore, investigators working with mothers and infants have suggested that focusing solely on the mother fails to engage the unique mother–infant experience of the postpartum period. Learning to deal with infant fussing, crying, and sleeping and feeding patterns can reduce maternal depression, and positive interaction between mother and infant or child can be therapeutic in itself (Werner et al., 2016). A 2017 review of evidence-based interventions for depressed mothers and their young children presents evidence for interventions to reduce maternal depression and describes the mechanisms underlying its relationship to the child’s development (Goodman and Garber, 2017). The authors of this review and others (Stein et al., 2018) recommend testing interventions that both treat maternal depression and enhance parenting skills with infants and young children.

There is also evidence that treating a parent’s depression using medications and evidence-based psychotherapy, alone or in combination, can reduce adverse effects on older children (Cuijpers et al., 2015). One example is the Sequenced Treatment Alternatives to Relieve Depression study, which was designed to test how best to treat depression and included an add-on study to determine the effect of remission of maternal depression on offspring (Weissman et al., 2006). This study showed that remission decreased the symptoms of adverse effects in a woman’s children, whereas when a mother remained depressed, her children showed either no change or an increase in their symptoms; the positive effects on children were sustained 1 year after the mother’s remission (Wickramaratne et al., 2011). Comparable effects were found by Garber and colleagues (2009), and a similar study in which mothers were treated successfully with medication showed positive effects on children of the participants (ages 7–17) (Weissman et al., 2015). A separate clinical trial found positive effects on children when their depressed mothers were treated with IPT (Swartz, 2015), suggesting that the important factor for the child was the successful treatment of the mother’s depression by reducing her depressive symptoms, whether by medication or by psychotherapy.

A related issue is the possibility that treating parental depression may be beneficial for adolescents who are at risk for or experiencing depression, based on the growing evidence that, whether because of genes, environment, or some combination of the two, the children of depressed parents are more likely to become depressed than are children of parents who have not been depressed (e.g.,

Hammen, 2017; Sawyer et al., 2019). There has been relatively little study of how to impede this transmission other than by treating maternal depression.

Overall, while important questions about long-term outcomes and other issues require further study, it is clear that successfully controlling parental depression is a critically important component of any effort to promote healthy MEB development and prevent MEB disorders.

Treatment for Substance Use Disorders and Parenting Training

While the effects of parental substance disorder on children have received attention over the years (U.S. Department of Health and Human Services, 2016), relatively little is known about the impact of substance use treatment for parents that is integrated with programs aimed at improving parenting. For example, a systematic review of studies of this approach found very few studies of child outcomes with either quasi-experimental or experimental comparison group designs, though it concluded that the available evidence does suggest that this approach is associated with improvements in parenting skills (Niccols et al., 2012).

A number of RCTs have examined the impact of adding parent or couples training programs to standard drug treatment. One such program is Parents Under Pressure, in which parent training by clinic staff is offered along with methadone treatment. Researchers documented reductions in child abuse and other improvements, although the study did not address effects on parents' addiction (Barlow et al., 2019). These findings reinforced findings from earlier work on the program (Dawe and Harnett, 2007). Other older research showed comparable benefits for parenting interventions delivered in the context of substance use treatment (Catalano et al., 1999; Fals-Stewart, O'Farrell, and Birchler, 2004; Haggerty et al., 2008) and similar approaches using couples-based treatment (Lam, Fals-Stewart, and Kelley, 2008). More recently, an RCT showed benefits from providing recovery coaches to substance-abusing mothers whose children had been in foster care and reunited with their parents (Douglas-Siegel and Ryan, 2013).

Overall, the existing research provides some indication that integrating parent training or couples therapy with drug treatment has positive effects on children's behavior and emotional well-being. With the exception of a single long-term follow-up study spanning 12 years (Haggerty et al., 2008), most of the evidence is based on small samples and short-term follow-up of 1 year or less, but the evidence is promising and merits investment in larger studies and longer-term follow-up.

CHILD NEGLECT AND ABUSE

Child maltreatment—including exposure to sexual, physical, and emotional abuse, physical and emotional neglect, and domestic violence or other trauma—is a global public health problem affecting millions of children (Stoltenborgh et

al., 2014), with well-established adverse effects on emotional, behavioral, and physical functioning over the life course (Devries et al., 2014; Gilbert et al., 2009; Jonson-Reid, Kohl, and Drake, 2012; Lindert et al., 2014). Preventing child maltreatment is critical, and a variety of approaches for intervening with children and youth at risk for abuse and maltreatment have been developed. Research conducted over the past 10 years confirms and extends the evidence base for the effectiveness of home visitation and parenting skills training in preventing child maltreatment (van der Put et al., 2018). While some universal approaches show promise, most preventive interventions in the United States have targeted families at greater risk of child maltreatment based on such risk factors as low income, parental history of maltreatment or other adverse experiences in childhood, or child behavioral problems. One promising example is the Child–Parent Psychotherapy model, which targets children ages 0–5 who have experienced traumatic events, including domestic violence (Lieberman and Van Horn, 2009).

Neglect and Physical Abuse

Home visitation has proven to be an effective intervention for preventing child physical abuse and neglect. A meta-analytic review of research on nine different home visiting models identified improved positive parenting and reduced risk for maltreatment as the most robust outcomes across programs; supervision and program fidelity monitoring were found to be significant moderators increasing these effects (Casillas et al., 2016).

One example of this approach that has been extensively evaluated is the Nurse–Family Partnership (NFP) model, in which nurses make home visits to low-income first-time mothers (Macmillan et al., 2009). An RCT with longitudinal follow-up found that firstborn children of mothers with low to moderate levels of exposure to domestic violence who received home visitation through the NFP model had fewer substantiated maltreatment reports through age 15 compared with firstborn children of comparable mothers who did not receive home visitation (Eckenrode et al., 2017). The impact of home visitation in reducing time on public assistance and number of subsequent children explained almost half the variance in this effect (Eckenrode et al., 2017). These findings suggest that reducing poverty and supporting family planning options may be key pathways toward prevention of child maltreatment (Eckenrode et al., 2017), hypotheses that merit further testing.

Another study—a 27-year follow-up of the offspring of mothers who participated in the NFP program—showed that exposure to child abuse and neglect was associated with genome-wide DNA methylation variation at age 27. Changes in DNA methylation patterns are associated with the development of physical and psychological health issues later in life so this is an example of the long-term biological effects of early adversity. Participants in NFP showed a modestly lower DNA methylation than their counterparts who did not participate in the program (Klutstein et al., 2016; O’Donnell et al., 2018; Wajed, Laird, and DeMeester, 2001).

Another program that has been extensively studied is Family Check-Up (FCU), a brief intervention delivered in the context of home visiting in which parents are given feedback to enhance their ability to interact positively with their children through provision of affection and behavioral monitoring (Dishion, Nelson, and Kavanagh, 2003; Shaw et al., 2006). In an RCT of low-income families, FCU was found to increase positive caretaker–child engagement by age 3, which predicted lower levels of child neglect at age 4 (Dishion et al., 2015). The program was particularly effective for families with the highest levels of social, economic, and emotional adversity (Dishion et al., 2015). Participation in these yearly check-ups was associated with improved parent reports of child behavior from ages 2 to 5, and with improved teacher reports when children were 7.5 years of age (Dishion et al., 2014). A similar program based in New Zealand, the Early Start program, also has demonstrated efficacy (Fergusson et al., 2005; Macmillan et al., 2009).

Well-child visits to medical practitioners offer another opportunity to address abuse and neglect. Box 3-4 describes a program implemented in this context to screen mothers for the risk of abusive behaviors.

Sexual Abuse

There has been considerably more study of parent-focused prevention programs that target physical abuse and neglect of children than of those designed to prevent child sexual abuse. Public health responses to child sexual abuse have focused on management of sex offenders through criminal justice policies, including not only incarceration but also registration of offenders and restrictions on their residence and employment. These strategies, however, have generally not been found to significantly reduce rates of abuse (Finkelhor, 2009; Mendelson and Letourneau, 2015). Other approaches to preventing child sexual abuse include advocacy and media campaigns, staff screening and training at youth-serving organizations, and school-based programs that teach children how to avoid sexual abuse. Yet while some of these strategies have been shown to increase knowledge about these offenses, effects on the incidence of abuse are unclear (Finkelhor et al., 2015; Letourneau et al., 2010).

Child sexual abuse is most commonly perpetrated by adults or minors well known to victims and their families, and prevention research suggests that parents may be a crucial target for a public health approach to preventing such abuse. Interventions that support parents in actions such as communicating with their children about rules of sexual behavior; monitoring children for signs of situational discomfort; and consistently monitoring child caretakers and interactions with siblings, peers, and adults have shown promise (Mendelson and Letourneau, 2015). The success of parent-focused interventions in preventing other forms of child maltreatment through enhancement of positive parenting skills (e.g., Triple P, Parent–Child Interaction Therapy) supports the value of this approach.

Parent-focused prevention of sexual abuse may have two kinds of benefits. As a universal prevention approach, it may increase parents' awareness of situations that pose risks to children and enhance their skills (e.g., communication, monitoring) to reduce the likelihood of their children's exposure to sexual abuse. As a selective and indicated strategy, it can be used to support families with risk factors for sexual abuse or those that have been reported previously to child protective services on suspicion of such abuse.

BOX 3-4

The Safe Environment for Every Kid (SEEK) Program

The SEEK Program combines screening of parents for risk of abusive behaviors potentially affecting their children at the time of well-child visits with the provision of information for parents and tools to help health professionals provide parenting guidance. This program has been implemented successfully in multiple practice settings: two randomized controlled trials have provided evidence for reductions in physical aggression and minor assaults (Dubowitz et al., 2012). There were too few reported episodes of abuse prior to participation in the program to show an effect on that outcome. SEEK is currently funded by the National Institute of Child Health and Human Development to examine the outcomes of the program in a number of U.S. communities.

SUMMARY

Parents play a pivotal role in shaping the MEB health of their children. Evidence has shown that promotive and preventive universal, selective, and indicated parenting interventions can play a role in improving children's MEB health by improving the MEB health of their parents. Interventions that target both individual children and parent-child dyads also show promise for promoting healthy development and mitigating risks to children's MEB health. Researchers have compiled evidence for many kinds of interventions, but the picture is not complete. For some interventions, the evidence thus far consists of individual studies covering relatively small populations, but for others, such as teaching some parenting skills and treating depression in pregnant and postpartum women, strong meta-analyses provide a clear indication that these interventions limit potential harms to children and youth. Longer-term studies of the effects on children are needed, particularly to

- improve understanding of the mechanisms that make interventions effective and the specific benefits to children's MEB health they can yield;

- improve understanding of the needs of fathers and other caregivers and the potential benefits of interventions targeting these groups in addition to what is already understood about the needs of mothers;
- track the long-term impacts of such interventions on MEB development and health; and
- better link efficacious interventions with opportunities to serve the populations who can benefit from them at broad scales.

CONCLUSION 3-1: There is evidence for the effectiveness of interventions designed to affect the behaviors and attitudes of parents and other caregivers and thereby improve mental, emotional, and behavioral (MEB) outcomes for young people, both by promoting healthy MEB development and by preventing MEB disorders:

- **Programs that support and promote effective parenting and family bonding can have both promotive and preventive benefits, particularly with respect to behavior issues and substance use and abuse.**
- **Screening of pregnant women and all mothers for depression and provision of effective treatments hold promise for averting harm and improving children's MEB development. Psychotherapy is an appropriate treatment for pregnant and postpartum women, and may be accompanied by medication when psychotherapy alone is not enough, but more research is needed to clarify the risks and benefits involved in medication use during pregnancy. After the postpartum period, either evidence-based psychotherapy or medication is effective at reducing depression in mothers, which may have a positive impact on the MEB health of their children.**
- **Limited evidence suggests that addressing substance use disorders in parents by integrating parent training and couples therapy with drug treatment shows promise for benefiting children's behavior and well-being.**
- **Certain parent programs, including approaches delivered through home visitation, have been found to reduce and prevent child neglect and physical abuse.**
- **Limited evidence suggests that implementing parent-focused approaches to the prevention of child sexual abuse may provide significant benefits for children. Approaches focused on parent education, particularly those that build communication and monitoring skills, show promise.**

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Strategies for Educational Settings

From preschool through college, the school setting is a universal touch point for children—a place that provides daily opportunities for educators and other professionals to connect with children and families, identify problems, and offer supports. Aside from a child’s home, no other setting has more influence on a child’s mental health and well-being, and it is a critical place to foster healthy mental, emotional, and behavioral (MEB) development.

The relationship between school climate and some MEB outcomes has been well documented, and both researchers and practitioners have explored ways to intervene at the school system level to bring organizational changes that affect whole populations, as opposed to delivering isolated programs aimed at preventing single disorders—a key emphasis of this report. In this chapter, we examine developments in school-based strategies for promoting MEB health and preventing MEB disorders. We focus in turn on early education and preschool settings; grades K–12; and postsecondary settings, for which the evidence is comparatively sparse. We highlight both promotion and prevention programs addressing a range of MEB needs, many of which focus on enhancing social and emotional learning or teaching such contemplative practices as mindful awareness and yoga.¹

EARLY EDUCATION AND PRESCHOOL SETTINGS

The value of high-quality early childhood care and education for improving MEB outcomes, especially among children at risk, has been well established, and includes long-term positive impacts on academic learning, socioemotional development, and health (Yoshikawa et al., 2013). Although there is no single definition of what constitutes high-quality early childhood care, the National Association for the Education of Young Children (NAEYC) has established 10

¹There are no precise definitions of mindful awareness or mindfulness, but they are commonly understood to have roots in the Buddhist practice of meditation and to encompass activities intended to direct an individual’s attention to the present moment and to cultivate acceptance and curiosity (see, e.g., Bishop et al., 2004).

standards of excellence for early childhood education.² These standards go beyond basic requirements for creating a safe and healthy learning environment to include factors that promote multiple facets of child development and well-being. For example, NAEYC standards require the inclusion of activities that promote positive relationships and encourage individual children's sense of self-worth; a coherent curriculum that fosters all areas of child development; the inclusion of ongoing progress assessment and home-school communication; instruction in health, nutrition, and injury/illness prevention; access to well-qualified teaching and professional staff; and coordination with community resources.

All children benefit from high-quality preschool, and children from low-income families derive particular benefit (Adams, Zaslow, and Tout, 2007). Yet while research suggests that high-quality universal preschool has the potential to help narrow the academic achievement gap between children living in poverty and ethnic minority children and their more economically advantaged and ethnic majority counterparts, it is the less-advantaged children who are less likely to have access to high-quality preschool (Valentino, 2018).

In the past decade, research has added to the evidence that high-quality early childhood interventions have long-term positive effects on MEB health lasting into adulthood. For example, programs designed to foster social-emotional learning in preschool settings have been found to improve socioemotional development, prosocial behavior, and adjustment to kindergarten (Bierman, Greenberg, and Abenavoli, 2017). This section reviews research on the long-term effects of high-quality preschool and then turns to research on the promotion of social-emotional learning in preschool settings, including a new approach to teaching contemplative practices in early childhood educational settings.

Evidence That Early Education Matters

A number of seminal studies from as early as the 1960s have documented the importance of early childhood education. Preschool programs including the Abecedarian Project, Head Start, the Chicago Child-Parent Center, and the HighScope Perry Preschool Project have now reported longitudinal evidence of benefits that last into adulthood. These examples illustrate the significance of early childhood education for long-term MEB development.

The Abecedarian Project

The Abecedarian Project, developed in the 1970s, was designed to expose children to high-quality care and education from birth until they entered school. It has served primarily African American children in low-income settings in rural

²See <https://www.naeyc.org/our-work/families/10-naeyc-program-standards>.

North Carolina.³ Participants received intensive pediatric monitoring, improved nutrition, and a more predictable and less stressful child care experience, which resulted in improved adult outcomes (Campbell et al., 2014). Longitudinal studies of participants have shown positive outcomes that last at least into young adulthood. For example, participants studied as adults were found to have had more years of education, to have been more consistently employed, and to have been less likely to receive public assistance. While there were no differences in rates of criminal conviction, participants were significantly more likely to have delayed parenthood (Campbell et al., 2012). Most striking was the impact of the program on participants' health in their mid-30s. As adults, the participants showed significantly lower rates of prehypertension and hypertension and a lower risk for coronary heart disease, and none exhibited symptoms of metabolic syndrome.

Head Start

The federally sponsored Head Start program focuses on improving the school readiness of children from low-income families by providing comprehensive enriched classroom experiences, nutrition, and family supports from birth until age 5.⁴ Strong evidence indicates that this program improves long-term outcomes. Analysis of data from the Early Childhood Longitudinal Study–Birth Cohort, a nationally representative sample of children born in 2001 (Schanzenbach and Bauer, 2016), showed that Head Start participants were more likely to graduate from high school; attend college; and earn a degree, license, or certificate. Other benefits to participants include improved self-control and self-esteem and the use of positive parenting practices when they become parents themselves.

However, recent evaluations of statewide preschool programs have raised questions about the extent of universal public health benefits when these otherwise high-quality programs are implemented at scale. For example, Lipsey and colleagues (2018) examined long-term outcomes for a subsample of children randomly assigned to attend the state-mandated Tennessee Preschool Program and followed this sample through 3rd grade. By the end of pre-K, program participants did indeed show better outcomes on measures of academic achievement and school readiness, compared with children who did not attend the state-mandated program. However, those effects were not sustained into subsequent years, and by the end of 3rd grade, the pre-K program participants actually scored lower on achievement measures and had more disciplinary infractions compared with nonparticipants. The authors of this study identified questions about the design and implementation of the state pre-K program and

³For more information, see <https://abc.fpg.unc.edu/design-and-innovative-curriculum>.

⁴For more information, see <https://www.acf.hhs.gov/ohs/about>.

called for additional research on the implementation quality and heterogeneity of effects.

Early Head Start is a federally funded community-based program created in 1995 for low-income families with infants and toddlers and for low-income pregnant women. The goal of Early Head Start is to provide prenatal support to pregnant women, support healthy family functioning, and support the development of children from birth to age 3. Studies of the program have documented significant benefits for program participants, including improved parenting skills, vocabulary, and cognitive functioning, and superior social-emotional functioning among students and families who participated in the program (Administration for Children and Families, 2002, n.d.).⁵

The Child-Parent Center

The Child-Parent Center Education Program is a publicly funded intervention that begins in preschool and provides up to 6 years of support to children and families in inner-city Chicago schools.⁶ A study examined the long-term impacts of this program on indicators of well-being up to 25 years later among more than 1,400 participants (Reynolds et al., 2011). As adults, participants demonstrated higher educational attainment, income, socioeconomic status, and rates of health insurance coverage relative to the comparison group, as well as lower rates of involvement in the justice system and less substance abuse. Impacts were strongest for males and children of parents who had dropped out of high school.

The HighScope Perry Preschool Project

Beginning in 1962, researchers began following a cohort of 123 African American preschool-age children with risk factors for school failure; data collection continued until they reached age 50. These children were randomly assigned to participate in a high-quality preschool program or to receive no preschool.⁷ The preschool program used the play-based HighScope curriculum and also included home visiting and parenting support. Multiple studies have confirmed the preschool program's effectiveness (Schweinhart, 2013). Compared with nonparticipants, those assigned to receive preschool performed better in school, showed less antisocial behavior, were more likely to graduate from high school, were more likely to be employed, earned more, and were more likely to

⁵A three-phase evaluation study was carried out between 1996 and 2010. See <https://www.acf.hhs.gov/opre/research/project/early-head-start-research-and-evaluation-project-ehsre-1996-2010>. See also DiLauro (2009), Raikes et al. (2003), and U.S. Department of Health and Human Services (2002, 2003, 2006, 2010).

⁶For more information, see <https://cps.edu/Schools/EarlyChildhood/Pages/Childparentcenter.aspx>.

⁷For more information, see <https://highscope.org/perry-preschool-project>.

own their own homes. Participants were also significantly less likely to engage in criminal behavior by age 40. An updated cost/benefit analysis found that the program's return on investment was seven times the costs involved in operating the program (Schweinhart, 2013). Most recently, follow-up research has documented benefits for the siblings of the original participants and also for the children of the children who originally participated, including higher levels of educational attainment and employment, fewer school suspensions, and lower levels of participation in crime (Heckman and Karapakula, 2019a, 2019b).

Challenges

The studies cited above demonstrate the long-lasting influence that early childhood intervention can have well into adulthood. What has also been evident over the past 50 years, however, is that high-quality, multicomponent early education programs such as these can also be challenging to scale up. At present, access to high-quality early childhood education is very uneven across and within states, and also varies significantly by income level and race; according to the U.S. Department of Education, "more than 2.5 million four-year-olds don't have access to publicly funded preschool programs" (U.S. Department of Education, 2015, p. 4). Factors in the ongoing challenge of ensuring that all children have access to high-quality programs include the cost of providing high-quality care, limitations in the preparation of many members of the early childhood education and care workforce, and low compensation levels for this workforce, especially in underresourced communities. These barriers will need to be addressed if preschool is to contribute to the healthy MEB development of children at a population level.

Social-Emotional Learning in Early Childhood Education

The past 15 years have seen a trend toward introducing academics in kindergarten, which in turn has increased concern that preschools need to better prepare children academically (Bassok, Latham, and Rorem, 2016). But this trend has also prompted warnings that young children are being asked to engage with content for which they are not yet developmentally ready, resulting in such negative outcomes as increased stress, reduced motivation and efficacy, and increases in negative attitudes toward school (Carlsson-Paige, McLaughlin, and Almon, 2015; Stipek, 2006). Another concern is that this focus on academics is crowding out time for social-emotional learning and undermining the development of skills shown to promote school success and feelings of connection with school (Bierman, Greenberg, and Abenavoli, 2017). These skills are critical. For example, one recent study suggests that kindergarten children's ability to get along with others, follow rules and procedures, and persist with tasks that are challenging predicts later success in both school and life (Jones, Greenberg, and

Crowley, 2015). Indeed, children without such skills may have difficulty adjusting to school and learning (Durlak et al., 2011).

Preschool is an optimal time to introduce social-emotional learning programs because socioemotional development, including associated brain development, is rapid during these years and benefits from high-quality interactions with adult caregivers (Blair and Raver, 2015). Randomized controlled trials (RCTs) have shown that evidence-based programs can promote these skills during the preschool years (Bierman and Motamedi, 2015; McClelland et al., 2017; Schindler et al., 2015). Comprehensive social-emotional learning programs in preschool focus on both interpersonal skills (making friends, getting along with others, taking turns, sharing, controlling aggressive behavior) and intrapersonal skills, such as emotion regulation and cognitive control (paying attention, inhibitory control, following directions). Such programs also provide support for teachers—both professional development and support in building teachers' own social-emotional learning skills (Bierman, Greenberg, and Abenavoli, 2017; McClelland et al., 2017).

This body of work has shown that at the preschool level, the most effective interventions apply direct instruction and practice in daily activities and interactions, enabling children to practice and generalize social-emotional learning skills across various contexts and situations. In the most effective programs, more complex and challenging activities are introduced as children mature and grow, and children's families are involved so the skills learned generalize to the home context. Strategies to educate parents in ways to support children's social-emotional learning have also shown promise (McClelland et al., 2017).⁸

Some programs designed to support socioemotional development among preschoolers involve contemplative or mindful awareness activities. While more research is needed to improve understanding of the potential benefits of such programs, two examples illustrate their potential. The Kindness Curriculum introduces children to simple, developmentally appropriate mindful awareness practices designed to promote attentional skills, kindness, compassion, and gratitude. One study found that the program had significant impacts on children's teacher-rated social competence, prosocial behavior, and grades, but no effect on executive function (cognitive flexibility, inhibitory control, or capacity for delayed gratification) (Flook et al., 2015). Another example is MindUp, a social-emotional learning program that integrates mindful awareness practices with practices from positive psychology (see Box 4-1). Two quasi-experimental studies of the preschool version of MindUp showed significant impact on teacher-reported executive functioning, literacy, and vocabulary skills, but no impact on receptive vocabulary, observed classroom interactions, social skills, or academic skills (Thierry et al., 2016, 2018). And a rigorous RCT examining the impact of

⁸Practitioners and policy makers can find information about evidence-based social-emotional learning programs at <https://healthdata.gov/dataset/evidence-based-practices-resource-center>; <https://casel.org/guide>; and <https://www.blueprintsprograms.org>.

MindUp found effects for executive function, empathy, perspective taking, emotional control, optimism, school self-concept, math achievement, mindfulness, peer-rated prosocial behavior, and peer acceptance. The researchers also found reduced depression and aggression in students who participated in the program (Schonert-Reichl et al., 2015).

BOX 4-1 MindUp

MindUp provides a research-based curriculum to help students learn through brain-centered management. The curriculum consists of 15 age-appropriate lessons that teach students strategies to focus attention, improve self-regulation, build resilience, and develop a positive mindset. Each lesson is designed to fit into any classroom with nominal teacher preparation. The program also includes recommendations for improved teacher management of classrooms (The Goldie Hawn Foundation, n.d.). MindUp is based on principles of Positive Psychology—the scientific study of the strengths that enable individuals and communities to thrive; see <https://ppc.sas.upenn.edu>.

K–12 SETTINGS

Interventions designed for the K–12 level include promotive programs, such as those intended to develop positive school climates or teach social and emotional skills, and programs targeted at specific problems, such as bullying and suicide, and populations of students at particular risk.

Promotion of MEB Health

School-wide programs that promote MEB health at the K–12 level are most commonly designed to improve the ways school staff respond to problem behaviors and to support the social-emotional learning of students.

Promoting a Positive School Climate

A positive school climate can significantly influence learning and positive youth development, as we discussed in Chapter 2. There is evidence that school climate can influence students' sense of social connectedness and foster greater school engagement, academic achievement, and prosocial behavior, and some states have begun to assess school climate and include it in their accountability systems (Kostyo, Cardichon, and Darling-Hammond, 2018). The Department of Justice recently issued a report on the importance of creating and sustaining a positive school climate, to promote school safety and yield benefits for students that include better socioemotional health (Payne, 2018). The report notes that

while research has identified ways to improve school climate, there is a gap between the research and existing policy, and that many states, districts, and schools are using tools to promote positive school climates that are not grounded in the evidence that has been amassed. The report points out the lack of a shared definition of school climate and the need for further research on ways to assess it. A key message of the report, based in the research reviewed, is that the entire school community must be involved in an effective effort to build a strong climate, a view that is extensively documented in another recent report that summarizes a broad base of literature on the subject (Darling-Hammond and Cook-Harvey, 2018).

One example of a universal intervention that promotes a positive school climate is School-Wide Positive Behavioral Interventions and Supports, which focuses on changing the behavior of school staff and improving the conduct of such administrative tasks as discipline, data management, and office referrals. An RCT showed that social-emotional learning, prosocial behaviors, concentration, and externalizing behaviors all significantly improved in the participating schools (Bradshaw, Mitchell, and Leaf, 2010; Bradshaw, Waasdorp, and Leaf, 2012). Teacher-reported student bullying and peer rejection were also reduced (Waasdorp, Bradshaw, and Leaf, 2012).

Chapter 2 also notes that preventing adverse childhood experiences and peer rejection may have significant positive effects on MEB development, and schools nationwide have begun to support staff education about the effects of trauma on children (Chafouleas et al., 2016). However, despite interest in “trauma-informed schools,” there are few evaluations that document how whole-school strategies to improve school climate affect trauma-related mental health and well-being in children.

Promoting Social-Emotional Learning

Increasingly, states are using the teaching of social-emotional learning skills to improve school climate and student engagement, and thereby promote healthy MEB development in schools: All 50 states now include social-emotional learning in their educational standards for preschool, and a growing number have adopted these standards for grades K–12 (Collaborative for Academic, Social, and Emotional Learning, 2018). (See the introduction to Part I of this report for discussion of competence domains defined for social-emotional learning.) Many programs to promote these skills focus on integrating them into the overall curriculum in schools and engaging teachers and other school staff in teaching students how to better manage emotions, set positive goals, express empathy, and establish positive peer relationships (Durlak et al., 2011; Taylor et al., 2017). Figure 4-1 illustrates the theory of change for social-emotional learning interventions: such interventions foster assets in young people, which in turn promote positive behavioral, academic, and mental health outcomes.

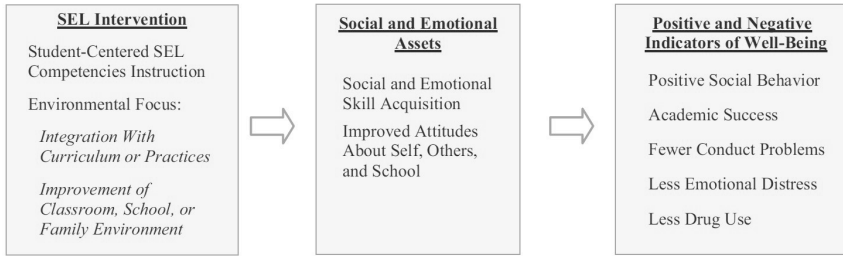


FIGURE 4-1 Theory of change for social and emotional learning.

NOTE: In this framework for positive youth development, interventions designed to promote social and emotional learning foster assets (skills and attitudes) that bring positive outcomes.

SOURCE: Taylor et al. (2017).

Several recent reviews have confirmed the short- and long-term benefits of universal school-based health promotion interventions that teach one or more social-emotional learning skills; these include positive and lasting effects across a range of key developmental outcomes, both promoting wellness and preventing illness. A meta-analysis of universal social-emotional learning interventions found positive effects, including improvements in social skills, mental health, prosocial behaviors, academic achievement, and prevention of antisocial behavior and substance abuse (Sklad et al., 2012). Another meta-analysis of school-based social-emotional learning interventions showed that program effects were significant for outcomes ranging from general social-emotional learning skills (social-cognitive and affective competencies) to positive social behavior, prevention of conduct problems and emotional distress, and gains in academic achievement (Durlak et al., 2011).

A third meta-analysis examined follow-up effects (outcomes 6 months or more postintervention) for 82 studies of school interventions focused on social-emotional learning published from 1981 to 2014, involving more than 97,000 K–12 students (Taylor et al., 2017). This meta-analysis not only found that social and emotional functioning improved with social-emotional learning interventions, but also documented modest improvements in academic performance as assessed by grades and test scores from school records, changes that exceeded those found with many educational programs (Hill et al., 2007; Taylor et al., 2017). Findings from Taylor and colleagues (2017) further demonstrate that these results are similar regardless of students’ race, socioeconomic background, or school location. Moreover, cost/benefit analyses of these programs have shown that every \$1 spent yields an \$11 return (Belfield et al., 2015) (such analyses are discussed in Chapter 9).

Other researchers have focused on programs that build resilience, defined as the “maintenance of, or return to, positive mental health following adversity by using a collection of multiple internal (personal characteristics or strengths) and external (qualities of wider family, social, and community environments)

resilience protective factors (assets and resources) that enable an individual to thrive and to overcome disadvantage or adversity” (Dray et al., 2017, pp. 813–814). A meta-analysis of universal prevention programs in schools showed effectiveness for programs focused on strengthening at least three internal resilience protective factors for preventing mental health problems (Dray et al., 2017). The majority of trials included in this review used cognitive-behavioral therapy approaches, but other trials implemented positive psychology, social-emotional learning, teaching of social skills and mindfulness, and other strategies. Across all trials, these interventions had a positive effect on behavioral outcomes. Child but not adolescent interventions had a significant effect on anxiety symptoms; no differences were found for conduct and hyperactivity symptoms. Box 4-2 describes an example of a social-emotional learning curriculum.

Although high-quality professional development is critical to the effectiveness of social-emotional learning programs, teacher preparation typically does not include instruction in social-emotional skill development and the knowledge and skills required to deliver such instruction effectively, Jennings and Frank, 2015). Consequently, few teachers are prepared to deliver social-emotional learning programs and generalize those skills in their classroom management strategies and interactions with students, or to integrate social-emotional learning concepts into other curricular content. Furthermore, the quality and duration of training teachers receive in delivering social-emotional learning programs vary widely (Jennings and Frank, 2015).

BOX 4-2

The Positive Action Social-Emotional Learning Curriculum

Positive Action is a social-emotional learning curriculum delivered in grades K–12 that focuses on encouraging positive behavior, improving social-emotional skills, and supporting a positive school climate (Positive Action, 2013). The curriculum encompasses six main units, which include the foundation of the program, “Thoughts-Actions-Feelings about Self Circle,” and the application of positive actions for such domains as physical (sleep, diet, exercise), intellectual (goal setting, persistence), social (empathy, kindness, respect), and behavioral (self-regulation) (Positive Action, 2013). In addition to these classroom lessons, this intervention includes a school-wide strategy to promote a positive school climate (Collaborative for Academic, Social, and Emotional Learning, 2019). This intervention has undergone two main evaluations with grades K–8 in primarily high-risk urban schools. Those evaluations showed improved school supportiveness, as reported by students and teachers, and such improved school outcomes as fewer grade retentions, suspensions, and absenteeism and higher standardized test scores (Li et al., 2011; Snyder et al., 2010).

Promoting Contemplative Practices

Since 2000, considerable attention has been focused on evaluating the impacts of interventions based on contemplative practices or mindful awareness. Promising results for adult populations have generated interest in applying such practices to fostering healthy MEB development among children and youth in school settings.⁹ While mindfulness is typically associated with meditation, it can be cultivated through a variety of other practices included under the rubric of mindful awareness, such as yoga, tai chi, and qigong, and can be practiced both formally and informally, such as while engaging in routine daily activities (e.g., eating, listening, or walking) (Williams and Kabat-Zinn, 2011).

Mindfulness approaches designed to be delivered in school settings for both students and teachers are becoming more common, and a growing body of research is showing that these interventions hold promise (Felver and Jennings, 2015). More research is needed, however, on which practices are most effective at developing mindfulness, for whom and at what ages, the optimal dosages and frequencies of program exposure for different types of mindfulness practices, and how best to integrate mindfulness approaches into school settings. As with training for teachers in the delivery of social-emotional learning programs, mindfulness programs have varied in duration and intensity, from daily activities offered across the school year to limited-duration programs lasting for several weeks to several months. Conclusions from research on these programs to date have been limited by small samples, few rigorous RCTs, a lack of longitudinal data, measurement limitations, and a lack of fidelity monitoring.

Although several models of the key components of mindfulness approaches have been proposed to explain their effects, their specific mechanisms are not fully understood (Grabovac, Lau, and Willett, 2011; Howell and Buro, 2010; Jankowski and Holas, 2014; Shapiro et al., 2006; Zelazo and Lyons, 2012). One hypothesis is that mindfulness practices help individuals cultivate distress tolerance, or the general capacity to persist in goal-directed behavior despite experiencing strong emotions (Broderick and Frank, 2014; Daughters et al., 2008). Through engagement in mindfulness practices, students learn to be more attentive to present-moment experiences and more aware of emotions that arise. This metacognitive awareness is a first step toward the cultivation of strategies for managing strong emotions through nonjudgmental awareness, openness, and acceptance. These skills in turn serve as key emotion regulation strategies that can be used to moderate affective experiences to meet the demands of different situations and achieve personal and learning goals during times of heightened stress (Campos, Frankel, and Camras, 2004; Eisenberg and Spinrad, 2004; Op't Eynde and Turner, 2006). The increased levels of awareness and control over emotional responsiveness attained through mindfulness practices may decrease

⁹Mindfulness-based interventions were popularized as an approach to stress reduction through the work of Jon Kabat-Zinn (1982).

negative affect and reduce rumination and somatic symptoms that have been implicated in the development of anxiety, depression, drug use, and poor school performance (Broderick and Jennings, 2012; refer to Figure 4-1).

Mindfulness practices also strengthen emotion regulation because they shift the individual's focus away from the past (e.g., memory of a troubling incident) and the future (e.g., apprehension of impending trouble) and disrupt patterns of automatic responding. Together, these benefits may help protect children and adolescents against the potential risks of developing internalizing and externalizing problems linked to deficits in emotion regulation and reduce overall reactivity to stress known to impair executive functions, including attentional control, working memory, and problem-solving capacity (Blair, 2002; Liston, McEwen, and Casey, 2009). In addition, voluntarily and repeatedly orienting attention to a specific object of focus (e.g., breath) while deliberately letting go of distractions may strengthen key executive functions involved in the regulation of attention.

A few individual studies illustrate how some mindfulness approaches are designed and their results. For example, study of the weekly .b or "dot-be" Mindfulness in Schools Project (2013), a training program for students, has shown null and/or iatrogenic effects for depression and eating disorders and increased anxiety in a sample of young adolescents, although the authors cite the quality of program delivery as problematic (Johnson et al., 2016, 2017). Another approach is that of the MindUp program, discussed earlier (refer to Box 4-1). Another program for which there is some evidence of effectiveness is MindfulKids, a universal primary school-based prevention strategy (van de Weijer-Bergsma et al., 2012). Fewer studies have been conducted on yoga interventions for youth, but researchers have begun to explore it. Most youth yoga interventions have been delivered in school contexts, and there is evidence of such benefits as improvements in stress management and reductions in self-reported anxiety and other psychological distress symptoms (Cramer et al., 2015; Daly et al., 2015; Fishbein et al., 2016; Frank, Bose, and Schrobrenhauser-Clonan, 2014; Hagins, Haden, and Daly, 2013; Khalsa et al., 2012; Mendelson et al., 2010; Noggle et al., 2012). As with other research on mindfulness approaches, however, the emerging research on yoga for youth has a number of methodological limitations. Because the outcome domains and measures are heterogeneous, it is difficult to draw conclusions about program effects on any given outcome. More than half of studies have included an active control condition, but some control groups have consisted of existing school programming (e.g., gym class), so the researchers could not control for such intervention elements as novel programming and exposure to unfamiliar instructors. Many studies also suffer from biases, including failure to blind participants or to report on participant attrition.

Several narrative and systematic reviews and meta-analyses have examined the effects of mindfulness and more general contemplative practices (including yoga) in school-age youth. Narrative reviews, including those by Meiklejohn and colleagues (2012), Greenberg and Harris (2012), and Thompson and Gauntlett-Gilbert (2008), indicate that mindfulness-based approaches are feasible and

promising, but the authors cautioned that further, more rigorous research is needed. Two meta-analyses of mindfulness-based interventions involving children and adolescents found positive and significant effects on multiple psychological outcomes. Zoogman and colleagues (2014) report on a synthesis of 20 studies published between 2004 and 2011 examining the efficacy of mindfulness meditation with clinical and nonclinical youth samples (e.g., psychiatric outpatients) across several dimensions of psychological functioning and well-being. Subsequent meta-analyses conducted by Zenner and colleagues (2014) of mindfulness approaches delivered in school settings also found evidence of effects on youths' cognitive performance, resilience, and stress measures. A recent random-effects meta-analysis examined studies of mindfulness-based interventions for children and adolescents up to October 2017 and showed significant positive impacts for mindfulness approaches in strengthening executive functioning and attention and reducing depression, anxiety, stress, and negative behaviors (Dunning et al., 2019).

Many mindfulness approaches that have been tested for children and adolescents were adapted from existing adult programs. With few exceptions (e.g., Tan and Martin, 2013), limited detail has been provided in publications regarding the rationale for modifications, and the optimal duration and frequency of practices across populations of developmentally heterogeneous youth are currently unknown. However, it is important to note that many of the components common in youth mindfulness programs (e.g., diaphragmatic breathing, body scan) have been used within the context of other, non-mindfulness-based programs safely for many years (Benson et al., 1994; Wyman et al., 2010).

Furthermore, programs vary with regard to the degree of home practice involved and its nature. Children and adolescents are likely to be more engaged in mindful awareness practices embedded into daily routines, such as mindful eating, listening, and body scan prior to sleep, as these daily routines can serve as a cue to practice. Finally, even older adolescents have less well-developed verbal and abstract reasoning skills than adults. Traditional sitting mindfulness meditation practice is generally modified to accommodate these differences (e.g., by shortening the practice or simplifying the instructions), but the modifications necessary to make the content understandable and engaging for diverse groups of students are not well understood. Additional research on these interventions, including analysis of hypothesized core program components (see Chapter 7) and implementation fidelity, will be valuable (Gould et al., 2016).

Health Promotion for the Education Workforce

Teaching at all levels (pre-K–12) is stressful and emotionally demanding (see Chapter 2), but research, policy, and practice are only beginning to focus attention on the development of teachers' social-emotional competence, their well-being, and the working conditions that support their job satisfaction and emotional and physical health (Greenberg, Brown, and Abenavoli, 2016; Papay

and Kraft, 2013). Causes of stress for teachers include characteristics of the school (such as leadership, salaries, resources, and collegial relationships); job demands (such as high-stakes testing and behavioral issues among students); and teachers' perceptions of their autonomy and capacity to manage stress (Greenberg, Brown, and Abenavoli, 2016). When schools provide the support teachers need and teachers develop the social-emotional competencies required to manage the demands of teaching, they can better regulate their emotions and behavior and are more able to provide emotional support to their students; these capacities are linked to desired student outcomes (e.g., academic achievement, prosocial behaviors, and students' own social-emotional competencies) (Fried, 2011; Jennings and Greenberg, 2009).

Research in this area is limited, but several programs and policies have been found to reduce teachers' stress, promote their well-being, and improve classroom and student outcomes. Mentoring and induction programs for beginning teachers improve teachers' satisfaction and retention and improve students' academic achievement (Ingersoll and Strong, 2011). Workplace wellness programs reduce health risk, health care costs, and absenteeism (Aldana et al., 2005; Merrill and LeCheminant, 2016; Merrill and Sloan, 2014). Programs designed to promote students' social-emotional learning and improve their behavior have been found to create more positive teacher engagement with students and to reduce teacher stress (Abry et al., 2013; Domitrovich et al., 2016; Tyson, Roberts, and Kane, 2012; Zhai, Raver, and Li-Grining, 2011). Finally, mindfulness-based stress reduction programs reduce teachers' stress and improve their coping skills, and also improve classroom interactions and student outcomes (Brown et al., 2017; Jennings et al., 2017; Jennings, Minnici, and Yoder, 2019; Roeser et al., 2013).

Prevention Strategies

Some school-based interventions foster healthy MEB development by focusing on the prevention of specific behavioral health conditions that affect individuals—such as disruptive behavior disorders, anxiety, posttraumatic stress, depression, and substance use disorders—as well as problems that affect the broader school community and result from multiple individual, social, and system conditions, such as bullying, violence, and suicide. While some school-based prevention programs have focused mainly on one disorder, researchers increasingly have been examining multiple outcomes and developing programs aimed at both promoting healthy development and preventing MEB disorders.

Disruptive Behavior

School-based interventions to prevent disruptive behavior include universal, selective, and indicated approaches and are frequently delivered during the elementary school years. Universal approaches (e.g., the Good Behavior Game, described in Box 4-3) are often integrated into general school practices.

Interventions classified as social-emotional learning programs, discussed above in the context of MEB health promotion, also often have a goal of reducing disruptive behavior. For instance, multiple studies have shown that the Promoting Alternative Thinking Strategies Program not only improves social and emotional outcomes for children but also reduces aggressive and disruptive behavior (National Research Council and Institute of Medicine, 2009). Other programs for which there is evidence of effectiveness include

- The Incredible Years Training Series, programs designed to reduce disruptive behavior and improve social-emotional learning and self-regulation in children ages 0–12 (Baker-Henningham et al., 2012; Hutchings et al., 2013; Kirkhaug et al., 2016; McGilloway et al., 2010);
- INSIGHTS into Children’s Temperament, an intervention that teaches students, teachers, and parents about temperament differences and how best to support healthy development for children of different temperaments (O’Connor et al., 2014);
- Anger Coping/Coping Power, a cognitive-behavioral intervention with school and parent components, targeted at reducing aggressive or disruptive behavior (Lochman et al., 2013);
- First Step to Success, a 3-month school- and parent-focused intervention for students in grades 1–3 with externalizing problems (Sumi et al., 2013; Walker et al., 2009); and
- Fast Track, an intensive school-based intervention targeting kindergarten children identified as at risk for behavior problems (Albert et al., 2015).

BOX 4-3 **The Good Behavior Game**

The Good Behavior Game is a universal classroom-based approach for preventing behavior problems in the elementary grades. Based on social learning principles, the program involves teams of students in a class who compete to display the most instances of on-task, prosocial behavior during specified times (while playing games that are part of the program). The program has been widely implemented and tested in the United States and other countries, and researchers have documented positive impacts on student behavior, as well as long-term effects, such as reduced initiation of tobacco and alcohol use and reduced high-risk sexual behaviors and substance use disorders in young adulthood (Bowman-Perrott et al., 2016; Kellam et al., 2014; Van Lier, Huizink, and Crijnen, 2009). A variation on the original curriculum, the PAX Good Behavior Game includes verbal and visual cues to promote prosocial behaviors. Robust evidence indicates that this approach has benefits for reducing behavior problems and promoting prosocial behavior (Embry, 2003; Jiang et al., 2018; Smith et al., 2018).

Anxiety Disorders

School-based programming focused on anxiety prevention has often been delivered in the elementary grades because anxiety disorders begin to emerge in childhood, with the onset of specific phobias and separation anxiety disorder being more common in children and the onset of generalized anxiety disorder and panic disorder being more common in late childhood and adolescence (Burstein et al., 2012). Anxiety prevention programs are most commonly delivered in a group format with a focus on cognitive-behavioral strategies; both universal and selective approaches have been used.

Systematic reviews and meta-analyses of these programs have generally reported small but significant effects in reducing anxiety symptoms immediately following programming (Ahlen, Lenhard, and Ghaderi, 2015; Corrieri et al., 2014; Fisak, Richard, and Mann, 2011; Neil and Christensen, 2009; Werner-Seidler et al., 2017). Some reviews have found that indicated approaches had more robust effects than universal approaches did (Stice et al., 2009; Teubert and Piquart, 2011), whereas others have found no differences related to prevention level (Werner-Seidler et al., 2017). Intervention benefits also have not been found to differ as a function of program delivery by school personnel versus external facilitators (mental health professionals or research staff) (Ahlen, Lenhard, and Ghaderi, 2015; Werner-Seidler et al., 2017), a promising finding with respect to the potential for sustainability and scale-up. Other reviews have found that delivery by an external facilitator was more effective (Fisak, Richard, and Mann, 2011; Stice et al., 2009; Teubert and Piquart, 2011), but these findings may have been influenced in part by the fact that indicated programs were more likely to use mental health professionals as facilitators given the higher symptom levels of participants (Ahlen, Lenhard, and Ghaderi, 2015; Stice et al., 2009).

Cognitive-behavioral approaches are the most commonly used interventions in school-based anxiety prevention programs. Some studies, however, have evaluated the potential of other approaches, such as interpersonal and mindfulness programs.¹⁰

Posttraumatic Stress Disorder and Trauma

The effects of traumatic events and adverse experiences on the development of children and youth can be profound (see Chapter 2). In addition to the effects on a student's biological and MEB development, these adverse experiences have been shown to be related to negative changes in academic performance, school attendance, disciplinary referrals, and graduation rates, which are outcomes of high priority for educators (Kataoka et al., 2012; Strøm et al., 2016). Prevention

¹⁰Examples include the FRIENDS Program (Barrett, 2010), the Coping Cat/C.A.T. Program, Cool Kids/Cool Kids Chilled, and Social Effectiveness Training for Children (SET-C).

programs have been developed to support students who have undergone these experiences (Santiago, Raviv, and Jaycox, 2018).

A systematic review of school-based interventions for symptoms of posttraumatic stress disorder found 16 studies that used cognitive-behavioral therapy, 11 of which had effect sizes in the medium to large range (Roflfsnes and Idsoe, 2011). Other approaches studied included Eye Movement Desensitization and Reprocessing, play and art therapy, and Mind-Body Skills, all of which showed promising results. This review found as well that school professionals could deliver these trauma interventions feasibly and effectively.¹¹

The importance of schools in providing access to prevention services is supported by evidence from Jaycox and colleagues (2010). They compared two effective trauma interventions—one delivered in schools and the other in a clinical setting—and found that 91 percent of those randomly assigned to receive services in a school completed the intervention, compared with only 15 percent of those assigned to receive care in a clinic.

More recent studies have examined classroom interventions for traumatized youth in urban schools in the United States and youth experiencing war and political violence outside the United States. The Mindfulness Stress Reduction Program, a 12-week curriculum originally created for adults and adapted for students in grades 5–8, teaches mindfulness, meditation yoga, and mind–body connection (Sibinga et al., 2016). In an RCT, the students who completed this program showed greater improvements in posttraumatic stress and depressive symptoms relative to those randomized to a health education program.

Similarly, an evaluation of a universal classroom curriculum for youth exposed to war trauma, consisting of psychoeducation, skills training, and resiliency strategies for traumatic stress combined with strategies to reduce stereotyping and discrimination, found improvement in posttraumatic stress, depression, anxiety, and somatization, as well as a relationship between reduction in posttraumatic stress and decreased prejudicial attitudes toward minorities (Berger, Gelkopf, and Heineberg, 2012). A follow-up study showed positive effects for the teachers, decreasing their primary and secondary traumatic stress symptoms, in addition to improving their self-efficacy in helping other trauma survivors, their sense of hope for the future, and their use of positive coping strategies (Berger, Abu-Raiya, and Benatov, 2016). Another teacher-led classroom prevention program for adolescents exposed to war trauma taught teachers and school counselors strategies for enhancing students' self-efficacy and social support in a crisis following war. In an RCT, researchers found improvements in emotional symptoms and psychological distress, as well as mobilization of social support and self-efficacy, for those receiving the program compared with a control group (Slone, Shoshani, and Lobel, 2013).

Despite the strong and growing evidence of the negative effects of trauma and adverse experiences on the MEB development of children, few school-based

¹¹See also Chemtob, Nakashima, and Carlson (2002); Layne et al. (2008); and Stein et al. (2003).

trauma interventions have as yet been extensively evaluated using rigorous designs. Schools may be the ideal setting in which to deliver early interventions to prevent traumatic stress in youth, including promising strategies for whole classrooms that are delivered by teachers, as well as selective and indicated interventions that also can be delivered in schools. Studies of the feasibility and sustainability of trauma interventions in schools yielding evidence for better MEB outcomes, along with dissemination studies with diverse populations, would provide important information about opportunities for improvement at a population level.

Depressive Disorders

Prevention of depression is a key focus for school-based prevention programming. Given that the risk for depression begins to increase during adolescence, most school-based depression prevention programs are delivered in middle school in a group format and based on cognitive-behavioral therapy principles (e.g., Gillham et al., 2012; Rohde et al., 2015). Some programs have also been tested with high school students (e.g., Melnyk et al., 2013, 2015). Both universal and targeted approaches have been used. Several reviews over the past 10 years have evaluated trials of depression prevention programs delivered in schools (Calear and Christensen, 2010; Corrieri et al., 2014; Werner-Seidler et al., 2017). Other recent reviews have included depression prevention trials for children and adolescents more generally, with most but not all being conducted in schools (Ahlen, Lenhard, and Ghaderi, 2015; Das et al., 2016; Hetrick et al., 2015; van Zoonen et al., 2014).

Studies assessing factors that may moderate the impact of school-based depression prevention have yielded mixed results. As with interventions focused on prevention of anxiety, for example, some reviews have found that program effects do not differ significantly regardless of whether programs are delivered by external facilitators, such as mental health professionals, research staff members, or school personnel such as classroom teachers (Ahlen, Lenhard, and Ghaderi, 2015), whereas others have found better outcomes with external facilitators (Calear and Christensen, 2010; Werner-Seidler et al., 2017). Some reviews have found larger effect sizes for indicated versus universal programs (Calear and Christensen, 2010). There is also some heterogeneity in the intervention outcomes assessed; most studies have assessed depressive symptoms as the outcome, but some studies have generated evidence for significant prevention effects on depression incidence (Merry et al., 2011).

Prevention programs generally have shown small but statistically significant effects in reducing depressive symptoms in children and adolescents (Ahlen, Lenhard, and Ghaderi, 2015; Calear and Christensen, 2010; Corrieri et al., 2014; Merry et al., 2011; Stice et al., 2009; Teubert and Piquart, 2011; Werner-Seidler et al., 2017). There is consistent evidence that small but significant benefits of depression prevention interventions were sustained over follow-up periods of less

than 1 year, but several reviews found that benefits generally were not maintained over longer periods (Ahlen, Lenhard, and Ghaderi, 2015; Kavanagh et al., 2009; Merry et al., 2011; Stice et al., 2009; Werner-Seidler et al., 2017). A recent integrative data analysis of 19 adolescent depression trials testing nine interventions through 2-year follow-up, however, found a significant overall effect on reduction of depressive symptoms at 2 years (Brown et al., 2018). This study indicated stronger effects for interventions that specifically targeted depression, rather than problem behaviors or general mental health, and for youth with elevated depressive symptoms.

Substance Use Disorders

School-based interventions to prevent substance use are generally delivered in middle or high school, the ages when many young people begin to experiment with smoking, alcohol, and illicit drugs. Most substance use prevention programs have targeted tobacco, alcohol, marijuana, or illicit drugs specifically, although some have targeted substance use more generally.

Systematic reviews and meta-analyses of school-based programs targeting tobacco use have reported mixed findings. A meta-analysis of 16 trials of smoking prevention programs for girls did not find overall evidence for efficacy (de Kleijn et al., 2015). Another meta-analysis of smoking prevention programs found no effect for the pooled trials at 1-year follow-up or prior but did find a modest reduction in smoking initiation (Thomas, McLellan, and Perera, 2015). This review also found that intervention curricula based on teaching skills derived from theories of social competence and social influences produced significant gains at both follow-ups. Consistent with that finding, Flay and colleagues had earlier observed that school-based smoking prevention programs based on these theories were more likely to be effective than other approaches and that intervention characteristics associated with success also included 15 or more sessions, starting program delivery in upper elementary or middle school and continuing into high school, and involving older peers (Flay, 2009). These reviews did not, however, address the potential of social competence and influence theories to prevent alcohol and illicit drug use.

With respect to programs targeting alcohol, one meta-analysis of interventions to reduce alcohol use in adolescents found that brief school-based interventions were effective in reducing adolescents' alcohol use relative to controls (Hennessy and Tanner-Smith, 2015). Effectiveness was greatest with a motivational enhancement approach and with individual versus group programs. As most motivational enhancement programs were delivered individually, however, it was unclear whether group formats were not effective, or effective alcohol intervention strategies had not yet been used in a group format (Hennessy and Tanner-Smith, 2015). Another meta-analysis showed that program impacts were not affected by the intensity of program dosage or by program delivery in junior high versus high school (Strøm et al., 2014). Agabio and colleagues (2015) identified the Unplugged Program, an intervention delivered and tested in Europe,

as the alcohol prevention program with the most robust evidence base in the European context. Fewer school-based programs have targeted marijuana and illicit drug use in isolation. A meta-analysis of cannabis prevention programs did find small but significant effects, but not on intentions to use or refusal skills (Lize et al., 2017).

Systematic reviews and meta-analyses highlight that diverse strategies can be effective for substance use prevention, although not all strategies are equally beneficial across different types of substances. For instance, a recent meta-analysis found benefits for multicomponent school interventions—approaches that went beyond health education curricula to address social determinants of health, such as by altering the physical or social school environment or promoting health schoolwide (Shackleton et al., 2016). Multicomponent interventions were found to be effective in reducing smoking, but evidence for their impact on alcohol or drug use was limited. Approaches that integrate health-based education in substance use prevention skills within broader academic curricula also appear promising (Melendez-Torres et al., 2018). Another study found support for the effectiveness of universal resilience-building interventions aimed at enhancing at least one individual and one environmental protective factor for youth ages 5–18 in reducing illicit substance use, but not tobacco or alcohol use (Hodder et al., 2017). Peer interventions delivered in schools may also be an effective strategy for reducing the likelihood of using tobacco, alcohol, and illicit drugs (MacArthur et al., 2016).

The developmental timing of school-based substance use prevention merits careful attention. Onrust and colleagues (2016) attempted to resolve inconsistencies in the substance use prevention literature by assessing 288 universal and targeted programs for four different age groups (elementary school, early adolescence, middle adolescence, and late adolescence). Their findings were broadly consistent with prevailing hypotheses; they found that while some prevention strategies were effective across multiple age groups, most had differential effects based on the age group to which they were delivered. Across multiple age groups, students participating in universal interventions showed improvements in self-control, problem solving, and cognitive-behavioral skills, and students participating in targeted interventions showed improvements in social influence skills, refusal skills, and health education. However, the impact of other approaches varied significantly by participants' ages. For instance, programs that explicitly included training related to substance use (e.g., refusal skills) were not effective with elementary school children, whereas training in basic social, self-control, and problem-solving skills worked well with that age group. By contrast, late adolescents benefited from universal programs that taught refusal skills using a social influences approach, consistent with the emphasis in late adolescence on developing one's identity (Onrust et al., 2016) (see Box 4-4 for an example).

Bullying

Over the past decade, awareness has grown of the deleterious effects of bullying and cyberbullying—a subset of bullying that involves using electronic or digital media to hurt or socially isolate a victim—on students’ social, emotional, and academic development.¹² It is estimated that between 18 and 31 percent of youth have experienced bullying in school, and 5 to 15 percent of youth have experienced cyberbullying. Some subgroups of young people are at particular risk; for instance, data suggest sexual minority and gender minority youth experience bullying victimization significantly more often than do heterosexual and cisgender youth (Reisner et al., 2014; Robinson, Espelage, and Rivers, 2013). Many states have passed antibullying legislation, and bullying prevention programs have been instituted in schools across the country (see Box 4-5 for an example). A number of the social-emotional learning interventions and universal interventions aimed at preventing disruptive behaviors discussed above also can prevent bullying; this section reviews only those programs for which outcomes related to bullying have been specifically measured.

Researchers have examined school-wide efforts to address bullying and support affected students (National Academies of Sciences, Engineering, and Medicine, 2016). The authors found that the most effective bullying prevention programs include multiple components and are implemented schoolwide, meaning that all school staff, teachers, and administrators adopt the practices within a school. The report also cautions that certain practices and policies, such as routine use of out-of-school discipline, as is seen with zero tolerance policies, should not be the primary strategy for responding to bullying incidents. Given the power differential inherent in bullying, peer mediation and encouraging students who have been targeted by bullying to “fight back” may also be harmful practices.

Several recent meta-analyses of school-based bullying prevention programs have shown small to moderate effects (Jiménez-Barbero et al., 2016; Lee, Kim, and Kim, 2015; Yeager et al., 2015), with stronger results for the more recently published studies (Jiménez-Barbero et al., 2016). Although some meta-analyses have found that bullying prevention programs that target younger children were more effective (Yeager et al., 2015), others have found that programs for older students did better (Jiménez-Barbero et al., 2016). Lee and colleagues (2015) found that those studies that taught emotional control had larger effect sizes on victimization than those without this training. Ttofi and Farrington (2011) conducted a meta-analysis of 44 studies and found that school-based bullying

¹²The Centers for Disease Control and Prevention defines bullying as “any unwanted aggressive behavior(s) by another youth or group of youths who are not siblings or current dating partners that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated. Bullying may inflict harm or distress on the targeted youth including physical, psychological, social, or educational harm” (Gladden, 2014, p. 7).

BOX 4-4
Life Skills Training (LST)

LST is a school-based group intervention designed to prevent adolescent use of substances including alcohol, tobacco, marijuana, and other psychoactive drugs. Based on social learning theory and problem behavior theory, LST targets malleable risk and protective factors associated with substance use and misuse and aims to enhance positive youth development. The program promotes personal competence and self-management skills (e.g., problem solving, decision making), social competence and social skills (e.g., communication skills), and drug resistance (e.g., refusal skills, assertiveness). LST is one of the most widely studied and broadly disseminated substance use prevention programs and has been used in more than 30 countries. It has been tested with diverse age groups, populations, and program facilitators. While some studies have not found LST to be effective (Gorman, 2011; Luna-Adame, Carrasco-Giménez, and Rueda-García, 2013), the preponderance of evidence supports its short- and longer-term efficacy for substance use prevention, with effects found for students with diverse ethnic and socioeconomic backgrounds (Botvin and Griffin, 2014). LST is a good example of a program that is effective at targeting multiple outcomes—not only use of multiple types of substances but also other health risk behaviors, including violence-related behaviors.

BOX 4-5
Steps to Respect

Steps to Respect is a bullying prevention curriculum for grades 3 through 5 designed to decrease bullying and destructive bystander behaviors and improve prosocial beliefs and social emotional skills by increasing staff awareness of and responsiveness to bullying, promoting socially responsive beliefs, and teaching social-emotional learning skills. An assessment of results documented benefits, such as changes in students' attitudes about bullying, increases in their inclination to intervene to support a friend, and greater adult responsiveness (Frey et al., 2005). Results for other indicators were mixed, but a later study found significant differences in student perceptions of school climate and lower rates of physical bullying (Brown et al., 2011).

prevention programs lowered bullying by 20 to 23 percent and victimization by 17 to 20 percent. They concluded that more intensive programs, those with parent involvement, and those that involved greater playground supervision were more effective. Evans and colleagues (2014), however, concluded from their systematic review of school-based bullying prevention programs that results were mixed; 45 percent of studies showed no program effects on bullying perpetration, and the

authors question the measurements in studies of programs that did show effects. They note that the program with the strongest effects was from Finland and was tested on a homogeneous population; when bullying prevention programs have been tested in the United States with culturally diverse youth, results have been mixed.

Another meta-analysis focuses on bystanders, defined as those who witness bullying but do not participate on behalf of either the bully or the victim. Research on the role of bystanders in the social context of bullying has shown that intervening with bystanders can be key, given that they represent such a large proportion of students (Polanin, Espelage, and Pigott, 2012).

A recent meta-analysis of the relationship between bullying and victim suicide indicated that bullying is related to both suicidal ideation and attempts, and that cyberbullying is more strongly associated with suicidal ideation than general bullying is (Van Geel, Vedder, and Tanilon, 2014). Given the relatively recent identification of this latter type of bullying, few studies have been conducted on its prevention. However, evidence suggests that general bullying prevention can also decrease cyberbullying and cyber victimization (Grading et al., 2015).

Violence

As schools attempt to maintain a safe and supportive campus, strategies for violence prevention can be of utmost importance. Schools are relatively safe places, with less than 2.6 percent of all youth homicides occurring on a school campus (Zhang, Musu-Gillette, and Oudekerk, 2016).¹³ However, about 20 percent of students report being bullied at school, and 7.8 percent are involved in a physical fight (Kann et al., 2016).

Schools have a number of strategies for preventing violence before it happens through universal prevention programs, such as those that target disruptive behaviors and bullying, discussed earlier. In addition, a number of interventions that prevent substance use disorders also prevent aggression and violent behavior (Bavarian et al., 2013, 2016; Botvin, Griffin, and Nichols, 2006). A recent meta-review of youth violence prevention programs (Matjasko et al., 2012) found that school-based programs consisting of classroom curricula and peer mediation, conflict resolution, and conduct behavior modification programs generally had moderate to strong effects on youth violence-related outcomes.

Despite evidence of effective MEB health promotion and MEB disorder prevention programs, schools continue to use out-of-school discipline, such as suspension and expulsion, inappropriately for such common disruptive behaviors as defiance and noncompliance. School staff also mete out discipline unevenly,

¹³Although multiple-victim shootings in the United States are on the rise in general, that is not the case in schools. There is an average of about one per year across the nation's 100,000 schools. In the 1992–1993 school year, about 0.55 students per million were shot and killed; in 2014–2015, that rate was closer to 0.15 per million (Fox and Fridel, 2019).

disproportionately disciplining African American youth (Skiba et al., 2014). For example, although African American males make up just 8 percent of U.S. enrolled students, they represent 25 percent of students with suspensions (U.S. Department of Education Office for Civil Rights, 2014). Some link high and disproportionate rates of out-of-school discipline for African American students with other forms of social disadvantage (Meek and Gilliam, 2016). Increasing the use of strategies to improve school climate and social-emotional learning may mitigate overuse of out-of-school discipline (Osher et al., 2010); national policy recommendations outline nondiscriminatory administration of school discipline (U.S. Department of Justice and U.S. Department of Education, 2014).

Another alternative to out-of-school discipline has been the dissemination in schools of restorative justice practices, which are based on practices observed in indigenous communities (Anfara, Evans, and Lester, 2013; Johnstone, 2011). This approach involves fostering dialogue between students involved in a conflict and encouraging participation of victims and offenders in resolving a conflict (Zehr, 2002). Although no rigorous evaluations of restorative justice practices have yet been published, practice-based evidence indicates that reductions in suspensions and referrals for violent behavior may be attributable to these practices, which are becoming increasingly common in the United States. Further research in this area would be a valuable contribution (Davis, 2014; Song and Swearer, 2016).

Schools have access to a range of strategies for responding to violence and other school crises, although there is little empirical evidence of effectiveness for many of these strategies (Kataoka et al., 2012). One promising crisis response strategy in schools is Psychological First Aid, a brief teacher-led intervention that provides guidance for teachers to enhance their connectedness with students following a crisis (Pynoos and Nader, 1988; Ramirez et al., 2013; Schreiber, Gurwitch, and Wong, 2006). In a 2012 RCT, the Virginia Student Threat Assessment Guidelines for determining next steps following a student threat of violence were compared with care as usual (Cornell, Allen, and Fan, 2012). Use of this threat assessment tool led to greater use of mental health services, better engagement with parents, and fewer school suspensions among students making these threats. Further research is needed to guide schools regarding best practices before, during, and after a school crisis.

Researchers have also focused on interventions to prevent teen dating violence. Box 4-6 describes an example of one such intervention. Teen dating violence is common, affecting 21 percent of female and 10.4 percent of male adolescents who date (Vagi et al., 2015). Interventions to support the development of healthy relationships in early adolescence are important, especially given that teen dating violence predicts later heavy episodic drinking, depressive symptoms and suicidality, smoking, and intimate partner violence as a young adult (Exner-Cortens, Eckenrode, and Rothman, 2013). Low and colleagues (2013) offer a social-ecological model of risk and protective factors for dating violence. These include individual factors such as attitudes about violence and myths about rape,

family factors such as parenting style, exposure to violence and maltreatment, peer support of dating violence, and school policies.

School-based preventive interventions for teen dating violence are universal, with educational components that attempt to change the school culture by promoting respect and lessening aggression. A meta-analysis of 23 studies of interventions to prevent teen dating violence among middle and high school students found improvements in knowledge and attitudes but not consistent changes in rates of dating violence and victimization (De La Rue et al., 2016). Another study, however, did document change in dating violence behavior (Miller et al., 2013). In *Coaching Boys Into Men*, high school male athletes received weekly, brief violence prevention messages from their trained athletic coach (Miller et al., 2012). At 1-year follow-up, youth in the intervention compared with those in the control group perpetrated less dating violence and engaged in less negative bystander behavior (Miller et al., 2013).

BOX 4-6 **Safe Dates**

Safe Dates is a 10-session dating violence prevention program implemented with middle and high school students that is designed to shift gender-based expectations and reduce physically violent dating behaviors (Foshee et al., 2005). Topics covered include defining a caring relationship and dating abuse, why people abuse, helping friends, gender stereotypes, equal power through communication, how we feel/how we deal, and preventing sexual assault. The school component incorporates a theater production on dating violence and a poster contest. Researchers have demonstrated effects including reductions in reported peer violence victimization, weapon carrying, and peer violence perpetration.

Overall, a wealth of school-based prevention strategies can address youth violence broadly, with multiple interventions showing positive effects on various types of violence (Foshee et al., 2014) and on high-risk behaviors associated with youth violence, including delinquency, substance use, and sexual risk behaviors (Beets et al., 2009; Botvin, Griffin, and Nichols, 2006; David-Ferdon and Simon, 2014). Cross-cutting prevention strategies that result in the prevention of multiple health risk behaviors may be the most efficient targets for the limited resources available in schools.

Suicide

The suicide of a student, although a rare event, can have devastating repercussions on a campus and pose a minor but significant risk of social contagion (Gould, Jamieson, and Romer, 2003). Unfortunately, as discussed in

Chapter 2, suicide among adolescents has been rising over the past decade (Simon, 2017), and it was recently estimated to be the second leading cause of death among adolescents and transitional-age youth (those ages 15–24) (Centers for Disease Control and Prevention, 2014). Among girls ages 15–19, the rate of suicide doubled from 2007 to 2015 (Centers for Disease Control and Prevention, 2014; De Silva et al., 2013; Katz et al., 2013). Rates of suicidality and depressive symptoms were also found to be higher in sexual minority as compared with heterosexual adolescents, and the increased risk for sexual minority youth persists through the transition to adulthood (Marshall et al., 2013).

In a recent review of school-based suicide prevention programs, the authors conclude that data in support of suicide prevention in schools are limited, with only two programs—Signs of Suicide and the Good Behavior Game—demonstrating effects on reducing suicide attempts (Katz et al., 2013). Signs of Suicide, which has been studied in middle and high school students, aims to increase knowledge and attitudes about depression, encourage individual and peer help-seeking, reduce stigma around mental illness and help-seeking, engage teachers and parents in gatekeeping activities, and encourage schools to expand mental health partnerships and services (Aseltine and DeMartino, 2004; Schilling et al., 2014). Evaluation of this suicide intervention at 3-month follow-up found that those who received Signs of Suicide were 64 percent less likely to report a suicide attempt compared with the control group and had improved knowledge and attitudes about intervening with friends who were suicidal. They were also more likely to seek help themselves (Schilling, Aseltine, and James, 2016).

The Good Behavior Game, discussed earlier (refer to Box 4-3), although not developed with the explicit aim of reducing youth suicidal thoughts, behaviors, or attempts, has been found to have multiple long-term benefits for participating young people. For instance, a young adult follow-up of students who had participated in the Good Behavior Game during elementary school found reductions in suicidal ideation and attempts for both males and females (Wilcox et al., 2008).

School Dropout

Dropping out of school has long-term adverse impacts over the life course, and there are persistent racial and socioeconomic disparities in high school graduation rates (McFarland et al., 2019; Rumberger, 2011; Rumberger et al., 2017). Some dropout prevention programs target individual students or small student groups, whereas others target whole schools. A meta-analysis of general dropout prevention programs (152 studies) showed that programs generally increased high school completion if implemented with fidelity, but that no particular program or approach emerged as clearly superior (Wilson et al., 2011). However, findings from the Institute of Education Sciences What Works Clearinghouse (Rumberger et al., 2017) and work by other researchers (Mac Iver and Mac Iver, 2009) indicate that specific approaches may be particularly beneficial, including early interventions, whole-school multitiered systems of

support, and multicomponent programs suitable for reaching different subgroups of youth at risk for high school dropout.

Relatively few programs have these features: most interventions are currently single-component, address individual students or small groups, and are delivered in high school (Freeman and Simonsen, 2015). There is a need for more multitiered approaches that address distinct subgroups of youth to be implemented and rigorously evaluated. Strategies to promote academic achievement and readiness for employment or postsecondary education are also critical, as standardized testing data indicate that many students are not proficient at core academic competencies (McFarland et al., 2019), and many high school graduates are deficient in key skills for future success. Integration of programs to prevent emotional and behavioral problems with dropout prevention and academic achievement promotion strategies—and assessment of emotional, behavioral, and academic outcomes—is also an important direction for future research, so that programs can be well aligned and efficiently integrated within school settings.

POSTSECONDARY SETTINGS

Prevention strategies have also been developed and tested in higher education settings. College-age young people often live apart from their families and have increasing independence to make decisions about their own lives. Those attending college are generally exposed to many opportunities to engage in potentially harmful behavior, including alcohol and drug use and risky sexual behavior. This is also a period of life when the onset of such psychiatric disorders as depression and anxiety is common and can have serious negative impacts on academic and social functioning.

Most preventive interventions in the college setting target alcohol use. In a meta-analytic review of 41 RCTs that examined strategies to prevent and reduce alcohol use in the first year of college, many programs were found to be efficacious for reducing alcohol use and related problems (Scott-Sheldon et al., 2014). The inclusion of such features as personalized feedback and goal setting was associated with better outcomes. By contrast, meta-analytic reviews have concluded that interventions targeting social norms (Foxcroft et al., 2015) or using motivational interviewing (Foxcroft et al., 2016) have no meaningful benefits for preventing alcohol misuse in young people up to age 25. Reviews have also evaluated features of intervention delivery that may be differentially associated with outcomes. For instance, a narrative review found that interventions targeting young adults' expectations regarding the likely outcomes of alcohol use were most effective when delivered to all-male student groups (Labbe and Maisto, 2011). A meta-analytic review comparing computer-delivered and face-to-face alcohol interventions reported superior performance for the latter (Carey et al., 2012). And a review of only seven mobile interventions to prevent and reduce risky drinking in college students notes variable findings and concludes that further development and testing of mobile interventions is needed (Berman et al., 2016).

Interventions have also addressed mental health, with a focus on depressive and anxiety symptoms and stress. A meta-analysis of universal mental health prevention programs in higher education identified 103 RTCs of interventions for college, graduate, and professional students (Conley, Durlak, and Kirsch, 2015). Skills-training programs with opportunities for supervised practice showed promising effects on psychological symptoms and outperformed both skills-training programs without supervised practice and programs that provided psychoeducation (Conley, Durlak, and Kirsch, 2015).

Some prevention programs addressing psychological symptoms are delivered using technology. A systematic review and meta-analysis of 17 RCTs of computer- or web-based interventions to prevent depression, anxiety, or stress found significant overall effects for these interventions when compared with inactive controls (i.e., those receiving no treatment) but not active controls (i.e., those who received materials designed to mimic the attention received by participants assigned to an intervention) (Davies, Morriss, and Glazebrook, 2014), which suggests that benefits may not relate to hypothesized core intervention components. A more recent meta-analysis of technology-delivered preventive interventions in higher education identified 22 universal and 26 indicated interventions as well supported; indicated interventions that provided support in person, online, or via e-mail produced better outcomes than those that did not (Conley et al., 2016).

Very few suicide prevention programs have been tested in higher education. A 2014 Cochrane systematic review identified only eight studies testing interventions for the primary prevention of suicide in postsecondary students (Harrod et al., 2014). Included studies were heterogeneous with respect to design, content, and findings. Five of the studies had a high risk of bias, and the authors concluded that the evidence was not sufficient to support any suicide prevention program or policy.

SUMMARY

Because young people spend so much of their time in school and are significantly influenced by their school experiences, this is a critical setting for efforts to both promote healthy MEB development and prevent MEB disorders. A wide variety of research has explored efforts for students from preschool through postsecondary education, although the research varies somewhat in rigor, and certain areas have been studied more comprehensively than others. Findings consistently indicate that school-based interventions for promotion of MEB health and prevention of MEB problems are both feasible and beneficial. A great deal of work remains to be done in determining how best to integrate different evidence-based intervention approaches so that they can be delivered across development and can efficiently target multiple risk and protective factors that promote MEB health across multiple social, emotional, and behavioral domains.

CONCLUSION 4-1: Evidence suggests that many strategies delivered in school settings for promoting mental, emotional, and behavioral (MEB) health and well-being and preventing MEB disorders and behavior problems achieve positive outcomes that last for years. Promising approaches include

- strategies designed to teach children at the preschool through grade 12 levels social and emotional skills, including cognitive-behavioral and mindful awareness practices;
- strategies for promoting a positive school environment by influencing the behavior of teachers and staff and such school policies as antidiscriminatory disciplinary practices;
- strategies that promote access to services for low-resourced populations and communities; and
- educational and skills-based strategies targeting multiple health-risk behaviors, such as bullying, substance use, and suicidal thoughts—particularly approaches that include multiple components and are implemented schoolwide.

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Strategies for Health Care Settings

Visits to a medical office or clinic provide an ideal opportunity for delivering many kinds of supports for children’s mental, emotional, and behavioral (MEB) health and development. In pediatric primary care settings, children are seen on repeated occasions for well-child care, at which time parents may receive education and support (anticipatory guidance). Clinicians have a chance to build trusting relationships with patients and their families during frequent well-child visits in the first 2 years, and perform less frequent surveillance and scheduled periodic assessments for healthy development of children thereafter (Leslie et al., 2016). Also important is the frequent contact that pregnant and postpartum women have with the health care system, where they can receive guidance for safe gestation and preparation for supporting healthy child development, as well as early intervention for such risks as parental depression and concerning lifestyle and home environments at a time when the fetus and child are undergoing rapid brain development (Shonkoff et al., 2012). Care that addresses the family as a unit can help foster the parent–child connection and the resilience of children and families.

Indeed, health care settings provide opportunities to support families at every stage that have the potential to influence a child’s MEB development—from before conception and throughout development, including

- preconception and prenatal health care involving both mother and father;
- child health care starting at birth and extending into young adulthood, including well-child care as well as care for acute and chronic conditions;
- health care for adolescents and young adults in the childbearing years; and
- parental health maintenance.

This array of opportunities could have a significant impact, but there is a notable gap between these possibilities and the reality of many health care settings. Neither health care personnel nor the health care system take full advantage of the opportunity to contribute systematically to improvement of the

MEB development of children and youth. Overall rates of developmental screening and surveillance remain low (Coker, Shaikh, and Chung, 2012; Hirai et al., 2018). Barriers to success also include a paucity of behavioral training for health professionals to carry out this work in primary care settings and low levels of reimbursement for preventive and behavioral pediatric care in office-based settings. Further, the health care system is not equipped to improve MEB health in children on its own and would benefit from partnerships with other community efforts.

While efforts to comprehensively improve child MEB development are not yet regularly included in health care for children, youth, and families, there is growing interest in how this might be accomplished. For example, interdisciplinary teams in primary care allow practices to attend more easily to all dimensions of health, including MEB development (Boat et al., 2016; Leslie et al., 2016). These teams often include

- physicians from various disciplines, such as pediatrics, family medicine, obstetrics/gynecology, and psychiatry;
- nurses and advance practice nurses;
- clinical psychologists and other behavioral health professionals;
- social workers, particularly those with behavioral health training and experience; and
- parent counselors, community health workers, peer parenting advocates, and other paraprofessionals.

Efforts to integrate primary child health care clinics and home visitation programs can enhance previsit planning of well-child visits in order to ensure that those visits address family needs and concerns, and also provide a way to monitor and enhance family attention to health care plans. Another example is embedding child, parent, and family community services into health care settings to provide “one-stop shopping” to address family MEB health needs. A third example is health care systems that partner with preschool and school health care programs. In this chapter we review the possibilities for universally fostering MEB health in health care settings, beginning with preconception health care. We close with a summary discussion of the issues that make this avenue for achieving population-level improvements challenging.

PRECONCEPTION HEALTH CARE

An important strategy to foster the MEB health of children and youth is to optimize the physical, behavioral, and social health of prospective parents and minimize the risk of adverse pregnancy outcomes. This strategy has been termed “three-generation health” because it has potential benefits for parents, their children, and those children’s future children (Cheng, Johnson, and Goodman,

2016). However, few evidence-based programs based on this strategy have been developed and implemented.

There are a number of challenges for delivering care that directly benefits the health of future parents. Young people in general participate in organized health care inconsistently, and participation is least likely among adolescent and young adult males. Young women seek care in a number of health care settings, including gynecology, pediatric adolescent medicine, internal medicine, and family medicine. However, those who most need health surveillance and advice during the preconception period are the least likely to connect with the health care system (Bish et al., 2012). Family health care is often segmented across separate systems that serve children and adults. Discontinuity in insurance and funding programs and limited training programs for providers are additional challenges. Although schools and school health clinics provide an opportunity to improve preconception health (Charafeddine et al., 2014), the involvement of additional community partners, including public health systems, will likely be needed to bring preconception care to the populations who most need it (Shannon et al., 2014).

Nevertheless, preconception reproductive risk assessments in primary care settings have had some positive results. A systematic review of studies of multiple- or single-component interventions for preconception health assessment found evidence for improved maternal self-efficacy, locus of control, and risk behavior that are pertinent to mothers' ability to provide the nurturance children require, although the authors were unable to draw any conclusions about the effects of the interventions on adverse pregnancy outcomes (Hussein, Qureshi, and Kai, 2014).

Several public health models of preconception care have been proposed (Shannon et al., 2014). In 2004, the Preconception Health and Health Care (PCHHC) initiative extended the length of maternity care to include the period prior to pregnancy (Centers for Disease Control and Prevention, 2014). To reinforce this idea, the PCHHC initiative published *A National Action Plan for Promoting Preconception Health Care in the United States* (Floyd et al., 2013). This action plan provides a model for use by states, communities, and public or private organizations in strategic planning for preconception care projects.

The PCHHC initiative proposed measures for assessing preconception wellness and sharing information related to pregnancy intention and planning, access to care, preconception use of a multivitamin with folic acid, tobacco avoidance, controlling depression, healthy weight, the absence of sexually transmitted infections, optimal glycemic control in women with pregestational diabetes, and avoidance of medications that disturb the growth and development of a fetus (Frayne et al., 2016). Implementation and outcome reports for the PCHHC initiative will help determine whether increased attention to preconception health can foster safe, stable, and nurturing environments and healthy MEB development in children at a population level.

PRENATAL HEALTH CARE

Several MEB development risk factors are associated with the prenatal period. The most common of these is preterm birth (see Chapter 2); fetal exposures to toxic substances and maternal adverse health conditions also pose significant risks. Despite evidence that promotion of healthy pregnancy and prevention of in utero risks support healthy MEB outcomes in children, relatively modest progress has been made toward these goals. Therefore, more comprehensive access to medical surveillance and care for women in the early stages of pregnancy is an important opportunity to improve children's MEB health.

Preterm Birth

Overall, premature birth has occurred in nearly 10 percent of U.S. pregnancies over the last several decades and the United States has had among the highest prevalence of preterm births in the world (Blencowe et al., 2012). However, there are large disparities by race and ethnicity. Black women have a preterm birth rate that is 49 percent higher than that of white women (13.4% compared with 8.9%); Asians/Pacific Islanders have the lowest percentage of preterm births (8.6%) (March of Dimes, 2018). The percentage of preterm births for Hispanics is 9.2 percent, while that of American Indians/Alaska Natives is below the national average at 10.8 percent (March of Dimes, 2018).

Many children born prematurely are at high risk for concerning neurobehavioral outcomes that currently are not preventable, although recent work has focused on identifying therapeutic agents that may protect brain development in preterm babies (Mürner-Lavanchy et al., 2018; Schang, Gressens, and Fleiss, 2014). The causes are genetic and environmental factors (Zhang et al., 2018), and researchers are pursuing understanding of contributing biological pathways as well as means of detecting and mitigating the risk for premature birth.

The risk factors that are known to be associated with preterm birth include maternal inflammatory conditions (Cappelletti et al., 2016), smoking during pregnancy (Wisborg et al., 1996), maternal disordered sleep (Felder et al., 2017), maternal stress (Wadhwa et al., 2011), and maternal anxiety and depression (Staneva et al., 2015). Multiple pregnancies, which occur more frequently with assisted reproductive technologies, are more likely to result in preterm deliveries (Barri et al., 2011).

Each of these risk factors may be amenable to prevention interventions, but evidence for effective interventions is limited. Interventions that may be effective include

- a stress-coping software application for hospitalized pregnant women at risk for premature labor (Jallo et al., 2017); and
- providing financial supports to low-income families (Beauregard et al., 2018).

Other interventions have proved beneficial for supporting the health and development of preterm babies. These include home visiting programs that target parent–child interactions, which provide short-term benefits for the healthy development of preterm babies (see Chapter 9 for an example) (Goyal, Teeters, and Ammerman, 2013) and providing early intervention services for children born prematurely until their entry into school (Chung, Opiari, and Koolwijk, 2017).

Some positive results have been shown for efforts to provide universal and anticipatory health care and support reproductive choice starting before or early in pregnancy, and for community-level efforts to address health risks associated with preterm birth. For example, the banning of tobacco smoking in public spaces and workplaces and measures to improve access to long-acting reversible contraceptives have both been associated with declines in rates of preterm birth in European countries (Been et al., 2014; Cox et al., 2013; Mackay et al., 2012; Simón et al., 2017).

Adverse Exposures and Conditions

In utero exposure to a long list of toxins and medications, including tobacco smoke, alcohol, opioids, and other substances of abuse, and prescription drugs such as antiepileptics and antidepressants, is known to affect fetal brain development adversely and can interfere with children’s healthy MEB development. Maternal health problems that pose risks for the fetus include poor nutrition; obesity; stress; and mental disorders, especially anxiety and depression. Rigorous surveillance of maternal health is key to mitigating these risks, which reinforces the importance of prenatal health care starting from the earliest possible time after conception.

Some of these adverse exposures are better understood than others. For example, the adverse effects on fetuses and young children of exposure to any level of lead has received considerable attention (Committee on Obstetric Practice, 2012). Perhaps less well known is that maternal obesity prior to conception is associated with adverse neurobehavioral effects in the child, including attention deficit-hyperactivity disorder (ADHD), autism spectrum disorders, and cognitive delays (Harmon and Hannon, 2018), and is a risk factor for premature birth as well. Insufficient or rapid weight gain during pregnancy also has adverse effects on neurobehavioral outcomes (Aubuchon-Endsley et al., 2017). Optimal nutrition during pregnancy has many dimensions, and close monitoring by the health care system is an important means of tracking whether expectant mothers are progressing optimally in this regard. Women of low socioeconomic status are at greatest risk for suboptimal nutrition because of poor access to both healthy food and nutritional guidance by health care providers.

Perhaps the largest class of exposures is to legal and illegal drugs, including alcohol, nicotine, cannabis, psychostimulants, and opioids, which can cross the placenta and affect the brain development of a fetus and cause related harms. Some of these substances have effects at the molecular level that are different for the fetal brain than for adults, for example, and these effects may also interact

with environmental factors (Ross et al., 2015). Pregnant women who use such substances also frequently have MEB disorders, environmental stressors, and inconsistent prenatal care (Forray, 2016). Pregnant women's exposure to these substances is widespread, although it varies by substance. Estimates vary, but a 2015 overview of the data found that among pregnant women ages 15–44, approximately

- 5.9 percent used illicit drugs;
- 17 percent had used cigarettes within the previous month, and 12 percent smoked throughout their pregnancies,¹ with many more being exposed to secondhand smoke; and
- 12 percent reported having used alcohol within the previous month (Ross et al., 2015).

These exposures can cause a range of harms to the fetus, including to physical, cognitive, and emotional development, as well as an increased likelihood of low birthweight (Ross et al., 2015). The effects vary depending on the stage at which the fetus is exposed and other factors, but they can be severe; see Figure 5-1. Adverse developmental, cognitive, and behavioral outcomes related to fetal alcohol exposure have been estimated to affect 1.5 in every 100 children in the United States (Popova et al., 2016). This prevalence is approximately the same as that for autism spectrum disorder (Baio et al., 2018) and may be considerably higher in low-resourced populations (Bell and Chimata, 2015). Heavy consumption of alcohol also tends to be accompanied by poor nutrition, a factor that may contribute further to adverse fetal outcomes. Use of cocaine and amphetamines during pregnancy has been linked to adverse neurobehavioral outcomes for children and youth (Forray and Foster, 2015). Infants exposed to tobacco products in utero have demonstrated effects including irritability, poor self-regulation (requiring more caregiver attention), and other deficits; older children with such exposure show signs of attention deficit (Ross et al., 2015).

Evidence-based options for treating pregnant women who use potentially harmful substances during pregnancy or have substance use disorders exist, but are not currently adequate to address pregnant women's needs (Bishop et al., 2017). Treatment approaches including cognitive-behavioral therapy; a community reinforcement approach; brief screening, brief intervention, and referral to treatment; and 12-step programs and other types of support groups have been shown to be effective for various types of substance use, but in practice many facilities do not offer services tailored for pregnant women, and access is limited by a shortage of providers and other factors (Bishop et al., 2017).

¹A more recent estimate for the prevalence of smoking during pregnancy in the United States was 7 percent (Drake, Driscoll, and Mathews, 2018).

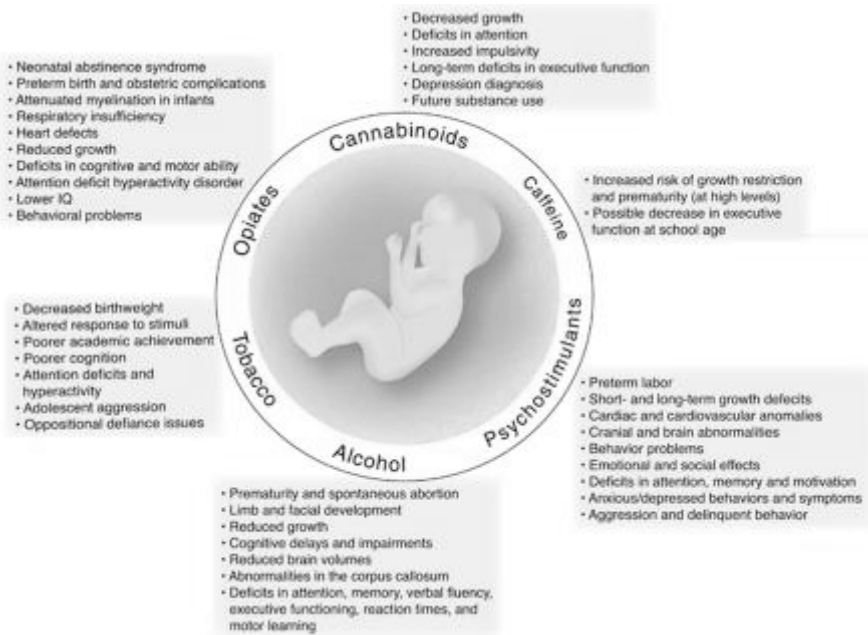


FIGURE 5-1 Deficits associated with fetal exposure to legal and illegal drugs. SOURCE: Ross et al. (2015).

The prevalence of smoking during pregnancy is concerning high, and this practice is associated with a well-known array of adverse outcomes, including stunted fetal and postpartum growth and more frequent cognitive and behavioral concerns, including ADHD. The available information about supporting pregnant women who smoke illustrates some of the challenges. Mothers who smoke may not be aware or acknowledge publicly that they are pregnant, delaying any options for intervening to prevent fetal exposure to smoke. E-cigarettes have been touted as a safer substitute for tobacco smoking, but e-cigarettes and other nicotine delivery devices have not been shown to be safer for pregnant women, and may eventually increase smoking for women of childbearing age (Klein, 2018). While studies of different interventions for smoking cessation show that monetary incentives may be the most effective, the rate of cessation of this addictive behavior is low with any intervention (Halpern et al., 2018).

Preventing potentially harmful substance use during pregnancy and mitigating harm to children are key objectives, and there is evidence of benefit for some efforts to do both. For example, preconception health care that includes self-care strategies for limiting alcohol consumption in sexually active women may contribute to reduced fetal exposure to alcohol. And early identification and introduction of targeted interventions for affected children show promise for improving functional outcomes and mitigating secondary behavioral disabilities

(Chasnoff, Wells, and King, 2015). Early developmental intervention programs for the children of substance-using mothers have also shown promise (Lowe et al., 2017; Maguire et al., 2016). As discussed above, opioid, cocaine, and other illicit substance use before or during pregnancy has adverse effects on the fetus and postpartum child. Preventing the initiation of use is likely to have greater impact than treating pregnant women already affected. The Youth Risk Index is a validated instrument for use in primary health care settings to target early teens; it detects initiation or risk for initiation of substance use and has considerable potential for prevention if linked to an effective intervention program (Ridenour et al., 2015).

Past policy approaches to potentially harmful substance use during pregnancy have included punitive legal measures that have proved ineffective and sometimes harmful in themselves (Bishop et al., 2017). More recently, the focus has been on public health approaches that emphasize mitigating harm and promoting access to evidence-based care and services (Bishop et al., 2017). However, further research is needed to fill in the picture of how developing babies are affected by combinations of circumstances that include mothers' substance use; the effectiveness of prevention and treatment options; and ways to increase public awareness of the potential risks of substance use in sexually active women, particularly those wishing to conceive.

Prenatal Parenting Education

Prenatal parenting education is an important tool for promoting healthy MEB development in children. One opportunity to provide prenatal parenting education is through classes organized by obstetric providers, including midwives. These widely popular classes focus on management of pregnancy and the birth process, but can also promote positive parenting. Prenatal visits at pediatric clinics, which are recommended by the American Academy of Pediatrics (AAP), are another opportunity to address the elements of positive parenting (Yogman et al., 2018). However, because this prenatal visit typically occurs only once during the pregnancy, its impact may be limited unless it is also linked to continuing discussion throughout postnatal visits. Parenting education within the health care system can be supplemented by evidence-based prenatal parenting programs such as Family Foundations and Centering Pregnancy (see Boxes 5-1 and 5-2, respectively).

**BOX 5-1
Family Foundations**

Family Foundations is a program designed by a clinical psychologist and prevention scientist to help parents maintain strong family bonds, reduce stress, and raise healthy children. Target outcomes include improved improvements in parents' teamwork, sensitivity, and warmth, as well as improvements in children's capacities for self-regulation, social competence, and academic skills (Family Foundations, n.d.). The program also aims to reduce rates of preterm birth, parental stress, maternal depression, parental conflict, and harsh parenting. Two randomized controlled trials have provided evidence of effectiveness.

**BOX 5-2
Centering Pregnancy**

Centering Pregnancy is a group prenatal care program that brings expectant mothers with roughly the same due dates to attend appointments together (Centering Healthcare Institute, 2019). The prenatal care follows the recommended schedule of 10 prenatal visits, but increases the length of visits as the women draw closer to their due dates. The expectant mothers participate in their care by taking their own weight and blood pressure and recording their own health data. Each woman also has private time with a provider. As part of each visit, the expectant mothers take part in facilitated discussions and activities meant to address timely health topics. This program has been found to increase compliance with prenatal visits, uptake of effective contraception, and breastfeeding among adolescent mothers (Trotman et al., 2015). There is also evidence that this program mitigates the effects of depression and prenatal distress on antepartum weight gain and postpartum weight retention (Magriples et al., 2015).

POSTNATAL HEALTH CARE

Primary health care currently offers the best opportunity to address children's early (0–3) MEB development at a population level. Nearly all children and their caregivers are seen in primary care settings for well-child visits, with multiple visits in the first 3 years of a child's life: the AAP recommends up to 13 such visits. These well-child checks have generally focused on physical and developmental health outcomes such as growth and immunizations, but tracking of children's socioemotional development is now increasingly being incorporated into pediatric primary care practice (Weitzman and Wegner, 2015). The most recent (fourth) edition of the AAP's Bright Futures guidelines, which are used by

primary care providers including pediatricians, family medicine physicians, and nurse practitioners, addresses elements of child care and includes more content than previous editions on attending to socioemotional outcomes for children.

Multidisciplinary and interdisciplinary primary care has gradually been embraced, first by clinics serving children from underresourced families, and more recently by private practices. Participants in this approach to comprehensive care include nurses and nurse practitioners, social workers, behaviorally trained practitioners including child psychologists, and parenting specialists. Inclusion of behavioral practitioners has been initiated through collocation or integration models that place these individuals geographically at the practice site or embed them in the practice (Stancin and Perrin, 2014). The objective of collocation of behavioral practitioners has been the provision of “one-stop shopping” for families of children with behavioral health disorders, and this development should facilitate activities targeting integrated MEB health promotion. (See the discussion of integrated behavioral and primary health care in the next section.) Only recently, however, has increased attention been paid to screening for behavioral disorders, such as autism spectrum disorders for young children and depression in adolescents, and screening of parents (largely mothers) for risks associated with negative parenting practices (Briggs et al., 2014; Dubowitz et al., 2011). For example, all children enrolled in Medicaid (currently approximately 40% of U.S. children) are supposed to be screened for behavioral issues, but the majority of those children are not yet receiving that screening (Children’s Bureau, n.d.).³

Most approaches for targeting healthy MEB development and better socioemotional outcomes through primary care are in the experimental or early implementation stages. A systematic review of 44 studies of behavioral health interventions for families of children ages 0–5 delivered in primary care found mixed evidence about impact and pointed to questions not yet answered by research about their mechanisms, trust in the primary care provider with respect to MEB issues, and populations most likely to benefit (Brown, Raglin Bignall, and Ammerman, 2018). The evidence base for the effects of these activities in achieving improved parenting skills and improved child outcomes is nascent but growing, and thus far there is some evidence to support the efficacy of parenting programs that are linked to or embedded in primary care practice.

One rationale for such programs is that the practice providers can selectively identify parents in need of enhanced parenting knowledge and skills, and that as trusted professionals, they may be successful in efforts to advise parents to join a parenting group or class (Leslie et al., 2016). An example is offering the Incredible Years parenting classes, in which parents bring their children to both academic-site pediatric practices and private practices in the Boston area (Perrin et al., 2014). Improved parent and child outcomes were documented at 1 year in this experimental intervention, but the program was not sustained after the research

³See <https://www.childwelfare.gov/topics/systemwide/bhw/federal/epsdt>.

effort (National Research Council, 2014). A number of other programs have tested recruitment for parenting interventions within the primary health care setting and determined that they may offer advantages. These programs include the Chicago Parenting Project (Breitenstein et al., 2007); Family Checkup (Shaw, 2017); and Familias Unidas, which enrolled 90 percent of referred parents of adolescents who had been identified in primary care as being at risk for substance use and other risky behaviors (Pantin et al., 2009).

An example of a program that embeds parenting specialists in a practice site is Healthy Steps (see Box 5-3). Other programs that have been studied include

- Reach Out and Read, which targets verbal and cognitive development (discussed in Chapter 10); and
- the Video Interaction Project, which targets socioemotional development (Mendelsohn et al., 2018).

BOX 5-3 Healthy Steps

Healthy Steps is a pediatric primary care program, administered under the auspices of ZERO TO THREE (n.d.) that focuses on training all practice personnel to use a team approach in attending to the developmental and behavioral needs of children served by the practice and the inclusion of a parent-child specialist on site. Parents in need of support and education, based on screening for social determinants of health, are seen by the parenting specialist in the office at the time of routine visits or via home visits as needed. Five-year outcomes have demonstrated mitigation of harsh parental discipline, increased odds that parents often/always negotiate with their child, and improved frequency of reported concerns about the behavior of their child (Minkovitz et al., 2007). More recently, the Healthy Steps Program was used as an intervention for inner-city parents who themselves reported multiple adverse childhood experiences. Children of those parents who received the Healthy Steps intervention scored much higher when screened for socioemotional development using parent reports on the Ages and Stages Questionnaire-Social Emotional (Briggs et al., 2014). Healthy Steps has been adopted by more than 150 pediatric practices located in more than 20 states, the District of Columbia, and Puerto Rico (<https://www.zerotothree.org>).

INTEGRATING BEHAVIORAL CARE AND PRIMARY HEALTH CARE

The importance of addressing both the MEB and physical health needs of children is increasingly recognized (Foy and American Academy of Pediatrics Task Force on Mental Health, 2010). The AAP reports that nearly one-third of pediatric office visits in the United States involve a behavioral concern about the

child. In a call to action, the American Board of Pediatrics has identified behavioral health as a critical but neglected dimension of children's health, and has proposed stronger behavioral health training for future pediatricians (McMillan, Land, and Leslie, 2017). As noted above, many pediatric offices do offer screening for certain disorders (e.g., autism spectrum disorders and adolescent depression) although the evidence base for doing so is currently viewed by the U.S. Preventive Services Task Force as weaker than the base for other kinds of screening (U.S. Preventive Services Task Force, 2016). Pediatric offices also frequently work with schools to identify and treat uncomplicated ADHD (Epstein et al., 2010). But while pediatric offices use well-child checks to work with families on a long list of prevention interventions for adverse physical health outcomes, MEB health promotion and prevention of MEB disorders are currently, at best, only a small part of pediatric care.

Although many efforts to promote MEB health through primary health care exist, particularly for children in the first 2 to 3 years of life, the health care system is not systematically taking full advantage of such opportunities, particularly opportunities to work with other community partners. One reason is the organization and structure of child health care practices, and another is a reimbursement system that has compensated poorly, if at all, for promotion and risk prevention directed at healthy MEB development (Counts et al., 2018). Another challenge is that relatively few primary pediatric and family medicine child health care providers have been trained to address behavioral issues, particularly at the level of promotion or risk prevention (Boat, Land, and Leslie, 2017).

A number of innovative efforts to change this situation are notable and may signal a move toward fully integrated universal practice. One such effort has been to strengthen training to address behavioral health. As noted, this type of training has typically played a small part in pediatricians' education, and has tended to target identification of behavioral disorders, not MEB health promotion and prevention of risks. Efforts are being made to address this lack. For example, as part of the implementation of the Triple P Parenting Program in Seattle, Washington (see Chapter 3), pediatric residents acquired knowledge and skills that translated into more effective interactions concerning parenting practices with the caregivers of their patients (McCormick et al., 2014). Another evidence-based intervention is the Safe Environment for Every Kid Program, which trains health professionals, including pediatric residents, to better address the psychosocial risks of child maltreatment (Dubowitz et al., 2011). The training of psychologists to participate as members of the care team for children and families in the primary care setting has also been described (Stancin and Perrin, 2014).

Some research has examined the full integration of behavioral care, oriented toward both promotion/prevention and diagnosis/treatment, in primary care settings (Boat, Land, and Leslie, 2017; Herbst, Burkhardt, and McClure, 2017). In these settings, child psychologists partner with the pediatricians in working with child and caretaker dyads at well-child visits. Emphasis is placed on promoting and modeling positive caregiver-child interactions, as well as coaching

caregivers to adopt positive parenting practices. Parents have embraced this model, and the rate at which caregivers and their children return to the next well-child appointment is higher for those families who spend time with the psychologist. Screening for maternal depression and socioemotional assessment of the child are carried out routinely. While MEB outcomes for children who receive this comprehensive intervention have not yet been reported, the feasibility and acceptability of combined physical and behavioral care have been demonstrated for a diverse population that is largely supported by Medicaid. Furthermore, both pediatric and psychology residents have the opportunity to observe and practice this mode of care.

Universal, comprehensive behavioral care in child primary health care practices may be one of the best opportunities to address the agenda of fostering MEB health in the first years of life at a population level. Challenges include demonstrating improved parenting and child MEB outcomes, as well as convincing child health training programs, health systems that largely control the practice of medicine in the United States, and payer organizations that this approach is programmatically and economically feasible and cost-beneficial.

Adolescent medicine and the care of children and youth with chronic medical conditions are two areas in which the integration of behavioral and medical care plays a key role.

Adolescent and Young Adult Medicine

As noted in Chapter 1, the lifetime prevalence of any mental disorder among adolescents is estimated to be 49.5 percent (National Institute of Mental Health, 2019). Furthermore, 1 in 25 adolescents has a substance use or abuse condition (American Addiction Centers, 2019) and suicide is the second leading cause of adolescent death (Heron, 2016). However, the ratio of board-certified adolescent medicine providers to adolescents is 0.8 to 100,000 (American Board of Pediatrics, 2018). While the Accreditation Council on Graduate Medical Education began requiring that pediatric resident training include one block (4 weeks) in adolescent medicine in 1997, faculty to provide comprehensive training in adolescent issues are in short supply, and pediatric residents report unmet needs in this area; many never encounter common adolescent issues in the course of their training (Ruedinger and Breland, 2017). Thus, while behavioral medicine has emerged as a greater part of adolescent care, much work remains to be done in this area.

Promotion of emotional health and prevention of depression and anxiety in this population appear to be substantial health care needs. Screening and treatment for depression are important not only for the health of adolescents but also for the well-being of their future progeny, and need to be a routine part of practice. Increasing the size of the medical workforce for adolescent medicine, whether through internal medicine, family medicine, or pediatric pathways, will be critical for a robust response to adolescent MEB needs. Anxiety also has emerged as an increasingly frequent concern in adolescents. Currently, 10.2 percent of those ages

12–17 have anxiety problems (Child and Adolescent Health Measurement Initiative, n.d.). College counseling services have reported large increases in students seeking assistance with anxiety (Center for Collegiate Mental Health, 2018). Preventive interventions, such as mind–body techniques and other self-monitoring and cognitive-behavioral practices, have been studied in student populations from the grade school to health professions school levels, with evidence for improved outcomes, at least in the short term (see Chapter 3) (Cotton et al., 2011).

Chronic Disease Care for Children and Youth

MEB disorders frequently co-occur with physical conditions that may cause stress to both the child and the family. Three to 5 percent of children and youth in the United States have a disabling or life-threatening chronic illness, and many more are considered to have special health care needs. This population of children has increased dramatically as medical technology has extended the life span of children with the most serious conditions (Perrin, Anderson, and Van Cleave, 2014). Often, the care burden results in home life that is disrupted and chaotic, and these children and their parents have a high prevalence of anxiety and depression (Quittner et al., 2014). Such cases add considerably to the MEB health burden in the United States, and the MEB needs of these families have only recently been recognized as an important target for pediatric subspecialty and chronic disease care (Boat, Filigno, and Amin, 2017).

Promoting family wellness in the face of devastating chronic disease by working with families on such lifestyle issues and better management of situational and chronic stress is possible in the context of most chronic medical care that is provided by teams of nurses, psychologists, social workers, dietitians, physical therapists, and physicians. In addition, screening of these families for such care needs as attention to behavioral disorders (Quittner et al., 2014) and socioeconomic adversities (National Academies of Sciences, Engineering, and Medicine, 2015) is being tested and implemented in practice. Further, many children with chronic disease do not succeed in school at a level that will allow them to prepare adequately for independent living and self-support, or are not adequately accommodated at their school. Therefore, partnerships between health care providers and schools to ensure a responsive school environment and academic success, a potent resilience factor, is another important opportunity (Cruden et al., 2016; Filigno et al., 2017).

SUMMARY

Strategies to promote optimal MEB development within the health care system have great potential and offer particular benefits for young children in low-resourced populations. Researchers have only begun to focus on some of the possibilities, while others are better established.

CONCLUSION 5-1: Primary care settings provide opportunities for promoting healthy mental, emotional, and behavioral (MEB) development for children and their parents and preventing many mental, emotional, and behavioral problems and disorders. Specifically:

- **Preconception and prenatal care for women provide critical opportunities to mitigate the risks of premature birth, tobacco and alcohol exposure, and other risks to children’s MEB development.**
- **Primary care for young people from infancy to young adulthood, particularly in the early years of life, offers critical opportunities to provide parenting education and screening for risks to MEB development.**
- **Multidisciplinary and interdisciplinary care, in which nurses and nurse practitioners, parenting counselors, behaviorally trained social workers, and psychologists work alongside or partner with physicians to provide care in a single setting that can address a wide range of promotion and prevention needs shows particular promise. Linking practice settings to promotion and prevention programs also deserves further exploration.**
- **Preventive and therapeutic attention to the behavioral needs of children with serious chronic disorders and their families can better address behavioral outcomes in this growing segment of the population.**

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6

Policy Strategies

As discussed in Chapter 2, the influences on mental, emotional, and behavioral (MEB) development include not only proximal factors that operate on individual children and families but also distal factors—characteristics of communities and society that shape opportunities and experiences. The intervention strategies discussed thus far address the promotion of MEB health and prevention of MEB problems directly, but other, more indirect strategies can promote well-being and alleviate sources of economic and other stress through policies with broad, population-level effects. We use the term *policy* to refer to actions taken by government entities at the community, state, or federal level to pursue social improvements; these actions may include formal rules, legislative actions, administrative programs, targeted funding initiatives, or other mechanisms.¹ While much remains to be learned about how policies influence the environments in which MEB development occurs, increasing attention to the possibilities for using scientific evidence about the effects of policy on public health and other social objectives has strengthened the foundation for policy strategies (see, e.g., Brownson, 2011; Catalano et al., 2012; Rajabi, 2012; U.S. Department of Health and Human Services, 2016).

Policy can affect the full range of institutions and structures in neighborhoods, communities, and society, including families, schools, churches, health care systems, community organizations, businesses, and corporations. The resulting characteristics and actions of those institutions and structures in turn affect the physical, economic, and social environments experienced by children and their families in their communities. Thus, policy can influence the distribution of wealth; employment; and the health care, education, child welfare, and juvenile justice systems—all of which, as discussed in Chapter 2, have implications for MEB development and health.

¹The term *policy* is used interchangeably with the term *law* throughout this chapter. In its narrowest sense, law may refer only to formal rules passed by legislative bodies and implemented by executive branches, but the discussion here also includes regulatory actions by government agencies.

Policies also can be used as a public health tool to protect populations against risks and prevent disease or harm. For example, some policies provide guidelines that directly alter the environment, thereby influencing exposure to risks or protections. Public health gains have been achieved through such laws, including through the regulation of dangerous substances such as lead, air pollution, alcohol, and tobacco. Tax law and safety net programs have direct effects on family resources, as well as on the distribution of resources within a society. Policy can also support opportunities for positive parenting, education, and economic mobility, the effects of which may explain large differences in health outcomes by neighborhood (Chetty and Hendren, 2018; Komro et al., 2016).

Figure 6-1 illustrates the processes through which laws influence child development and health, and highlights how the environments of children can be altered to reduce adverse exposures or increase protective factors (Komro, O’Mara, and Wagenaar, 2013). The figure demonstrates how the many dimensions of the environment drive exposures and behaviors that, when moderated by individual-level factors, ultimately affect population-level child outcomes (Komro, Flay, and Biglan, 2011).

This chapter looks at policies at all levels of government that can affect MEB development and health outcomes in children and youth in the areas of health care and nutrition, economic well-being, risk behavior and injury, and education.

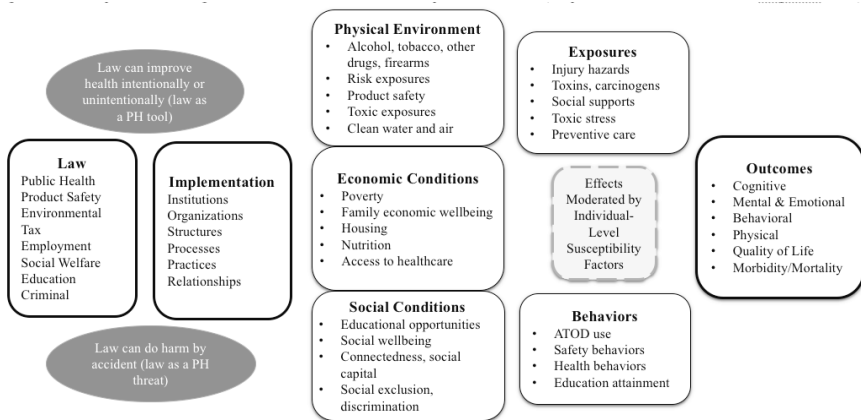


FIGURE 6-1 How laws influence child development and health. SOURCE: Adapted from Komro, O’Mara, and Wagenaar (2013).

HEALTH CARE AND NUTRITION

A number of large-scale federal policies are designed to facilitate low-income families’ access to health care and adequate nutrition.

Health Care

Several federal programs are focused on access to and affordability of health care for children and adolescents. Other health care–related federal programs include the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program and the Mental Health Parity Act (MHPA).

Access to and Affordability of Health Care

One federal health care program that has had a substantial effect on the MEB health of children and youth is Medicaid, established by the Social Security Act of 1965. Medicaid provides health insurance to millions of low-income adults, children, pregnant women, and people with disabilities, and it is supplemented by the Children’s Health Insurance Program (CHIP). In 2016, these two programs provided coverage to 45 million children under the age of 18, 45 percent of U.S. children under 6, and 35 percent of those ages 6–18 (Chester and Burak, 2016).² Medicaid is the single largest payer for mental health services in the United States (Centers for Medicare & Medicaid Services, n.d.-a). Because the states and the federal government fund Medicaid jointly, states have considerable latitude in choosing which Medicaid benefits to provide.

The Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit is the specific component of Medicaid that targets child health. States are required to provide EPSDT services—including developmental and behavioral screening, vision services, dental services, and hearing services—for all children under age 21 enrolled in Medicaid. When a screening examination indicates a need for further evaluation, EPSDT provides diagnostic services. Additionally, EPSDT requires that necessary health care services be made available for the treatment of all physical and mental illnesses discovered during the screening and diagnostic processes (Centers for Medicare & Medicaid Services, n.d.-b).

The 1997 passage of CHIP built on the Medicaid program to provide coverage to additional American children. As of 2017, 9.4 million children were enrolled in CHIP (David-Ferdon and Simon, 2014). Like Medicaid, CHIP is jointly funded by the states and the federal government. Notably, all CHIP programs cover physical, occupational, and speech and language therapies. CHIP also requires the developmental and behavioral screenings covered by EPSDT.

The Patient Protection and Affordable Care Act (ACA), enacted in 2010, extended Medicaid coverage to millions more American families. It also specified essential health benefits whose coverage was mandatory for all individual and small-group health plans. Mental health and substance use disorder services, including behavioral health treatment, are among these essential health benefits (Davies, Morriss, and Glazebrook, 2014).

²See <https://ccf.georgetown.edu/2016/12/13/fact-sheet-medicaids-role-for-young-children>.

States' flexibility in both Medicaid and CHIP program design results in differences in coverage that can lead to negative MEB health outcomes. Beginning in 2020, for example, states will have greater flexibility in choosing essential health benefits, which may result in reduced access to mental health services for Medicaid participants (de Kleijn et al., 2015). Additionally, while some states choose to reimburse providers for screening for maternal depression through the Medicaid program, most states do not. It should also be noted that in most states, neither Medicaid nor CHIP supports reimbursement of providers for MEB-related promotion and prevention programs, even though global access to such programs is associated with earlier pregnancy care, better birth outcomes, and early developmental screening.

Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program

The MIECHV Program was the first federal program to support large-scale promotion and prevention programs aimed at improving parenting practices and children's MEB outcomes. A prevention component of the ACA, it serves as a national support mechanism for the provision of home visitation for mothers and children at risk for adverse MEB outcomes (De La Rue et al., 2016). While the program has been able to serve only a segment of all children with need for those services, it represents the first national-level attempt to expand complex, effective support programs for infants and young children at high risk for adverse MEB development. It is currently being studied, but no outcome data are yet available.

Mental Health Parity Act (MHPA)

The MHPA, passed in 1996, prevented large group health plans from imposing annual lifetime limits on mental health benefits that are less favorable than the limits imposed on medical or surgical benefits. The Mental Health Parity and Addiction Equity Act of 2008 built on the MHPA by adding new protections, including the extension of parity requirements to substance use disorders. The result of this federal law has been a significant reduction in the number of health plans that impose limits on behavioral health treatment (Thalmayer et al., 2017), potentially benefiting children in families in which mental health disorders interfere with caretaking.

Nutrition

Federal programs focused on the growth and healthy development of young children include the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); the Supplemental Nutrition Assistance Program (SNAP); and the National School Lunch Program (NSLP). Evidence suggests that these programs reduce food insecurity and improve nutrition in children, and that broadening eligibility for these programs would foster children's healthy MEB development.

Special Supplemental Nutrition Program Women, Infants, and Children (WIC)

The WIC program provides federal grants to states for supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and postpartum women, as well as for infants and children up to age 5 who are at nutritional risk. In 2017, more than 7 million participants benefited from the WIC program (Food and Nutrition Service, 2019).⁴ The WIC program is associated with small but significant increases in birthweight and increased intake of healthy food and nutrients among pregnant and postnatal women (Black et al., 2012). After reviewing 40 years of research on WIC, the Center on Budget and Policy Priorities concluded that it is a “cost-effective investment that improves the nutrition and health of low-income families—leading to healthier infants, more nutritious diets, and better health care for children, and subsequently to higher academic achievement for students” (Carlson and Neuberger, 2017, p. 1).

In 2009, the WIC food package policy was revised to promote consumption of fruits, vegetables, whole grains, and low-fat dairy products. This revision is associated with an increase in the availability of healthy foods and beverages in authorized WIC stores and improved dietary intake among WIC participants (Schultz, Byker Shanks, and Houghtaling, 2015).

Supplemental Nutrition Assistance Program (SNAP)

SNAP is a federal program that provides food-purchasing assistance to eligible low-income individuals and families (U.S. Department of Agriculture, 2018). In 2017, an estimated 42 million people benefited from SNAP (Nchako and Cai, 2018). According to a recent report, SNAP is the primary source of nutrition assistance for many low-income families. It reduces food insecurity among children, enables families to purchase healthier food, and is associated with improved child health and fewer low-weight births. Moreover, exposure to the program during early childhood is linked with improved health in adulthood (Carlson and Keith-Jennings, 2018).

At the same time, SNAP does not eliminate food insecurity. SNAP benefits are estimated to be 25 percent less than the average cost of a low-income meal, and do not cover the cost of a low-income meal in 99 percent of U.S. counties (Waxman, Gundersen, and Thompson, 2018). Evidence supports the importance of expanding SNAP benefits during the summer months, when children lack access to free and reduced-price lunches through school (Carlson and Keith-Jennings, 2018).

⁴See <https://www.fns.usda.gov/wic/frequently-asked-questions-about-wic>.

National School Lunch Program (NSLP)

The NSLP is a federally assisted meal program that provides nutritionally balanced free or reduced-price lunches to children in public and nonprofit private schools. Children may be eligible to participate in this program if their families also participate in SNAP, or based on their status as a homeless, migrant, runaway, or foster child. They can also qualify on the basis of household income and family size. In 2016, 30.4 million children participated in the NSLP (U.S. Department of Agriculture, 2017).

Children receiving free or reduced-price NSLP lunches consume fewer empty calories and more fiber, milk, fruit, and vegetables relative to income-eligible nonparticipants. They also are more likely to have adequate average intakes of calcium, vitamin A, and zinc. In addition, the NSLP is associated with lower rates of food insecurity among households with children (Ralston and Coleman-Jensen, 2017).

ECONOMIC WELL-BEING

Poverty and the risk factors associated with it present challenges at every phase of MEB development.⁵ Thus, economic policies that promote livable wages and income supplementation may have broad effects on children's MEB health. Policies aimed at reducing poverty, especially those affecting neighborhoods of concentrated disadvantage, are an important foundation for fostering healthy MEB development. Such policies include minimum wage laws, paid family leave, and the Earned Income Tax Credit (EITC). Other policies, such as child care subsidies and Temporary Assistance for Needy Families (TANF), are also designed to alleviate family poverty.

Although research on the impact of housing, employment, and economic policies (e.g., policies on supplemental security income) on MEB outcomes for children and families is limited, some evidence demonstrates an association. For example, more than 5 million low-income households receive federal housing assistance through Housing Choice Vouchers, Section 8 Project-based Rental Assistance, and Public Housing (Center on Budget and Policy Priorities, 2017a), and more than one-third of these are households with children (Fischer, 2016). The receipt of housing vouchers among families with children has resulted in reduced homelessness, crowding, housing instability, and family poverty (Center on Budget and Policy Priorities, 2017a). It is also clear that supplemental security income policies have enabled many families with children with disabilities to rise above the federal poverty level (National Academies of Sciences, Engineering, and Medicine, 2015). More detailed evidence about the relationship between poverty and child well-being can be found in a recently released National

⁵The discussion in this section includes findings gathered by Komro (2018) for a paper commissioned for this study, available for free download at <https://www.nap.edu/catalog/25201>.

Academies report on poverty (National Academies of Sciences, Engineering, and Medicine, 2019).

Minimum Wage Laws

The current federal minimum wage is \$7.25 per hour, and it has not increased since 2009. However, states, cities, and counties can set a higher minimum wage for their communities, and there are documented benefits to doing so that relate to MEB development and health. Increases in the minimum wage are associated with reduced smoking during pregnancy and increased prenatal care (Komro et al., 2016). Moreover, a \$1 increase in the minimum wage is associated with both a 9.6 percent decline in reports of neglect of children ages 0–12 (Raissian and Bullinger, 2017) and a decreased rate of teenage pregnancies (Bullinger, 2017). At the same time, some evidence suggests unintended negative effects of increasing the minimum wage, including increases in alcohol-related fatalities among youth and in binge drinking, especially among adolescent males (Adams, Blackburn, and Cotti, 2012; Hoke and Cotti, 2015).

Paid Family Leave

The Family and Medical Leave Act (FMLA) of 1993 mandates that employers with 50 or more employees provide 12 weeks of job-protected leave for workers so they can manage their own illnesses, care for a newborn or newly adopted child, or care for an immediate family member with an illness or disability. This leave, however, does not have to be paid and covers only about 60 percent of workers (Greenfield and Klawetter, 2016). The unpaid nature of the FMLA creates access barriers that affect lower-income working parents disproportionately, as only an estimated 34 percent of working parents meet eligibility requirements and earn enough to afford taking unpaid leave (Joshi et al., 2014). Evidence at the state level shows that when leave is paid, leave taking among minority workers increases significantly compared with when leave is unpaid (Joshi et al., 2014).

Substantial evidence indicates that paid leave for families with a newborn is beneficial: it is associated with decreases in maternal depression, improvements in infant health, increases in breastfeeding, a higher likelihood of infant immunization and well-baby visits, and improvement in children's cognitive outcomes (National Academies of Sciences, Engineering, and Medicine, 2016; Wilson-Simmons, Setty, and Smith, 2018). Additionally, longitudinal studies of 16 European and 18 Organisation for Economic Co-operation and Development (OECD) countries found that the provision of paid maternity and parental leave was associated with reductions in neonatal, infant, and child mortality. These benefits increased as the length of leave increased, and no benefits were found for leave that was unpaid or did not provide job protection (Heymann, Earle, and McNeill, 2013). A natural experiment with parental leave in Norway also provided evidence about leave policies. In 1977, Norway changed its leave policy

from one similar to that of the United States—12 weeks of unpaid leave—and began to provide 18 weeks of paid leave. Research comparing outcomes for children of matched women before and after the policy change demonstrated better long-term outcomes for the children of mothers taking paid leave, including higher IQ, better academic achievement, and less teen pregnancy (Murray Horwitz et al., 2018).

Among 44 countries surveyed by the OECD in 2019, the United States was the only one in which women are not entitled to any amount of paid maternity leave not voluntarily provided by their employers; the average across those countries was 37 weeks (OECD, 2019). In recent years, several U.S. states, including California, New Jersey, New York, and Rhode Island, as well as the District of Columbia, have passed their own paid family leave legislation; similar laws will take effect in Washington and Massachusetts in January 2020 (National Partnership for Women & Families, 2018). Currently, however, only about half of U.S. working women receive any paid leave before or after childbirth through employer or state programs (Laughlin, 2011), even though a U.S.-based study of paid family leave showed a reduction in maternal and infant rehospitalizations and increases in maternal exercise and stress management among those who took paid leave versus those who took unpaid or no leave (Jou et al., 2018). A U.S.-based study of unpaid leave also showed that children of college-educated and married mothers who were most able to take advantage of unpaid leave had small increases in birthweight, decreases in the likelihood of a premature birth, and substantial decreases in infant mortality (Rossin, 2011). Thus, while paid leave may provide the opportunity for greater benefits in child development, unpaid leave does offer some benefit.

Earned Income Tax Credit (EITC)

The EITC is a tax benefit for low- to moderate-income working people (Sawhill and Pulliam, 2019). In addition to the federal EITC, 29 states plus the District of Columbia have established their own EITCs, which build on the federal credit (Center on Budget and Policy Priorities, 2017b). In 2016, the EITC lifted an estimated 5.8 million people, including 3 million children, out of poverty; it reduced the severity of poverty for an additional 18.7 million people, including 6.9 million children. Without the EITC, the number of poor children would have been more than 25 percent higher (Center on Budget and Policy Priorities, 2018).

Furthermore, federal and state EITCs have been found to have a positive effect on families' economic circumstances; increase participation in the labor force, particularly among single mothers; and improve educational outcomes among both mothers and children (Gassman-Pines and Hill, 2013; Sherman, DeBot, and Huang, 2016; Spencer and Komro, 2017). Expansions of the EITC are associated with decreases in maternal smoking, decreases in low birthweight, and increases in average birthweight, especially among those with greater socioeconomic risk and the greatest increase in EITC income (Hamad and Rehkopf, 2015; Hoynes, Miller, and Simon, 2015; Markowitz et al., 2017; Strully,

Rehkopf, and Xuan, 2010; Wicks-Lim and Arno, 2017). States with more generous EITCs see larger improvements in infant health outcomes over time (Markowitz et al., 2017). Among children ages 6–14, state EITCs have been associated with an increase in private health care coverage, a lower probability of being in fair or poor health, and a high probability of being in excellent health (Baughman and Duchovny, 2016).

EITCs also are linked to specific MEB outcomes. EITC payments and EITC-related higher income are associated with improved home environments and reduced problem behaviors (Hamad and Rehkopf, 2015). There is evidence as well of an association between EITCs and a reduction in mother-reported child neglect and child protective services involvement, particularly among low-income single mothers (Berger et al., 2017), as well as fewer hospital admissions for abusive head trauma in children under the age of 2 (Klevens et al., 2017).

Child Care Subsidies

Most public expenditures on child care subsidies are provided by the Child Care and Development Fund, which was created alongside welfare reform in 1996 and is supported as a block grant to states (Herbst and Tekin, 2016). Eligibility for child care subsidies is conditioned on fulfilling a state-defined work requirement, which typically includes paid employment or participation in a job training or education program (Herbst and Tekin, 2016).

Evidence is mixed for the benefits of child care subsidies in improving child well-being. Whereas such subsidies have been shown to increase maternal employment (Herbst and Tekin, 2016), some evidence indicates that children who receive subsidized child care in the year before kindergarten score lower on tests of cognitive ability and show more behavioral problems (Johnson and Ryan, 2015). These negative effects largely disappear by the time children finish 1st grade and may be the result of poor quality or intermittent availability of child care. Additionally, the presence of wait lists for access to subsidized child care is associated with an increase in maltreatment investigations (Klevens et al., 2015).

Temporary Assistance for Needy Families (TANF)

Through the TANF program, states receive block grants from the federal government to design and implement programs intended to help needy families achieve self-sufficiency. To receive these block grants, states must require that mothers work to be eligible for TANF benefits once their child reaches a certain age, as established by the state. States in which mothers are required to return to work earlier in their child's life show significantly higher rates of infant mortality among unmarried women with a high school education or less and at least one previous birth (Leonard and Mas, 2008). Early maternal employment also is associated with negative effects, including increased depressive symptoms and reduced rates of breastfeeding (Herbst, 2017).

TANF benefits have little demonstrated effect on child well-being (Dunifon, Hynes, and Peters, 2006; Wang, 2015), likely because the benefits are too small to lift families out of poverty (Wang, 2015). Indeed, strict lifetime limits on TANF benefits and tougher sanctions for noncompliance are related to higher levels of substantiated child maltreatment (Paxson and Waldfogel, 2003).

The degree to which TANF and the other programs discussed here influence the health and well-being of children is understudied. Future research that includes child health outcomes as a measure for program analysis would be a valuable contribution to the literature.

RISK BEHAVIOR AND INJURY

Policies designed to limit harmful behaviors and exposures and to prevent injuries have also benefited young people.

Limiting Harmful Behaviors and Exposures

Policies that discourage harmful behaviors or exposures—especially to alcohol, tobacco, marijuana, opioids, and lead—have pronounced benefits for preventing harm to children and promoting healthy MEB development. Children’s healthy MEB development can be fostered by policies that discourage substance use by parents and youth, and that protect fetuses and children from toxic exposures. There are several mechanisms through which this can be accomplished.

Alcohol

A number of policies have proven effective in reducing alcohol use and alcohol-related harms among youth. Raising the minimum legal drinking age to 21 has reduced both frequent and heavy drinking (DeJong and Blanchette, 2014; Hingson and White, 2014; U.S. Department of Health and Human Services, 2016; Wagenaar and Toomey, 2002). It is also associated with a reduced suicide rate among youth (Xuan et al., 2016), and has the potential to reduce preconception and prenatal alcohol use.

There is also evidence that policies making it illegal for those younger than age 21 to drive with any measureable blood alcohol concentration reduce both driving after drinking among youth and alcohol-related traffic deaths (U.S. Department of Health and Human Services, 2016). Moreover, social host liability laws, which hold liable adults who host underage drinking parties on their property, are associated with declines in binge drinking, driving after drinking, and alcohol-related traffic deaths (Hingson and White, 2014; U.S. Department of Health and Human Services, 2016). Requirements for signs warning against the risk of drinking during pregnancy are associated with a significant reduction in prenatal alcohol exposure, as well as decreases in very low-birthweight and very preterm births (Cil, 2017). Evidence also shows that increasing the price of

alcohol through taxation reduces alcohol-related harms among underage youth (Elder et al., 2010; Xu and Chaloupka, 2011). However, the effects of increased alcohol taxation on alcohol use by pregnant women have not been assessed.

Tobacco

Clear evidence demonstrates that increasing the price of cigarettes through taxation provides significant benefit in preventing young people from taking up smoking (Centers for Disease Control and Prevention, 2012). Also beneficial in preventing or reducing smoking are mass media campaigns, comprehensive community programs, comprehensive statewide tobacco control programs, and laws restricting the sale of tobacco to minors (DiFranza, 2012). Evidence shows further that comprehensive smoke-free legislation is associated with reductions in preterm births and pediatric hospital admissions for respiratory tract infections and asthma, both of which pose risks for adverse MEB development (Faber et al., 2016, 2017).

There is also evidence that comprehensive bans on tobacco advertising, which prohibit all types of advertising or promotion designed to encourage tobacco use, can reduce tobacco consumption (Campaign for Tobacco-Free Kids, n.d.). However, restrictions in the United States permit some forms of marketing, and there is currently no evidence that such partial bans effectively reduce tobacco consumption (American Lung Association, 2019). International studies comparing the effects of restrictions on point-of-sale tobacco marketing have found reductions in exposure to marketing and impulse purchasing of cigarettes among adults (Li et al., 2013) and reductions in experimental and regular smoking among youth (Shang et al., 2015, 2016).

E-cigarettes, now the most commonly used tobacco products among youth, pose a public health concern (U.S. Department of Health and Human Services, 2016). Little is known about legal and regulatory efforts to prevent initiation of use of these products among youth. One policy move has been the Food and Drug Administration's (FDA's) crackdown on the sale of e-cigarettes to minors and young people (Jenco, 2018), and this issue continues to be recognized as important. FDA recently proposed restricting sales of flavored e-cigarettes to closed-off areas of stores that are inaccessible to minors, as well as banning menthol cigarettes and flavored cigars (Kaplan and Hoffman, 2018), policies targeting youth users of tobacco products.

Marijuana

As of 2018, 30 states, the District of Columbia, Guam, and Puerto Rico had legalized the use of medical marijuana, while 8 states and the District of Columbia had legalized marijuana's recreational use (Peeling, 2018; Smith, 2018). Few jurisdictions have legalized the use of medical marijuana for young people, and its use for recreational purposes has not been legalized at all for people under age 21 (U.S. Department of Health and Human Services, 2016).

Studies have thus far found both benefits and risks associated with the legalization of marijuana. Consistent evidence indicates that states in which marijuana use is decriminalized have higher rates of unintentional exposure among children under age 6 (Wang et al., 2014). Other research has found that legalization of medical marijuana in states was followed by a decline in use of multiple drugs among 8th graders, no change in drug use among 10th graders, and increased cigarette and nonprescription opioid use among 12th graders. Legalization of recreational marijuana for people over age 21 was associated with increased rates of marijuana use among college students for those reporting recent heavy alcohol use (Kerr et al., 2017), but a decrease in marijuana use among all children under 18 (Dilley et al., 2019).

Studies have found no definitive evidence of an association between medical marijuana laws and traffic fatalities or youth suicide. Additional research in these areas could be useful. Also deserving attention is the potential of adverse effects on the MEB development of offspring of pregnant mothers who continue to use marijuana during their pregnancy (see Chapter 2).

Opioids

Current evidence on the value of policies aimed at restricting prescriptions for opioids is limited, but some work suggests that prescription drug monitoring programs may have a beneficial effect. Researchers have examined the effects of such programs, as well as policies to control the dispensing of narcotics not indicated medically. One study, for example, compared Georgia, where neither type of policy was in place, with Florida, which had both prescription drug monitoring and dispensing policies, and found that while Florida had modest reductions in dispensing of opioid prescriptions, there was no effect on length of treatment. The benefits were observed in patients and prescribers who were the heaviest users and dispensers (U.S. Department of Health and Human Services, 2016). However, a nationwide study found mixed results for policies aimed at monitoring nonmedical use of prescription drugs and heroin, probably because these policies were varied in nature (Ali et al., 2017). Recent studies show some evidence that the strength of a monitoring program may be the most important variable (Bao et al., 2016; Pardo, 2017).

In the face of an increase in medically unnecessary opioid use among pregnant women, state lawmakers have increasingly responded with laws that criminalize this practice. Although limited research has been conducted, obstetricians and gynecologists have cautioned against such policies because they may prevent women from seeking prenatal care and other preventive health care services, as well as alienate vulnerable patients from their providers (Krans and Patrick, 2016; Kremer and Arora, 2015).

Lead

Since the 1970s, the United States has enacted several laws aimed at reducing blood lead levels in children. The first of these was the 1971 Lead-Based Paint Poisoning Prevention Act, which prohibited the use of lead paint in government-funded housing. Other federal efforts include the Environmental Protection Agency's phase-out of lead in gasoline, limits on lead in residential paint and children's products, the 1974 Safe Drinking Water Act, and the prohibition against the use of lead pipes and plumbing (Komro, 2018). As a result of these policies, the average blood lead levels among children in the United States have declined about 94 percent, from 15 micrograms per deciliter in 1976 to 0.86 micrograms per deciliter today (Komro, 2018).

Ongoing management of children's exposure to lead is critical, as any level of lead in children's blood can have detrimental effects on their cognitive and behavioral development (Lanphear et al., 2005). If childhood lead exposure were completely eliminated, an estimated \$84 billion in long-term benefits could be realized for each birth cohort. Children would be likely to have higher grade point averages, and more likely to earn high school diplomas and graduate from college. They would also be less likely to become teen parents or be convicted of crimes (Komro, 2018).

Injury Prevention

Policies to prevent injuries in young people address motor vehicles, bicycle helmets and concussion protocols, and firearms.

Motor Vehicles

The benefits of seatbelt and motor vehicle safety laws have been recognized for decades. Since the mid-1980s, all states have had some type of child restraint laws. However, state laws vary widely in the specificity of the population, restraint devices, vehicle operators, and penalties covered. Most state laws now include general seatbelt or restraint requirements and restraint based on height/weight definitions instead of age (Bae et al., 2014). Evaluations of state laws designed to increase use of booster seats have found increases in child restraint and correct restraint and reductions in traffic injury rates, injury hospital expenditures, and motor vehicle fatalities among covered children following the laws' implementation (Eichelberger, Chouinard, and Jermakian, 2012; Farmer et al., 2009; Mannix et al., 2012; Pressley et al., 2009; Sun, Bauer, and Hardman, 2010).

States also have passed graduated driving licensing (GDL) laws in response to the increased risk of motor vehicle crashes among adolescents. GDL laws ideally include three stages: first requiring that an adult with a valid license be present at all times, second allowing the new driver to drive alone but with certain restrictions, and third providing full licensure to drive independently under the

usual laws and regulations. A systematic review found consistent evidence that GDL laws reduce crash and injury rates among young drivers, with stronger laws being associated with greater fatality reduction (Russell, Vandermeer, and Hartling, 2011).

Bicycle Helmets and Concussion Protocols

Growing evidence supports the effectiveness of laws and campaigns promoting the use of bicycle helmets. Studies have demonstrated an increase in helmet use following helmet legislation, especially among younger age groups and in those communities with low pre-intervention use (Karkhaneh et al., 2006; Macpherson and Spinks, 2008). This increased helmet use is also associated with a decrease in head injuries among children (Macpherson and Spinks, 2008).

Given increased attention to the long-term consequences of repeated traumatic brain injuries, all 50 states plus the District of Columbia have passed legislation requiring medical attention for head injuries among young athletes. These laws typically include concussion education, criteria for removal from play, requirements for evaluation, and requirements regarding return to play after concussion (Tomei et al., 2012). The laws focus on identifying and responding to traumatic brain injuries; no current state law focuses on primary prevention (Harvey, 2013). Whether these laws have resulted in the prevention of long-term MEB consequences of repeated concussions remains unknown.

Firearms

Consistent evidence shows that higher rates of U.S. household firearm ownership are associated with overall higher rates of gun suicide and homicide for every age group (Miller, Azrael, and Hemenway, 2002; National Research Council, 2004; Siegel and Rothman, 2016). Evidence also consistently suggests that waiting periods and background checks are associated with lower statewide suicide rates and decreased rates of firearm homicide (Anestis and Anestis, 2015; Lee et al., 2017). Age-specific laws, including those addressing child access prevention, which focus on safe storage and juvenile age restrictions, are associated with a decrease in suicide among adolescents (Parikh et al., 2017), in pediatric unintentional firearm injuries (Parikh et al., 2017), and in unintentional firearm deaths (Santaella-Tenorio et al., 2016).

EDUCATION

Laws and policies at the federal, state, and local levels affect schools and their ability to promote MEB health. Chapter 4 reviews MEB interventions delivered within schools; here we look briefly at education policies intended to influence young people's behavior and welfare.

Zero Tolerance Policies

The zero tolerance philosophy became widespread in schools in the early 1990s as a method for requiring predetermined consequences for the actions of students. Although there is no singular definition of zero tolerance, it typically refers to punitive responses that are meant to be applied regardless of the gravity of the individual's behavior or the situational context (American Psychological Association Zero Tolerance Task Force, 2008). The underlying assumption behind these policies is that they will deter other students from engaging in similar behavior, thus creating an improved school climate. Zero tolerance policies are often linked to exclusionary discipline, such as expulsion and out-of-school suspension.

Although zero tolerance policies have been widely criticized by teachers, parents, and students alike, they remain relatively popular in American schools. Research shows, however, a negative relationship between the use of school suspension and expulsion and school-wide academic achievement, even after controlling for such demographic factors as socioeconomic status (American Psychological Association Zero Tolerance Task Force, 2008). Evidence also demonstrates the potential for zero tolerance policies to have negative impacts on MEB health. Specifically, such policies may lead to increases in student alienation, anxiety, rejection, and breaking of healthy adult bonds. Additionally, rather than reducing the likelihood of classroom disruption, school suspension appears to predict higher future rates of misbehavior and suspension among those students who are suspended. In the long term, students experiencing suspension and expulsion have a moderately higher likelihood of dropping out of school and failing to graduate on time. Prevention interventions may be more effective than zero tolerance policies as a means of achieving school discipline (American Psychological Association Zero Tolerance Task Force, 2008).

One study offers corroboration with respect to the negative impact of school policies that prescribe suspension or expulsion for drug use (Evans-Whipp et al., 2015). A cross-national study of school policy showed that the likelihood of student marijuana use was higher in schools in which administrators reported using out-of-school suspension for drug-related violations of school policy, and students reported low policy enforcement. Student marijuana use was less likely where students reported receiving abstinence messages at school and where students violating school policy were counseled about the dangers of marijuana use.

Every Student Succeeds Act (ESSA)

ESSA, signed into law in 2015, includes various provisions meant to ensure success for both students and schools. This federal policy gives states the opportunity to receive grant funding by submitting education plans that align with general U.S. Department of Education goals; states and local education authorities have considerable leeway to use the funding to meet their own goals. States may

identify their own accountability targets and plans for meeting them, but must use indicators of academic proficiency as well as measures of student and educator engagement, school climate and safety, and other elements of public schooling (Education Week, 2015). Other provisions address protections for disadvantaged and high-need students and offer support for evidence-based local interventions.

This act established social-emotional development as a priority for schools, and it makes several funding streams available for social-emotional learning. The authors of ESSA also identified 60 evidence-based interventions for promoting social-emotional learning that schools can implement across all grade levels. Many of these interventions have been validated with samples that consist mainly of students from low-income families or racial/ethnic minority groups (Grant et al., 2017).

Individuals with Disabilities Education Act (IDEA)

IDEA guarantees a free appropriate public education to children with disabilities and ensures that they receive special education and related services. The law emphasizes the importance of improving educational results for children with disabilities to ensure that they can enjoy equality of opportunity, full participation, independent living, and economic self-sufficiency. Under IDEA, more than 6.9 million children with disabilities receive special education and related services designed to meet their individual needs. More than 62 percent of children with disabilities now spend at least 80 percent of their school day in a general classroom. Early intervention services are being provided to more than 340,000 infants and toddlers with disabilities (Conley, Durlak, and Kirsch, 2015). Individual Education Plans and 504 Plans provide for school accommodations for an array of health problems, including those in the behavioral health area, and enhance opportunities for these children to grow academically and socially.

State Policies on Social-Emotional Learning

Recognizing the growing evidence that efforts to teach social-emotional learning can be effective (as discussed in Chapter 4), many states have passed regulations or enacted statutes to encourage instruction in this area in schools, either as part of a health curriculum or as a stand-alone component. A policy scan by Child Trends, an independent nonprofit organization, showed that 15 states require some form of social-emotional learning or character education, and another 15 states recommend it (Gabriel et al., 2019). Curricula in nearly 40 states include requirements related to some type of social-emotional learning skills, such as emotional or mental health or healthy relationships; curricula in 11 states include requirements for trauma-informed care (attention to past trauma in addressing students' problems). In short, social-emotional learning requirements are not yet universal, but attention in this area appears to be increasing.

SUMMARY

We have discussed policies most directly related to MEB development in children and youth, predominantly those that are national in effect. Other policy approaches are likely to be of benefit as well. For example, evidence supports the common-sense observation that large-scale incarceration of adult males in low-income neighborhoods has negative outcomes for families (Brookings Institute, 2014; Wiltz, 2017). Policy approaches in such areas warrant extensive further study because they address important social determinants of child health and well-being.

It is also important to note the great variation in the implementation and sustainability of federal, state, and local policies that directly affect the health and well-being of not only individual children and families but also entire neighborhoods and communities. Research on these issues has been limited with respect to the MEB development of children and adolescents. For example, state and local tobacco policies vary greatly by locale, and their influence is affected even by the density of tobacco outlets within neighborhoods and by the specific enforcement efforts of neighborhood police and health departments within communities. Also varying widely are local and state policies on assessment for eligibility, enrollment, and continuation reviews for the federal Supplemental Security Income program for children with disabilities. It is important to learn about the impact of these policy variations on children's MEB development and health. In fact, if linked to rates of MEB problems in young people, this variation could make a positive contribution to understanding the effectiveness of these policies.

CONCLUSION 6-1: The evidence base regarding the use of local, state, and federal policies as tools to promote healthy mental, emotional, and behavioral (MEB) development in children and youth at a population level is growing but incomplete. For some programs of long standing, such as Medicaid and the Earned Income Tax Credit, there is evidence of benefits for children and families. Additional research is needed to provide a basis for redirecting current policies and developing new policies to support healthy MEB development in children and youth more effectively.

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Assessing the Evidence on Interventions

Part II of this report examines a wide range of evidence that has expanded understanding of the efficacy of many sorts of interventions designed to promote healthy mental, emotional, and behavioral (MEB) development and prevent disorders. In many areas, findings that have emerged since 2009 provide the basis for more productive directions and shifts in emphasis for policy makers and others who are tackling specific MEB-related challenges.

The evidence for some interventions is quite well established. Much of it has been synthesized in meta-analyses of research including randomized controlled trials and other strong study designs, and in many cases research that has tracked potential effects across long time periods. Looking across Chapters 3 through 6, we note, for example, strong evidence for the efficacy of programs to support and promote effective parenting and family bonding, screen pregnant women and mothers for depression and offer effective treatments, and teach children from preschool through grade 12 social and emotional skills and mindfulness. Emerging evidence is the basis for recommendations regarding the integration of MEB health promotion and disorder prevention into primary health care. On the policy front, we have seen evidence that programs of long standing, such as Medicaid and the Earned Income Tax Credit, can have direct benefits for the MEB health of children and youth.

For other interventions—such as parent training to reduce substance use disorders or prevent child abuse, whole-school approaches to establishing a positive school climate, or prenatal parenting education to reduce pregnant women’s substance use—researchers are still exploring mechanisms for achieving desired outcomes and other questions. Existing work, however, points to significant potential benefits.

This body of evidence is foundational—the necessary basis for selecting programs for dissemination and implementation on a broad scale that are the path for achieving meaningful improvements in MEB health for U.S. children and youth. We close Part II with our reflections on the nature of the research on interventions relevant to MEB health and the broad implications of this body of work.

We begin this discussion by noting that it is common to speak of the value of “evidence-based” interventions without necessarily defining what “evidence” means in general or in specific contexts. The research reviewed in Part II on the primary points of access for improving MEB health—families and caregivers, schools, the health care system, and government policy—includes randomized controlled trials, quasi-experimental studies, and qualitative studies. We have described many individual studies to illustrate the sorts of interventions that are available and some of the ways researchers have tried to identify the components of effectiveness. Where large-scale studies with strong experimental designs or meta-analyses are available, we have highlighted those studies, and we have also highlighted available meta-analyses.

Evidence is often reported in terms of effect size, reflecting the degree to which a hoped-for outcome was achieved. Looking across the research we have reviewed, it consists primarily of efficacy studies (which examine whether an intervention can produce the intended result when the study circumstances are tightly controlled) and limited numbers of effectiveness studies (which examine whether an intervention can produce the intended result in more complex, real-world circumstances) (Gartlehner et al., 2006). In efficacy and effectiveness studies related to MEB outcomes, effect sizes vary, but average approximately 0.3. A robust effect size would be 0.5 or above, which means that many study participants did not show an expected benefit, even when the outcome for the study group was statistically significant. Effect sizes are usually lower in effectiveness and dissemination than in efficacy studies, which suggests that in scaled interventions, expectations for effect sizes should be relatively low, even if the intervention is faithfully implemented.

Obviously, effect size is an important consideration when selecting an intervention for implementation at a population level, but other factors are also important. One is that for many reasons, people eligible to participate in an intervention often decline to do so. For example, refusal rates for home visiting can be as high as 50 percent, and those who agree to participate are often those who least need the intervention (Ammerman et al., 2015). Most reports of outcomes from efficacy and effectiveness studies do not include data on enrollment rate, although this situation may be changing. To the extent that rates of program dropout are reported, they are also high, as discussed in Chapter 8.

There is little available data about outcomes when participation is limited. In practice, an intervention that has a favorable effect size of 0.5 in efficacy studies, participation and retention rates of 50 percent each, and an effect size in effectiveness studies that is 75 percent of that found in efficacy studies, the calculation might actually show benefit for fewer than 10 percent of families or children who were projected to benefit. These considerations mean that it is important also to report and consider the number of eligible participants who enroll in a study, the number of enrollees who complete the study, and what the benefit might be for partial participation, as well as other factors that affect the potential for successful implementation, such as program complexity, cost, and the infrastructure and workforce needed to create and sustain the program.

If these factors were routinely reported and discussed in published studies, it would be easier to consider them carefully when planning scale-up, organizing quality improvement efforts to achieve best outcomes, and assessing the population-level value of an intervention. For example, benefit/cost calculations have been based on outcomes of efficacy studies and have not routinely factored in these considerations; they therefore may overestimate potential benefits.

We also note that many randomized controlled trials of the sorts of interventions discussed in this report have a risk of bias because the study conditions are not blinded, or for other reasons (e.g., Allen et al., 2016; Yap et al., 2016). Blinding is not always feasible in the context of intervention trials, particularly those delivered in real-world settings. It is also worth noting that strictly controlled laboratory experiments often lack generalizability to real-world settings (external validity), whereas intervention trials conducted in unmodified settings (pragmatic trials) that serve children and families can provide valuable information to support implementation and dissemination.

This discussion of methodological issues does not reveal weaknesses in the interventions studied but rather limitations on the certainty provided by even the most rigorous research because of the complexity of factors that influence developmental outcomes for children and youth. In short, it is important to look beyond the expectation that “evidence-based” programs, as defined in the past, if widely adopted, can achieve the desired benefits for all or even a substantial proportion of children in need.

Without a doubt, research is needed to continue building on this foundation. But the problem that has kept a body of knowledge that was already strong 10 years ago from bringing meaningful improvement at the population level, in the committee’s judgment, is not with whether and how interventions work in an experimental setting, but with how to effectively reach and benefit children and families who could benefit at a population level, the subject of Part III.

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Part III

Implementation and Scale-Up of Effective Interventions

We have explored strong evidence about the effectiveness of many kinds of strategies for fostering healthy mental, emotional, and behavioral (MEB) development, and turn next to the question of why they have not yet brought greater improvement in outcomes (see Chapter 1). If intervention strategies are to achieve real benefits, not just for individual children and families but for communities and larger populations, they must be implemented well and at broad scales. The most effective strategies cannot achieve their intended benefits if they are not implemented with fidelity—delivered with careful attention to the intended model or design—and optimized to meet objectives for the environments in which they are implemented. Moreover, they must be of sufficient scale to reach intended populations.

Researchers and practitioners not just in fields that address MEB development but across the fields concerned with human services more broadly have been frustrated by the elusiveness of public health impact from demonstrably strong intervention strategies. A key concern in assessing progress has been whether strategies for which there is strong evidence of effectiveness were implemented well—indeed it has been difficult even to document the effectiveness with which child, family, school, and community programs have been broadly implemented (Bruns et al., 2016; Crosse et al., 2011; Moore, Bumbarger, and Cooper, 2013).

Increased attention to implementation has demonstrated that it is considerably more complicated than had been clearly recognized. Effective implementation is as important for simple activities or practices—such as handwashing in health care settings to reduce infection—as it is for the most complex programs and policies. The challenges to implementation range from practical, local ones, such as mobilizing the people and resources needed and demonstrating impacts, to the broadest challenges of building infrastructure and resources to support effective prevention and intervention approaches on a nationwide scale. While fidelity continues to be a cornerstone of quality implementation, a much more comprehensive set of implementation outcomes has

been articulated and is now being used in research and practice to determine the integrity with which a program or practice is being implemented (Proctor et al., 2011).

The authors of the 2009 National Research Council and Institute of Medicine report recognized the importance of implementation and discussed alternative ways of adapting programs for diverse settings and engaging communities in decision making about program implementation. The 2009 report also describes challenges to effective implementation. It touches on the difficulties inherent in different types of settings, as well as broader challenges, including funding the intervention program, integrating intervention objectives with other priorities, ensuring that training and capacity to deliver the intervention are adequate, and providing for monitoring of the program delivery and outcomes. The report presents policy strategies for promoting MEB health and preventing disorder and emphasizes the need for research on implementation and dissemination.

The 2009 report takes note of the emerging field of implementation science and calls specifically for research to support wide-scale implementation that addresses the need for sensitivity to context, as well as the capacity to sustain the effort. The field of implementation science has matured since then. Researchers have expanded understanding of many of these issues, and their contributions are increasingly appreciated in health, education, child welfare, juvenile justice, and other fields (Bauer et al., 2015; Lobb and Colditz, 2013). This work has continued to build evidence about the connections between the integrity of implementation and outcomes. Researchers have refined the definition of implementation as a complex process for ensuring not only that the elements essential to making a program work are faithfully executed but also that an iterative process is used to optimize the program so it can yield its intended benefits as it is scaled up.

Implementation and scale-up are increasingly understood as context-dependent, tailored processes that rely on core sets of partners, strategies, and capacities rather than generalized processes easily overlaid across varied types of settings. Researchers have worked on adaptive program design methods to clearly identify core intervention components and methods for adapting programs in the field based on cultural and community values and processes. Taxonomies of implementation strategies have been developed and are now being used in research and practice to more clearly articulate and test ways of addressing barriers and promoting facilitators of implementation. And the partnerships and system capacities needed to support and sustain implementation and scale-up outcomes have become better articulated and researched, moving well past the necessary—but likely not sufficient—elements of training, materials, funding, and evaluation.¹

¹Norton and colleagues (2017) describe the growth of the field over the last decade, citing increases in journals addressing the subject, scientific conferences and meetings, training resources, measurement instruments and repositories, academic programs and courses, and professional societies. The number of dissemination and implementation

In Part III, we set advances that have emerged since the 2009 report in the context of what was already known to provide a clear overview of the current state of knowledge about this complex process. Chapter 8 offers an overview of some of the foundations on which effective implementation rests: identification of core components, adaptation, and careful strategies for implementation. In Chapter 9, we explore the need for effective partnerships and the capacity to support faithful implementation.

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theories and frameworks has also accelerated, with a recent review counting more than 61 dissemination and/or implementation models (Tabak et al., 2012).

Effective Implementation: Core Components, Adaptation, and Strategies

Implementation is sometimes compared to an engineering process because it requires a combination of methods and tools that are based in research but intended to guide a complex, real-world activity with many moving parts. As one expert told the committee, implementation is “about making things work, not discovering whether they could work.”¹ The purpose of careful implementation is to take initiatives from the research stage into widespread practice in a way that ensures fidelity to the original concept and achieves the desired outcome (Fixsen et al., 2009). Effectively implementing a program on a broad scale is a process that takes time and requires ongoing evaluation and adaptation to local circumstances (Aarons, Hurlburt, and Horwitz, 2011; Metz and Bartley, 2012; Meyers, Durlak, and Wandersman, 2012).

There are several prerequisites to effective implementation. The program needs to be based on a sound theoretical model that characterizes precisely how it can be expected to bring about a desired change. Evaluation then produces data that can be used to refine the program’s design and establish the parameters for delivering it with fidelity; Box 8-1 defines the dimensions of fidelity that need to be considered.

During the past decade, implementation research has focused both on the foundations that support the process—the development of a design that highlights essential components needed for effectiveness while allowing for adaptation to suit diverse populations—and the process itself—what it takes to deliver an intervention at a scale that can benefit broad populations. Thus, the term *scale-up* refers to systematic ways of increasing the coverage, range, and sustainability of the intervention, such as by taking a tested, effective local program to the regional, national, or international level (Ilott et al., 2013). This chapter focuses on three elements of sound program design that support effective implementation:

¹C. Hendricks Brown, personal communication.

1. identification of the core components that make an intervention effective and monitoring of the fidelity with which those components are implemented;
2. adaptation of interventions to suit the needs and characteristics of diverse communities, especially at broader scales; and
3. the implementation strategies—building blocks—used in mental, emotional, and behavioral (MEB) health-related programs.

BOX 8-1
Dimensions of Implementation Fidelity

Primary dimensions of fidelity in the implementation of a program or intervention include adherence, quality, participant engagement, and dosage:

- *Adherence* refers to whether core intervention components are being delivered as designed or written (i.e., to the appropriate population; by staff trained appropriately in the logic models through which these core components effect the desired outcome; using the right protocols, techniques, and materials; and in the locations or contexts prescribed).
- *Quality* denotes the manner in which practitioners deliver the intervention (e.g., skill in using the prescribed techniques or methods, enthusiasm, preparedness, and attitude).
- *Participant engagement* is the extent to which participants are engaged by and involved in activities related to the core intervention components.
- *Dosage* may include the amount of time, number of times, or frequency with which participants receive core intervention components.

SOURCE: Based on Dane and Schneider (1998) and Mihalic (2004).

**IDENTIFYING AND MONITORING THE FIDELITY OF
CORE COMPONENTS**

Effective implementation of an intervention starts with identifying its core components and the logic model or theory of how those components are intended to bring about the desired outcome. Also sometimes referred to as the active ingredients, essential elements, or mechanisms of change, core components are those variables that are essential if a program is to function as designed. Examples include the development of particular skills, such as self-management, decision making, drug resistance, or coping with stress and anxiety (Botvin and Griffin, 2015). Identifying those components that are truly essential makes it possible to then adapt nonessential elements to meet local needs and preferences (Fixsen et al., 2013). Most important, once a program's core components have been clearly defined, it is possible to implement the program with fidelity, which has

consistently been shown to be associated with program effectiveness (see meta-analyses by Dane and Schneider, 1998; Durlak and DuPre, 2008).

Ideally, a program's developers will begin identifying its core components early on while they are working out the program design, and then monitor the role played by these components as they proceed through efficacy and effectiveness trials, so as to identify the most potent ingredients or mechanisms for change. This process is supported by mediation research, which entails searching for mediating factors—those that explain how the core components actually operate—as well as other factors such as sex, class, or race that moderate those relationships. Mediation studies can also support dissemination by suggesting how interventions might be made more efficient without sacrificing impact. The sections below describe this process in greater detail.

Studying Mediating Factors

Researchers studying mediating factors in family- and school-based interventions have explored a variety of child and adolescent intervention outcomes, including effects on child conduct problems and externalizing behaviors, school engagement and achievement, depression and anxiety symptoms, initiation of and growth in substance use, and delinquency and arrests (Carreras et al., 2016). Others have explored core skills and intervention targets, such as positive parenting (Bjørknes et al., 2012; Gardner, Burton, and Klimes, 2006; Tein et al., 2006), youth social-emotional character development (Bavarian et al., 2016), and peer refusal skills (Glassman et al., 2014). Studies typically examine the role of one or two of many possible mediating mechanisms by which an intervention is thought to work.

For example, Sandler and colleagues (2011) examined the mechanisms through which parenting interventions affect child outcomes. Their work suggests that long-term intervention effects are best understood in the context of changes in social, cognitive, behavioral, and biological processes in parents and their children, as well as transactions between youth and their social contexts. Other researchers have used longitudinal studies to examine mediating factors, capitalizing on research designs that can potentially support causal statements by collecting data in three or more waves—examining direct intervention effects first, then targeting mediating constructs, and then measuring longer-term outcomes (Fairchild and MacKinnon, 2014; Gonzales et al., 2014; Leve and Chamberlain, 2007; Lewis, Bailey, and Galbally, 2012; Stigler et al., 2011; Van Ryzin and Dishion, 2012). Several examples illustrate the types of mediators being examined in intervention studies; research of this kind provides clues to the potential core components of interventions.

Example: Preventing Adolescent Depression

Perrino and colleagues (2014) integrated data from three trials of the family intervention program *Familias Unidas* to examine mechanisms by which the

intervention prevented adolescent depression and internalizing symptoms (negative emotions that are directed inward, such as anxiety or withdrawal). Familias Unidas is a community counseling and information center serving primarily Hispanic families that focuses on increasing positive parenting, family support, and parental involvement and improving parent–adolescent communication. Results of previous tests have found modest to large effect sizes depending on the outcome and trial (Prado and Pantin, 2011).² Perrino and colleagues sought to understand both how and for whom a specific intervention component might improve adolescent depression and internalizing symptoms, as well as externalizing behaviors (such as aggression or bullying).

The researchers focused on the mediating role of one proximal intervention target—parent–adolescent communication—and three moderators—baseline levels of internalizing symptoms, externalizing symptoms, and parent–adolescent communication. They found that the communication component fully mediated intervention effects on levels of internalizing symptoms, particularly among families with lower levels of parent–adolescent communication skills at baseline, providing support for the hypothesis that parent–adolescent communication is an effective component of the Familias Unidas intervention curriculum.

Example: Preventing Substance Use in Adolescents

DeGarmo and colleagues (2009) sought to test mediators in their study of a universal school-based intervention for early adolescents—Linking the Interests of Families and Teachers (LIFT)—aimed at preventing antisocial behavior, including youth substance use. The intervention focused on proximal intervention targets—strengthening positive relationships between young people and their parents and peers—because of evidence that these relationships have a protective effect with respect to antisocial behavior and early substance use. Intervention components included parent training, training for children in social and problem-solving skills, a recess intervention game (the Good Behavior Game³), and encouraging communication between parents and teachers.

The researchers hoped to understand the possible mediating effects of family problem solving and reduction in peer playground aggression on long-term outcomes for the LIFT intervention with respect to initiation and growth of substance use through grade 12. They found that intervention-related effects on reducing average tobacco use were mediated by improvements in family problem solving, while effects on growth in substance use were mediated by family problem solving and reductions in playground aggression. This work highlights that mechanisms and associated program components may play different roles for different outcomes: family training in problem-solving skills and the Good

²For more information, see <http://www.familias-unidas.org>.

³For more information, see <https://www.goodbehaviorgame.org>. See also Box 4-3 in Chapter 4.

Behavior Game may be critical components for substance use, but family problem solving alone may be sufficient for tobacco use.

Example: A Blended Strategy to Address Substance Use and Antisocial Behavior

Communities That Care (CTC) is a strategy developed by researchers at the University of Washington for providing workshops, instructional materials, and other resources to communities and states over the Internet.⁴ CTC uses a blended implementation strategy aimed at developing community-based prevention systems that take advantage of multiple evidence-based programs. Brown and colleagues (2014) assessed the influence of five possible community-level mediators of the effects of CTC on youth substance use and antisocial behavior. The five mediators they examined are core components of CTC's theory of change with respect to reductions in risk and problem behaviors: (1) community adoption of science-based approaches to prevention, (2) collaboration on prevention initiatives, (3) widespread support for prevention, (4) community norms against drug use and antisocial behavior, and (5) use of the social development strategy in everyday interactions. The researchers found that CTC's impacts on youth problem behaviors in grade 8 were fully mediated by changes in community adoption of a science-based approach to prevention; none of the other putative mediators had a significant impact. This study is notable for having identified a single core component as the active ingredient in mediating change in CTC's overall objective of preventing problem behaviors in youth. Another study examined community adoption of the program by surveying community members about their awareness and use of prevention science concepts, use of epidemiological data, and system monitoring (Cambron et al., 2019).

Pinning Down Essential Factors

The studies of mediation described above show how the operation of core theoretical constructs can be established and how specific components of an intervention influence long-term outcomes. However, such studies do not provide strong evidence about which components of interventions can be dropped to make the program more efficient. With CTC, for example, the benefits likely occur not solely as a result of half-day orientation sessions for leaders; rather, the training of a well-functioning community coalition to use tools and decision-making processes in selecting evidence-based programs and implementing them with fidelity is likely extremely important.

Methods for isolating the core components of an intervention more precisely have been proposed. Dismantling or factorial designs (methods for disentangling potentially influential factors) could provide robust evidence about which intervention components are necessary to produce desired effects on youth

⁴For more information, see <https://www.communitiesthatcare.net>.

outcomes and which can be removed to streamline or adapt the intervention (Collins, 2014; Collins, Murphy, and Strecher, 2007; Danaher and Seeley, 2009; Lindquist et al., 2007). One such approach, the Multiphase Optimization Strategy, uses a three-step process based on engineering principles (Collins and Kugler, 2018; Collins et al., 2005). In the first step, a variety of experimental methods are used to assess an array of interventions or delivery components; a second set of experiments is used to confirm the identification of essential components; and finally, efficacy and effectiveness are confirmed in randomized controlled trials. Other work has also used trials of a range of intervention components to identify those that are essential, beginning with a thorough evaluation of a single multicomponent intervention (Collins, 2014; Collins, Murphy, and Strecher, 2007; Danaher and Seeley, 2009; Lindquist et al., 2007; Mohr et al., 2015).

Mediating constructs, such as community adoption of particular prevention strategies, may be complex, so disentangling them into more discrete elements may further illuminate causal mechanisms. Moreover, because many preventive interventions are intended to influence multiple outcomes, potentially through multiple proximal intervention targets, holistic analyses are often desirable. Another approach, the sequential mediation study, explores the operation of an intervention across time to examine possible reactions and complex pathways involving relationships among cognitive, biological, social, and/or behavioral mediators (Deković et al., 2012; Sandler et al., 2011).

Monitoring Fidelity

Once core components of a program have been established, monitoring the fidelity with which they are being implemented as the program is being designed and tested is critical. Yet systematic attention to both fidelity monitoring and the role of core components has been neglected in the past and still is (Dane and Schneider, 1998; Jensen et al., 2005; Matthias and John, 2010; Moncher and Prinz, 1991; O'Shea et al., 2016; Prowse and Nagel, 2015). While fidelity monitoring is important in efficacy trials, moreover, it becomes even more so—and more complicated—once an intervention has been put into practice in real-world environments (Crosse et al., 2011). Although the value of consistent quality monitoring has long been recognized, securing the necessary resources and managing the increased burden such monitoring can place on service systems, practitioners, and consumers can be significant challenges (Aarons, Fettes, et al., 2009; Aarons, Sommerfeld, et al., 2009). Regardless, without data to suggest whether a program has been implemented with fidelity, it is unclear whether program outcomes can accurately be attributed to the program itself or whether poor implementation was a culprit in unexpected outcomes (Fixsen et al., 2013).

Researchers have suggested ways to support fidelity assessment in both the research and scale-up stages of an intervention (refer to Box 8-2). Increasing the connections among clearly identified core intervention components, fidelity assessments, and intended intervention outcomes, as well as ensuring much more rigorous monitoring of core intervention components in both research and

practice, may be essential to achieving desired outcomes in everyday practice more consistently. These recommendations also make clear that fidelity monitoring is a shared responsibility for implementing organizations or evaluators, supported and reinforced by stakeholders.

BOX 8-2
Ways to Support Fidelity Monitoring

- **Researchers:** Identify, measure, and test the efficacy of core program components.
- **Funders:** Include the specification of core components among project deliverables to support both demonstration or pilot testing and quality assurance and improvement efforts.
- **Decision makers for program adoption:** Include among program selection criteria (1) a clear description of core program components; (2) clarity on how core components are connected with expected program outcomes; (3) fidelity assessment tools that are feasible, reliable, and valid; and (4) monitoring mechanisms in place to provide feedback for improvement to program implementers.
- **Program disseminators:** Provide fidelity assessment resources or capabilities with which to monitor the presence of core components during implementation, and clearly comment on potential detriments to intended outcomes when fidelity is low.

SOURCE: Adapted from Blasé and Fixsen (2013, p. 2).

CHOOSING AND ADAPTING PROGRAMS FOR LOCAL COMMUNITIES

Although identifying the core components of a program is critical, a growing body of research is emphasizing that programs are more effective and sustainable if they are responsive to local needs, preferences, and capacities (Horner, Blitz, and Ross, 2014; Walker, Bumbarger, and Phillippi, 2015). The diversity of the U.S. population and its communities highlights the importance of careful attention to the distinctive cultural characteristics of communities in implementing interventions related to MEB health at scale (Bernal, Jimenez-Chafey, and Domenech Rodriguez, 2009), particularly given the disparities in both access to care and outcomes for minority populations and those who live in underresourced communities (Alegria, Vallas, and Pumariega, 2010; Alegria et al., 2015; Coker et al., 2009).

Adapting programs to suit the local context requires care, however. The 2009 National Research Council and Institute of Medicine report notes a “long-standing consensus that health promotion and prevention programs should be culturally sensitive” (National Research Council and Institute of Medicine, 2009,

p. 302), and that adapting programs for cultural groups while maintaining their core components has yielded significant benefits. The report's authors observe that a culturally sensitive intervention has content that is welcoming to the target culture, is not offensive, and comes across as familiar to the people involved. However, they also describe the tension between making adaptations and preserving the elements essential for effectiveness, and note the limited research on cultural, racial, and ethnic issues related to adaptation of interventions. In general, assuming that the selected program accords with the needs and values of the local context in which it is to be implemented and that its core components have been identified, adaptations are most likely to have sustainable impact when they are based on evidence that shows they align with the program's goals and theory (Aarons et al., 2012; Castro and Yasui, 2017; Chambers, Glasgow, and Stange, 2013; Durlak and DuPre, 2008).⁵

Frameworks for Cultural Adaptation

Over the past two decades, researchers have developed several frameworks for cultural adaptation. For example, the Ecological Validity Model describes eight dimensions to be considered: language, persons, metaphors, content, concepts, goals, methods, and context (Bernal, Bonilla, and Bellido, 1995), and ADAPT-ITT provides a process framework for steps in adaptation, such as assessment to understand the target population, pretesting, consultation with topical experts, and pilot testing (Wingood and DiClemente, 2008).⁶ Other authors have distinguished between "surface" adaptations, which involve superficial aspects of an intervention, such as activities or materials, and "deep" structural adaptations that relate to content and affect outcomes of interest more directly (Resnicow et al., 2000).

Despite this thinking about what is important in adapting programs to meet the needs of diverse communities, a recent meta-analysis of studies of the effects of cultural adaptations on treatment outcomes suggests that results thus far have been mixed (Gonzales, 2017). A prior meta-analysis of ethnic minority children and adolescents who had received an evidence-based intervention showed no difference in outcomes for culturally adapted and nonadapted interventions (Huey and Polo, 2008), while other meta-analyses combining child and adult studies have found that culturally adapted interventions had modestly better effects,

⁵In practice, interventions that address MEB health and other objectives are frequently adapted without careful attention to fidelity. For example, in a survey of Pennsylvania program grantees, 44 percent of respondents reported making adaptations to program procedures, dosage, and content, both intentional and not (Moore, Bumbarger, and Cooper, 2013). Reasons cited were primarily logistical in nature: lack of time, limited resources, and difficulty with participant engagement.

⁶See also Lau (2006) for discussion of the Selective and Directed Treatment Adaptation Framework, designed for use in determining whether and to what extent adaptation is recommended.

particularly for adults compared with children (Benish, Quintana, and Wampold, 2011; Griner and Smith, 2006). A recent review of parent training interventions found that parents' ethnicity did not appear to moderate the effects of the interventions, and that cultural adaptation did not appear to improve outcomes compared with nonadapted programs (Ortiz and Del Vecchio, 2013). In their systematic review of four widely disseminated evidence-based parent training interventions, Baumann and colleagues (2015) found only 8 of 610 published studies that met their strict criteria for cultural adaptation; they advocate documenting explicitly how, why, and for whom adaptations were made (see, e.g., Chowdhary et al., 2014; Le et al., 2010).

These mixed findings suggest that, although surface adaptations may be necessary to ensure that interventions are culturally sensitive to and engage the populations being served, more rigorous research is needed to determine whether deep adaptations are warranted. Some researchers have noted the time and cost of evaluating these adaptations and the resulting potential delay in dissemination of effective treatments to those most in need (Domenech Rodriguez, Baumann, and Schwartz, 2011). Further, it may be best if intervention developers examine broad issues of culture and context in the development process, while gathering input from multiple constituencies.

A Focus on Community Engagement

Research on how to adapt programs effectively to serve diverse populations increasingly highlights the importance of engaging directly with communities. For MEB interventions, one way to accomplish such engagement and to respond directly to community needs is to engage community health workers in delivering the interventions. Such workers are often from the same community as the clients being served, and evidence of the effectiveness of this approach has been found in a variety of settings and for a variety of targeted problems in research conducted both in the United States and in other countries (Barnett et al., 2018). This research has addressed topics ranging from the delivery of a parenting intervention to Native American families to treatment for traumatic stress and mental disorders (Barlow et al., 2015; Chibanda et al., 2016; Murray et al., 2015; Nadkarni et al., 2015; Patel et al., 2016; Walkup et al., 2009). However, such barriers as rules and policies related to reimbursement (e.g., difficulty securing Medicaid payments for some types of interventions) have hampered the use of this approach in the United States.

Looking more broadly, multiple studies have shown community partnership and consultation in adaptation and implementation to be an effective approach (Barrera, Castro, and Steiker, 2011; Baumann et al., 2015; Goodkind et al., 2012; Guttmanova et al., 2017). An example of this approach is community-based participatory research (CBPR), which emphasizes reciprocal knowledge exchange and mutual benefit among partners (Minkler and Wallerstein, 2011; Wallerstein and Duran, 2010). A recent meta-analysis of eight programs using this approach found improvements in both health outcomes for individuals and

measures of health in the community (Salimi et al., 2012). Another study, in the context of targeting depression, compared the results for a CBPR-based approach with those for standard strategies for delivering depression care. The authors found that the results for some indicators were equivalent but others were better with the CPBR-based approach (Wells et al., 2013). Positive results have been documented for the CBPR approach in child and youth mental health interventions as well (Betancourt et al., 2015; Mance et al., 2010; Stacciarini et al., 2011).

The CBPR approach has shown particularly strong results in programs designed to promote MEB health in Native American populations. Native American youth have long been at particularly high risk for dropping out of high school, substance use disorders, teen pregnancy, and suicide. These high risks have been attributed to multiple factors, including poverty, historical and acute trauma, and lack of access to evidence-based prevention interventions (Brockie et al., 2015; Goodkind, Lanoue, and Milford, 2010; Ohannessian et al., 2015; Thayer et al., 2017; Whitesell et al., 2009). Studies using a CBPR approach to promote mental health among Native American youth have also demonstrated positive effects (Goodkind et al., 2012; Mullany et al., 2012). A study of two interventions for prevention of alcohol abuse among youth in a rural Native American community that were adapted for the local culture—Communities Mobilizing for Change on Alcohol (CMCA), a community organizing intervention, and CONNECT, a school-based universal screening and brief intervention—showed that both effectively decreased individual-level alcohol use and heavy episodic drinking (Komro et al., 2015). The CMCA intervention also had community effects on reducing overall access to alcohol among underage youth (Komro et al., 2017).

An alternative to adapting an existing evidence-based intervention is when local practitioners develop interventions based on the real-world needs and cultures of specific communities (Marsiglia and Kulis, 2009). This approach, often referred to as the use of practice-based evidence, highlights culturally specific interventions and healing practices that are used in ethnic minority communities and reflect the beliefs and values of the local community (Isaacs et al., 2005). Initiatives developed in this way may be well accepted as effective by the local community. However, one recent examination of interventions in use in a statewide setting showed that few practices, regardless of whether they were based on research or practice-based evidence, were culturally specific (Lyon et al., 2017). Moreover, most of the cultural features noted reflected only surface-level program characteristics, such as providing services in languages other than English or provider–recipient matching, rather than deep content characteristics that attend to cultural values and other central cultural components (Lyon et al., 2017).

IMPLEMENTATION STRATEGIES

Implementation strategies are methods and tools used to change policies, administrative procedures, and environments; they are the *how* of implementation, the means through which core components are put into practice. Such strategies might include, for example, engaging program consumers, providing training and technical support to staff delivering the program, or garnering stakeholder support for the program. The evolution of implementation science has included a focus on identifying, classifying, and studying these basic elements of the implementation process (Proctor, Powell, and McMillen, 2013). This section reviews in turn discrete and blended implementation strategies, providing three examples of the latter, and then examines the evidence on ways of supporting implementation efforts.

Discrete Implementation Strategies

Some implementation strategies are discrete—single actions or processes (e.g., reminders, educational meetings) that are part of an effort to implement a new practice or program. Researchers have examined discrete strategies and identified an array of purposes they serve, including engaging consumers of the program being implemented, developing relationships with other stakeholders, supporting practitioners, and providing interactive assistance or training (Powell et al., 2015; Waltz et al., 2015). Such actions are the building blocks of more complex strategies, and researchers have analyzed them in seeking to identify core implementation components and track and assess fidelity. Their analyses have also helped support the development of a common language for strategies and highlight those that have not been adequately studied, facilitating efforts to select and tailor strategies for different contexts (Powell et al., 2017).

Still, the evidence base on discrete strategies and ways of combining them to form multifaceted strategies remains nascent. Only a handful of strategies have been studied in detail. For example, strategies designed to change the behavior of health care professionals (such as giving them printed materials, conducting audits and providing feedback, and influencing them through local opinion leaders) have demonstrated some effectiveness (Grimshaw et al., 2012). But few strategies have been tested for their individual contributions to effectiveness, and researchers are increasingly turning their attention from questions about whether strategies work to how, why, where, and for whom they work. This research is a useful contribution to the field, but more research is needed to improve understanding of the potential impact of tailoring implementation strategies, the barriers to implementation in particular contexts, and optimal ways of selecting strategies (Baker et al., 2015).

Blended Implementation Strategies: Three Examples

Blended implementation strategies combine several discrete strategies to address broad implementation challenges (Powell et al., 2012; Spoth, Redmond et al., 2013). Those challenges are complex and can include, for instance, increasing local readiness and enhancing program quality (Chinman et al., 2015; Hawkins, Catalano, and Arthur, 2002). This section explores three examples of blended strategies, which have been developed and tested to assist agencies, communities, and states in sustainably implementing MEB health programs: Communities That Care (CTC), Promoting School-Community-University Partnerships to Enhance Resilience (PROSPER), and Getting to Outcomes (GTO).

Communities That Care (CTC)

CTC is a web-assisted system, first developed in the 1990s, designed to support communities in planning and capacity building aimed at promoting youth development through effective local coalition action. It provides such resources as instructional videos and other materials, research summaries, live training in the use of the materials for community members, and web-based consulting and coaching for communities and states.⁷ Its focus is on making evidence about prevention available so that communities can promote healthy development and outcomes and reduce problem behaviors in young people. The developers used a CBPR process (see above) to continuously improve the design (which has been tested in 24 randomized controlled trials), and CTC has now been implemented in several hundred communities in the United States (Chilenski et al., 2019; Fagan et al., 2019) and in Europe, South America, and Australia (Fagan et al., 2019; Jonkman et al., 2009; Pérez-Gómez et al., 2016; Toumbourou et al., 2019). Box 8-3 describes CTC's implementation process.

The central idea of CTC is that the training and technical support it provides serve as a catalyst for the development of a well-functioning community coalition of diverse local stakeholders. This coalition develops the skills needed to assess the highest-priority risk and protective factors in the community, and thus to select effective programs that can address community needs, implement those programs faithfully, and monitor the results (Hawkins, Catalano et al., 2008; Rhew et al., 2013). Reducing targeted risk and strengthening targeted protective factors is expected to lead to lower rates of problem behavior and more favorable behavioral health outcomes for local youth. The CTC process emphasizes community and collaboration for prevention activities and strengthening of community norms against adolescent drug use, and has defined a social development strategy to protect youth beginning at birth; refer to Box 8-4 (see also Brown et al., 2014).

⁷For more information, see <https://www.communitiesthatcare.net>.

BOX 8-3**Communities That Care's (CTC's) Implementation Process**

Implementation of CTC involves a five-phase process:

1. Get started: Communities get ready to introduce CTC. They work behind the scenes to:

- Activate a small group of catalysts.
- Assess how ready the community is to begin the process.
- Identify key community leaders to champion the process.
- Invite diverse stakeholders to get involved.

2. Get organized: Communities form a board or work within an existing coalition. After recruiting community board members, they:

- Learn about prevention science.
- Write a vision statement.
- Organize workgroups.
- Develop a timeline for installing CTC.

3. Develop a community profile: Communities assess community risks and strengths—and identify existing resources. The community board and workgroups:

- Review data from the community's youth survey.
- Identify priority risk and protective factors that predict targeted health and behavior problems.
- Assess community resources that address these factors.
- Identify gaps to be filled in existing resources.

4. Create a community action plan: The community board creates a plan for prevention work in their community to:

- Reduce widespread risks and strengthen protection.
- Define clear, measurable outcomes using assessment data.
- Select and expand tested and effective policies and programs using the Blueprints for Healthy Youth Development website.

5. Implement and evaluate: In this final phase, communities:

- Implement selected programs and policies.
- Monitor and evaluate them.
- Measure results and track progress to ensure improvements are achieved.

SOURCE: Excerpted from <https://www.communitiesthatcare.net/how-ctc-works>.

CTC has been evaluated in both quasi-experimental (Chilenski et al., 2019; Feinberg et al., 2007, 2010) and experimental studies (Brown et al., 2014; Hawkins, Catalano et al., 2008; Oesterle et al., 2018). These studies have provided strong support for CTC's theory of change and its impacts on positive youth development. Among the effects that have been documented are improved coalition functioning (Shapiro, Hawkins, and Oesterle, 2015; Shapiro, Oesterle, and Hawkins, 2015); sustained improvements in the adoption of a science-based approach to prevention (Gloppen et al., 2012, 2016); implementation of a greater number of effective programs relative to control communities (Fagan et al., 2011, 2012); high levels of fidelity to the program and CTC prevention system (Arthur et al., 2010; Fagan et al., 2009; Quinby et al., 2008); and improvements in risk and protection in middle school (Hawkins, Brown, et al., 2008; Kim et al., 2015).

BOX 8-4

Communities That Care's (CTC's) Social Development Strategy

[Using] the Social Development Strategy in daily interactions with young people...helps keep them on track for healthy development. The strategy has five key components:

1. **Opportunities:** Provide developmentally appropriate opportunities to young people, for active participation and meaningful interaction with prosocial others.
2. **Skills:** Teach young people the skills they need to succeed.
3. **Recognition:** Provide consistent specific praise and recognition for effort, improvement, and achievement.
4. **Bonding:** Acknowledge a young person's effort and promote positive bonding—a sense of attachment, emotional connection and commitment to the people and groups who provide that recognition. Bonding can occur with a family member, teacher, coach, employer, or neighbor.
5. **Clear Standards for Behavior:** Through the process of bonding, young people become motivated to live according to the healthy standards of the person or group to whom they are bonded.

SOURCE: Excerpted from <https://www.communitiesthatcare.net/how-ctc-works/social-development-strategy>.

Researchers have also generally documented sustained reductions in health risk behaviors among study participants, including reductions in the prevalence of current substance use, delinquency, and violence through grade 10 (Hawkins et al., 2009), and greater abstinence from gateway use of drugs and antisocial

behavior and lower incidence of violence through age 21 (Feinberg et al., 2010; Oesterle et al., 2018). A quasi-experimental trial across Pennsylvania school districts that implemented CTC showed small to moderate improvements in delinquency compared with students from non-CTC districts (Feinberg et al., 2010) and long-term (16-year) sustained reductions in substance use after statewide adoption of the program (Chilenski et al., 2019). Research to refine understanding of how the elements of the program function in different contexts is ongoing.

Promoting School-Community-University Partnerships to Enhance Resilience (PROSPER)

PROSPER is a system for linking university researchers with state and community teams to support the delivery of effective programs for preventing risky behaviors, promoting youth development, and strengthening families.⁸ Its focus is on taking advantage of existing public education infrastructure as a foundation for building the capacity needed to implement and sustain effective programs, engaging teams that understand local concerns and culture. PROSPER provides technical assistance so that programs are delivered as intended, as well as supported and sustained by the community.

In the PROSPER model, extension agents from land grant universities serve as prevention coordinators on local community prevention teams. Representatives from public schools co-lead the teams, and a state management team consisting of university officials and prevention researchers provides oversight and supports evaluation activities. PROSPER's National Network supports the partnership by providing training and ongoing technical assistance and coaching, as well as the expertise in prevention science of university-based prevention researchers. The extension agent offers community knowledge and experience in disseminating educational programs, while the public school offers access to youth and educators in the community. PROSPER builds on this initial partnership by adding other community providers of services to youth and families to form small strategic teams.

Once a strategic team has been formed, its members select one family-based and one school-based prevention program from a menu of evidence-based programs PROSPER has identified (an approach that contrasts with that of CTC, which gives communities more latitude in selecting programs). Team participants complete a three-unit training program (see Box 8-5). Program area specialists, prevention scientists, and evaluation experts support teams throughout the implementation process. PROSPER's National Network further supports partnership by providing training and ongoing technical assistance, as well as expertise in prevention science (Partnerships in Prevention Science Institute, 2019).

⁸For more information, see <http://helpingkidsprosper.org> (see also Spoth et al., 2004; Welsh et al., 2016).

PROSPER has been evaluated in a number of studies, including a longitudinal cluster-randomized trial that began in 2002 (Redmond et al., 2009; Spoth and Greenberg, 2011; Spoth, Clair et al., 2007; Spoth, Redmond et al., 2007; Spoth, Trudeau et al., 2013; Spoth et al., 2015). Among the program's documented benefits are small to moderate increases in rates of family recruitment in prevention programs; improvement in child and family risk and protective factors that predict adolescent substance use; reduced rates of prescription drug and opioid misuse; and reductions in youth misconduct, such as stealing, skipping school, and carrying a weapon (Spoth et al., 2015). Implementation studies of PROSPER have documented the role of poverty, attitudes about prevention, substance use norms, and prior experience with collaboration in predicting team functioning (Feinberg et al., 2007; Greenberg et al., 2007). These studies have also shown that providing technical assistance to a community team was associated with improved team functioning (Chilenski et al., 2016). Additionally, teams that functioned well early on were better able to address challenges related to long-term sustainability (Perkins et al., 2011). Teams also demonstrated multiple pathways to financial viability, with some communities generating more in external resources and others more in in-kind contributions (Welsh et al., 2016).

BOX 8-5
PROSPER's Training Program

All PROSPER trainings can be tailored to meet the needs of each partnership team, but generally include core content divided into three units:

- **Unit 1** occurs in the first year of the partnership, and focuses on initial organization and definition of participant roles. During this training, participants develop a long-term plan for full implementation.
- **Unit 2** also occurs in the first year. It builds on the first training by teaching participants about selecting and implementing a family-focused program.
- **Unit 3** takes place in year 2, and focuses on the selection and implementation of the school-based program.

SOURCE: Adapted from https://prosper-ppi.sws.iastate.edu/how-it-works/state-partnership-training?_ga=2.224854418.964852718.1553619796-683765434.1551211193 (Partnerships in Prevention Science Institute, 2019).

Getting to Outcomes (GTO)

GTO is a toolkit developed by researchers to help communities implement and evaluate programs that target risk behaviors in young people and, like CTC and PROSPER, is designed to link research on implementation with practice in

communities.⁹ Rather than identifying programs that researchers recommend to communities, GTO offers supports to community leaders in following 10 steps (see Box 8-6) to identify the best program for meeting the community's needs and adapt and implement that program effectively to achieve the desired results. Steps 1 through 6 are planning activities, steps 7 and 8 detail implementation processes and evaluation, and steps 9 and 10 focus on the use of data to improve and maintain programs.

GTO is both a model and a support intervention. The 10 steps are intended to serve as a guide for communities in identifying and implementing prevention programs on their own. Unlike PROSPER and CTC, which emphasize reliance on evidence in the selection of programs, GTO is intended to strengthen agencies' and organizations' use of prevention programs regardless of prior evidence of effectiveness. GTO also provides support, including manuals, in-person training, and onsite technical assistance (Wandersman, Chien, and Katz, 2012; Wandersman et al., 2016), designed to build practitioners' knowledge and strengthen their skills in such areas as goal setting, planning, and evaluation. This increased capacity, in turn, is expected to improve the fidelity of the selected prevention program and increase the likelihood that desired prevention outcomes will be achieved (Chinman et al., 2016).

BOX 8-6

Getting to Outcome's (GTO's) 10 Steps

1. **Focus** Choose which problem(s) to focus on
2. **Target** Identify goals, target population, and desired outcomes
3. **Adopt** Find existing programs and best practices worth adapting
4. **Adapt** Modify the program or best practices to fit your needs
5. **Resources** Assess capacity (staff, financing, etc.) to implement the program
6. **Plan** Make a plan for getting started: who, what, when, where, and how
7. **Monitor** Track planning and implementation. How did it go?
8. **Evaluation** Evaluate the program's success in achieving desired results
9. **Improve** Make a plan for continuous quality improvement
10. **Sustain** Consider how to keep the program going if it is successful

SOURCE: Excerpted from <https://www.rand.org/health-care/projects/getting-to-outcomes.html> (RAND Corporation, 2019).

⁹For more information, see <https://www.rand.org/health-care/projects/getting-to-outcomes.html> (see Chinman et al., 2018; Chinman, Imm, and Wandersman, 2004).

GTO has been tested in a number of studies, including those with both quasi-experimental and randomized designs. In a recent cluster-randomized trial, researchers documented improvements in process outcomes and in youth attitudes related to sexual risk behaviors, such as intentions with respect to condom use (Acosta et al., 2013; Chinman et al., 2009); however, youth behaviors, such as frequency of sex and condom use, did not change (Chinman et al., 2018).

Evidence about Implementation Support

External providers of implementation support work directly within organizational and system environments to ensure the success and sustainability of program implementation and scale-up. Implementation support is sometimes provided by the technology-transfer companies established to disseminate well-established programs, although it is most commonly a function of intermediary organizations established to support the implementation or scale-up of a number of effective programs within a region or state (Franks and Bory, 2015; McWilliam et al., 2016; Mettrick et al., 2015). Such support may be paid for by program adaptors, but is more commonly paid for by program funders (e.g., state and federal service administrators, private foundations) to support their investments and increase the likelihood of success.

The three examples described above illustrate how implementation support may enhance the capacity of agencies, coalitions, and communities to carry out prevention programming. Each of these blended implementation strategies includes the provision of external support in the form of training and technical assistance for facilitators, as well as change agents. This type of support is found in most implementation frameworks; it is generally both proactive and responsive in nature and usually involves a combination of implementation science and skills training, facilitation, and supportive behavioral coaching for individuals, groups, and organizations (Meyers, Durlak, and Wandersman, 2012).

Other work has clearly indicated that external support plays a primary role in optimizing local implementation outcomes (Berta et al., 2015; Blasé, 2009; Chinman et al., 2016; Katz and Wandersman, 2016; Rushovich et al., 2015; Spoth and Greenberg, 2011; West et al., 2012). Studies of the PROSPER model, for example, showed that collaboration with providers of technical assistance (e.g., cooperation, responsiveness) was associated with the achievement of local implementation goals, such as higher participant recruitment rates and stronger functioning of community prevention teams (Chilenski et al., 2016; Spoth, Clair, et al., 2007). The provision of external support early in local implementation processes demonstrated particular benefits in studies of CTC and GTO (Chinman et al., 2016; Feinberg, Ridenour, and Greenberg, 2008). Similar work in other contexts reinforces these findings (Fagan and Mihalic, 2003; Leeman et al., 2015; Romney, Israel, and Zlatevski, 2014; West et al., 2012), although research to determine the necessary dosage of implementation support has thus far been indeterminate (Beam et al., 2012; Chinman et al., 2016; Feinberg, Ridenour, and Greenberg, 2008; Spoth, Clair, et al., 2007).

SUMMARY

Research conducted in the past decade has shed additional light on aspects of implementation that are key foundations for successful scale-up of effective approaches.

CONCLUSION 8-1: The effectiveness of an intervention intended to foster healthy mental, emotional, and mental development depends on careful research that identifies the intervention's core theoretical components that are essential to its effectiveness and how those components influence long-term outcomes. While a variety of methods for assessing core components have been developed, they have not been routinely applied in trials, and more work is needed to develop means of distinguishing essential from nonessential components.

CONCLUSION 8-2: Adapting nonessential elements of a program so that it meets the needs of diverse communities while retaining the program's core components is key to successful implementation. While more research is needed to develop methods of identifying specific adaptations that yield improved outcomes, strong evidence indicates that engaging communities closely in the selection and implementation of promotion and prevention programs is critical to program success.

CONCLUSION 8-3: The evidence base on discrete implementation strategies and ways of combining them remains nascent. A handful of discrete strategies have been studied in detail, but research is needed to improve understanding of optimal ways of selecting such strategies and the potential impact of tailoring them to address the barriers to their implementation in particular contexts.

CONCLUSION 8-4: Evidence indicates that blended implementation strategies that involve external support to practitioners in such forms as providing training, technical assistance, or facilitators play a key role in optimizing local implementation outcomes.

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Effective Implementation: Partners and Capacities

Large-scale implementation requires more than a well-researched program design based on clear evidence for the efficacy of both core components and the specific practices through which those components take effect, thoughtfully adapted to meet the needs of diverse communities. The process of implementing an intervention at a scale that maximizes its impact also requires the system capacity—organizational infrastructure, resources, and abilities—to deliver it to a broad population and sustain the effort. That is, it requires not only effective methods and tools that can affect the behaviors and actions of people and organizations and thereby bring about change, but also an engineering process that produces the capacities required to sustainably support the use of those methods and tools in local settings.

In this chapter, we explore primary elements of this process, based on the now voluminous number of implementation models, frameworks, and strategies in implementation science (Tabak et al., 2012; Waltz et al., 2015). We look first at an integrated model of the overall functioning of the system, synthesizing key features and foundational concepts from across many of the more applied implementation science models. We then explore the roles of key partners involved in this model—the “co-creation” partners who each play a part in developing the capacities needed to make programs and interventions work and sustain them at scale. Next we focus on some key elements of effective overall system capacities for scale-up: collaboration, including leadership and implementation teams, community coalitions, and learning collaboratives; workforce development systems; systems to monitor and improve quality and outcomes; and communications and media systems for disseminating science-based information within communities beyond direct intervention services alone.

A MODEL OF SYSTEM FUNCTIONING

Researchers have created models of how partners work together to develop the capacity for successful implementation of a program at scale and the key functions involved. Figure 9-1 depicts a model of essential partners, capacities, and processes needed to achieve sustained benefits at a population level—a theory of change. Co-creation partners¹ (Metz, 2015), shown at the left of the figure, work together, each contributing in a different way but collectively supporting the development of a system with the capacity to implement and scale the intervention, which has the elements shown in the green band. The system is optimized to pursue key implementation outcomes as it is first put into practice and then adapted (center band); information is collected about initial results and developments on the ground related to feasibility, fidelity, cost, how the intervention is received by participants, and the like (Proctor et al., 2011). As this system becomes operational, attention focuses on outcomes at the individual, family, school, and community levels, and further modifications are made to optimize these outcomes (band second from right), with the objective of ultimately effecting robust improvement that is evident in population-level indicators, represented in the band on the right.

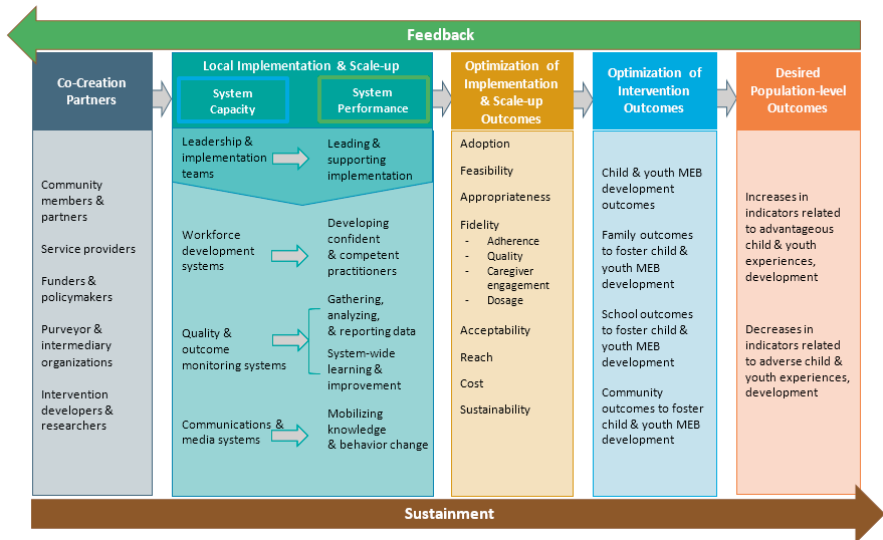


FIGURE 9-1 Integrated theory of change for the successful, sustainable scale-up of evidence-based interventions.

SOURCE: Adapted from Aldridge, Boothroyd, Veazey, et al. (2016) and Chinman et al. (2016).

¹“Co-creation” is a term also used in a business context to refer to strategies for blending ideas and contributions from varied partners interested in a shared goal.

If successful, this process can contribute to the establishment of learning-based partnerships and shared accountability for strategies and outcomes. Figure 9-1 highlights the importance of each of the partners and each link in the process, but it is important also to emphasize that the scaling system is a feedback loop, as indicated by the arrows in the figure representing support and feedback. At each stage of the process, practitioners and researchers collect data and other kinds of feedback about results, unexpected difficulties, and the ideas and experiences of practitioners and program participants. This information is used continuously (but especially in the early stages) to refine the design of the intervention and plans for implementation, develop effective adaptations for diverse community needs, improve intervention and implementation as scaling continues, and sustain the intervention and the scaling process as needs and challenges develop.

CO-CREATION PARTNERS

Researchers have used the term “co-creation” to describe situations in which partners are closely involved in both the identification of the problem to be solved and its solution, and whose involvement is both coordinated and aligned with program goals (Metz, 2015; Metz, Albers, and Albers, 2014; Pfitzer, Bockstette, and Stamp, 2013; Voorberg, Bekkers, and Tummers, 2015). Although the literature on co-creation partners includes field and case studies that characterize the contributions of the various partners and how they coordinate, little evidence has emerged thus far about the direct outcomes of co-creation. Nevertheless, the importance of each of these groups of partners is clear.

Community Members

As co-creation partners, community members are those who can be expected to benefit broadly from the implementation or scaling of an effective intervention, including individuals and families who would benefit directly from participation and other community stakeholders who might benefit indirectly from the improved outcomes for individuals and families. Apart from participating in the program, community members may help spread information about it or provide tangible and intangible supports (International Association for Public Participation, 2014). They also may help shape the political and policy climate to support the program’s scaling. From case studies of the implementation of a practice model in county child welfare environments, Boothroyd and colleagues (2017) identified five key functions that community members may play in the development of system capacity for program implementation and scale-up: (1) relationship building, (2) addressing system barriers, (3) establishing culturally relevant supports and services, (4) meaningful involvement in implementation, and (5) ongoing communication and feedback for continuous improvement.

Community members may also be partners in research that supports effective program implementation (Deverka et al., 2012; Graham et al., 2016;

Lavallee et al., 2012). While seeking community input can slow the change process and may add an additional layer of complexity, it is key to true collaboration (Barnes and Schmitz, 2016; Boothroyd et al., 2017). Researchers have drawn lessons from efforts to engage community members. For example, D'Angelo and colleagues (2017) examine the implementation of a policy in Washington State designed to increase the availability of and access to mental, emotional, and behavioral health-related practices and describe successful strategies for planning, education, financing, restructuring, and quality management. Walker and colleagues (2015) explore the use of a statewide Tribal Gathering for multiphased engagement of tribal communities in the planning of behavioral interventions for youth. And Sanders and Kirby (2012) use examples from large trials of Triple P (Positive Parenting Program) to highlight community engagement strategies, means of enhancing program fit with community needs and preferences, and ways to increase population reach. Nevertheless, more research is needed to clarify effective strategies for engagement and their outcomes.

Service Providers

Service providers are leaders, managers, supervisors, and practitioners who have a stake in the adoption, implementation, and outcomes of a program, and they play at least two key roles. First, practitioners and their direct supervisors have a distinct perspective on program fit, delivery, and reception. They may be able to point to gaps in the program, its organization, and the system that supports its implementation that are more difficult for leaders and external partners to see, thus creating unique opportunities to advance desired outcomes strategically during planning and improvement processes. Second, the readiness of service providers to change and act when a new program is implemented is critical to its success, although “readiness” is not simple to assess and should perhaps be viewed as a process rather than a state (Dymnicki et al., 2014).

While researchers are only beginning to look in detail at what readiness entails, some have suggested that it is a combination of willingness and ability in the context of a program that fits the context and community well (Dymnicki et al., 2014; Flaspohler et al., 2012; Horner, Blitz, and Ross, 2014; Scaccia et al., 2015; Weiner, 2009). It is important to note further that, while the concept of readiness for implementation may have primary relevance to service providers, the concept may also be meaningful across all co-creation partners.

Additional work has also pointed to the importance of strong organizational leadership; communication; and openness to trying new policies, procedures, and programs, as well as to the value of careful site selection (Chilenski et al., 2015; Romney, Israel, and Zlatevski, 2014). Additional research on factors, strategies, and outcomes related to organizational readiness is clearly needed.

Funders and Policy Makers

Funders are individuals and organizations, whether public or private, that provide financial support for a program's implementation or scale-up, while policy makers set legislative or administrative policy related to factors known to contribute to MEB well-being (e.g., the availability of effective services, the community environment). Both groups are key to making the environment hospitable for a sustainable program (Chapter 10 reviews recent developments in funding and policy making at the federal state, and local levels).

Powell and colleagues (2016) analyze efforts in Philadelphia to transform a behavioral health system. These authors suggest that policy strategies at the service provider, state agency, political, and social levels show promise. They see little benefit from strict mandates that might force top-down approaches, finding instead that developing broad political support by engaging multiple stakeholders is the approach most likely to succeed. This perspective is supported by a study of policy makers' perspectives on the implementation of an evidence-based program, SafeCare, in two state child welfare systems (Willging et al., 2015). This study showed that SafeCare was sustained where policy makers had strong partnerships with service providers and academic institutions. Policy makers who participated in this study also pointed to robust planning and collaborative problem solving by all stakeholders involved as elements in program success. Also aligned with this perspective is work demonstrating the value of networking in helping all partners gain access to information, resources, and tools for decision making (Armstrong et al., 2013; Tricco et al., 2016). The important role of legislative staff members in advancing mental health-related policy has also been noted (Purtle, Brownson, and Proctor, 2017).

Purveyors and Intermediary Organizations

Purveyors are people who provide training and technical assistance for implementers or supporters of a program, usually through a close relationship to the program's developer (Fixsen et al., 2005). Their interactions with service providers may include both formal interactions addressing such matters as program guidelines, adherence, training, and supervision, and informal interactions addressing personal and professional issues outside the scope of primary work efforts (Palinkas et al., 2009). Purveyors also may collect evaluation data, as well as local and clinical knowledge, from the service providers with whom they work as part of effective adaptation of the program to the local context. Among the factors that promote effective interactions between service providers and purveyors are accessibility, mutual respect, a shared language, and a willingness to engage in negotiation and compromise (see, e.g., McWilliam et al., 2016; Schoenwald and Henggeler, 2003; Webster-Stratton, Reid, and Marsenich, 2014).

Whereas purveyors typically represent a single program, intermediaries—organized centers or partnerships developed to support state and local agencies—

support a wide range of programs (Mettrick et al., 2015). Often housed within universities or nonprofit organizations, they take direction from state and local governments and complement state and local efforts to use research evidence to improve child, family, and community outcomes. Their functions may include providing support in the identification of promising programs and service delivery models; conducting research, evaluation, and data linking; supporting partnership engagement and collaboration; assisting in workforce development activities, including training; and providing expertise in policy and financing (Mettrick et al., 2015).

A study of two centers that play the intermediary role—the Evidence-based Prevention and Intervention Support Center at Penn State University’s Prevention Research Center and the Center for Effective Practice at the Child Health and Development Institute of Connecticut—highlights ingredients that appear to promote successful interactions between such groups and the other stakeholders with whom they interact (Bumbarger and Campbell, 2012; Franks, 2010; Rhoades et al., 2012). This work points to the importance of, for example, attending to the immediate needs of practitioners and policy makers, ensuring clear communication and recommendations by using media common to and accessible to these audiences, balancing research and science with local expertise and wisdom, and establishing mutually reinforcing activities and shared objectives among partners.

Intervention Developers and Researchers

Individuals and organizations that conduct the research needed to generate or improve the design of a program clearly play a critical role, as do those that carry out the continued work necessary to increase the program’s utility and support its implementation and scale-up. Progress in methods for consistently identifying a program’s core components (discussed in Chapter 8) should allow developers, program purveyors, and intermediaries to support service providers with feasible and valid fidelity assessment and adaptation processes.

The value of partnerships between researchers and other stakeholders is also garnering increased attention. One key benefit of such collaboration is in the translation of field evidence to ongoing program improvements that support more efficient implementation processes, better implementation outcomes, and stronger program outcomes (Chambers, Glasgow, and Stange, 2013). An ongoing process of development, evaluation, and refinement allows for the ultimate achievement of effective programs, as long as that process is supported by shared access to data obtained through program and implementation monitoring (discussed below) (Chambers and Azrin, 2013). This approach is illustrated by the Plan-Do-Study-Act cycle (Taylor et al., 2014) (see Box 9-1). It is also of benefit in guiding the necessary iterative actions of other co-creation partners, particularly those closer to the ground level of implementation efforts. We discuss monitoring and related issues more fully in Chapter 11.

BOX 9-1
Plan-Do-Study-Act (PDSA)

PDSA—a quality improvement model that originated in industry and has been used extensively in other sectors, including health care—has been promoted by the Agency for Healthcare Research and Quality.* An element of the Institute for Healthcare Improvement’s Model for Improvement, it is intended for use by a team that has identified an objective and a way to pursue it. PDSA provides a methodology for designing and testing improvements as an ongoing process. This methodology is dependent on the collection of data on the outcomes of a program, preferably in real time, that are used to support decisions about modifying the program. It has advantages in both time and cost efficiencies.

PDSA consists of a four-step process, which is usually carried out repetitively to arrive at a desired program improvement:

1. Plan—Plan the test of change, including a plan for collecting data.
2. Do—Try out (implement) the test on a small scale.
3. Study—Analyze the data, and study the results.
4. Act—Refine the program or process based on what was learned.

*This agency is an office within the U.S. Department of Health and Human Services; for more information, see <https://innovations.ahrq.gov>.

SOURCE: Adapted from <https://innovations.ahrq.gov/qualitytools/plan-do-study-act-pdsa-cycle>; see also Taylor et al. (2014) for a review of effectiveness.

KEY ELEMENTS OF CAPACITY FOR SCALE-UP

Several key elements support effective implementation of a program at scale, including collaboration, workforce development systems, quality and outcome monitoring systems, and communications and media systems.

Collaboration

Collaboration is needed at multiple levels, including both within and among leadership and implementation teams and broader community coalitions. In some cases, these collaborations have been augmented by the use of learning collaboratives.

Leadership and Implementation Teams

Local leadership and implementation teams design and lead an organization-wide strategy for bringing about a targeted change (Higgins, Weiner, and Young, 2012). They act as internal change agents, ensuring that core components of a program are carried out and that it is implemented with fidelity (Aldridge,

Boothroyd, Fleming et al., 2016). Researchers who have examined implementation frameworks suggest that to be effective, leadership and implementation teams need to include individuals who have decision-making authority within the organization or community, some form of oversight over front-line practitioners' delivery of a program, and the capacity to both engage others (secure buy-in) and foster a supportive climate for the program (Meyers, Durlak, and Wandersman, 2012).

Implementation teams are part of effective blended strategies for implementation, such as the strategies of Communities That Care (CTC) and Promoting School-Community-University Partnerships to Enhance Resilience (PROSPER) (see Chapter 8). However, research to date has focused more on the factors that influence the functioning of such teams than on their specific effects on the implementation process (Feinberg et al., 2007; Perkins et al., 2011). An exception is a randomized controlled trial of a program now known as Treatment Foster Care Oregon, which targets adolescents with behavioral and other problems. This study showed that although community development teams did not lead to higher rates of or faster implementation, they were associated with greater program reach and more thorough completion of stage-based implementation activities relative to implementation efforts that did not use such teams (Brown et al., 2014). A study of Triple P service organizations found that leadership team capacity was associated with greater organizational implementation capacity and predicted agency sustainment of program delivery (Aldridge, Murray, et al., 2016).

Researchers have also focused on specific aspects of leadership in the context of implementation and pointed to various reasons for its importance. For example, two studies of transformational leadership strategies (those that are motivational and promote innovation and change) compared with other strategies, such as those focused on bidirectional relationships between leaders and followers, found that the former strategies tend to foster a sense that new programs are attainable and reduce perceptions that the program imposes burdens, as well as to promote favorable attitudes toward a new program or practice (Aarons and Sommerfeld, 2012; Brimhall et al., 2016). Strategies often associated with transformational leadership styles include recruiting and selecting staff members receptive to change, offering support and requesting feedback during the implementation process, and ensuring opportunities for hands-on learning experiences (Guerrero et al., 2016).

Other observational studies have identified features of system leadership that contribute to successful, sustained program implementation. These include setting a project mission and vision, planning for program sustainment early and often, setting realistic program plans, and having alternative strategies for program survival (Aarons et al., 2016). Qualitative studies have pointed to other roles played by leadership teams, such as championing the program and marketing it to stakeholders; institutionalizing the program through a combination of funding, contracting, and improvement plans; and fostering multilevel

collaborations among state, county, and community stakeholders (Aarons et al., 2016).

Community Coalitions

Successful leadership and implementation teams bring together individuals and groups within organizations and single-system environments and, depending on the scale of the program, across organizations and system environments. For large-scale programs, links across communities are needed. A community coalition is a relatively formal alliance of local organizations and individuals that have engaged to address a community issue collectively.² It serves as a hub for integrating and coordinating efforts, facilitating communication, and mutually reinforcing activities (Billioux, Conway, and Alley, 2017; Hanleybrown, Kania, and Kramer, 2012). The development of a community coalition is therefore a strategy for linking leadership, implementation teams, and other system partners in cross-sector community environments (Hawkins, Catalano, and Arthur, 2002; Spoth and Greenberg, 2011).

Researchers have examined the effectiveness of community coalitions developed for varied purposes. For example, a meta-analysis of studies of 58 community coalition-driven interventions to reduce health disparities among racial and ethnic minority populations yielded several conclusions (Anderson et al., 2015). It showed that coalitions focused on broad health and social care system-level strategies had modest but positive effects, as did coalitions that used lay community health outreach workers or group-based health education led by professional staff. More inconsistent results were found for coalitions that focused on more targeted system-level changes, such as improvements in housing, green spaces, neighborhood safety, and regulatory processes, as well as coalitions that used group-based health education led by peers.

Several studies have investigated factors associated with the success or sustainability of such coalitions and provided evidence for the value of a number of process and structural elements: community readiness; training and fidelity to the coalition process; the presence and formalization of rules; staff competence, focus, cohesion, and enthusiasm; effective board functioning; skilled, capable, and shared leadership models; membership diversity, engagement, and cohesion; member agency collaboration; diversity and leveraging of funding sources; and increases in coalition capacity, data resources, and funding resources (Brown et al., 2015; Brown, Feinberg, and Greenberg, 2010; Feinberg, Bontempo, and Greenberg, 2008; Feinberg et al., 2002; Feinberg, Greenberg, and Osgood, 2004; Gomez, Greenberg, and Feinberg, 2005; Johnson et al., 2017; Kegler and Swan, 2011; Zakocs and Edwards, 2006; Zakocs and Guckenburg, 2007).

²See <https://www.med.upenn.edu/hbhe4/part4-ch15-community-coalition-action-theory.shtml> for information about Community Coalition Action Theory.

One study focused specifically on the impact of community coalitions on outcomes for youth. A study of coalitions funded through the federally sponsored Strategic Prevention Framework State Incentive Grant showed that internal organization and structure, community connections and outreach, and funding from multiple sources each predicted reductions in one or more outcomes related to underage drinking that were sustained through young adulthood, especially for males (Flewelling and Hanley, 2016; Oesterle et al., 2018).

Learning Collaboratives

Learning collaboratives populated by independent programs with similar goals have been efficient mechanisms for program implementation and improvement over time. Used successfully in health care (Margolis, Peterson, and Seid, 2013), they serve not only as vehicles for joint planning, but also as laboratories for implementing, testing, and improving programs across a spectrum of sites. Sharing of learning within such collaboratives has considerable potential to accelerate the development and dissemination of effective programs, but also to support testing of outcomes in multiple sites. As implementation is a time-consuming and expensive process, novel approaches to effective and efficient scaling of programs will become increasingly important. As with any effort of this complexity, strong leadership, sharing among participants, and infrastructure are key ingredients in success.

Workforce Development Systems

The effectiveness of any program to foster healthy mental, emotional, and behavioral (MEB) development will depend on a well-trained workforce. However, both shortages in the numbers of individuals interested in this work and insufficient professional development for the existing workforce have been documented in health care, early childhood education, K–12 education, and community-based programs (such as home visiting) (Institute of Medicine and National Research Council, 2015). Documentation of the rising prevalence of adverse early childhood experiences, disadvantageous social determinants of behavioral health, and increasing health and educational disparities has focused the attention of policy makers and leaders on the need to strengthen this workforce.

A substantial body of evidence from fields including industrial and organizational psychology points to methods for identifying the attributes needed for particular roles; recruiting, selecting, and retaining workers likely to be successful; and providing continuous opportunities for both formal and informal learning (see, e.g., National Academies of Sciences, Engineering, and Medicine, 2017, 2018b). Education researchers and others have also contributed to a substantial body of work on both preparation and professional development for teachers (see, e.g., Institute of Medicine and National Research Council, 2012, 2015; National Research Council, 2010). We do not review these and other ways

of strengthening the early childhood workforce (see, e.g., Institute of Medicine and National Research Council, 2012, 2015; National Research Council, 2010) here but we note several areas in which researchers have focused on challenges for the MEB health-related workforce (see also Boat, Land, and Leslie, 2017).

The demands on those who work in MEB health-related settings are significant. Effective staffing of child-focused programs and sites requires a pool of individuals who can reflect in their daily activities the delicate balance between fidelity to core program components and the flexibility to meet the needs of those they serve. Staff in such programs frequently work with distressed children and families, and are called upon to bring compassion, patience, and a wide range of skills and strategies to such challenges as helping families provide supportive environments for children. These individuals must also be comfortable with and skilled at working in teams. At the same time, programs associated with fostering MEB health will increasingly integrate research into daily activities, and workers must contribute to ongoing data gathering and be responsive to the resulting need for modifications of programs and practices. Thus, these workers are called on to engage in quality improvement and to work collaboratively in interdisciplinary settings and across sectors of the landscape of programs that serve children and families and promote MEB health.

Program developers frequently specify criteria for recruitment and selection of workers based on the professional qualifications and experience determined to be necessary for staff who can deliver core components of the program design. For example, intensive family interventions that integrate cognitive-behavioral approaches may require practitioners with related training, experience, and possibly certification. However, for a program that relies on more straightforward behavioral practices shown to be effective in a variety of service settings, individuals with less formal training may be able to deliver the intervention reliably and effectively (Embry and Biglan, 2008). These individuals, including peer counselors, parenting counselors, and community health workers, come to the job with varied training, credentialing, and licensing; in many cases they are deeply culturally connected with the communities in which they work, and work at lower salaries than workers with more substantial credentials (Boat et al., 2016).

While many program purveyors provide training and materials as a foundational learning experience for new practitioners, it is important that training be well aligned with the core program components, not only to enhance practitioners' understanding of the essentials of program delivery but also to increase the efficiency of training processes (not spending an undue amount of time on peripheral or nonessential intervention ingredients). Despite the importance of foundational training in evidence-based practices, such basic training strategies as workshops, reading of treatment manuals, and brief supervision have not been shown to produce adequate training outcomes for practitioners or clients (Beidas and Kendall, 2010; Herschell et al., 2010). Other work has also supported the importance of active learning experiences for training practitioners in evidence-based practices (e.g., Beidas and Kendall, 2010). Other elements of effective training include experiential learning in a multidisciplinary

and well-supervised model setting, with frequent evaluation and two-way feedback.

Ongoing coaching and supervision of practitioners and other individuals also play an important role in maintaining an effective workforce, and researchers have examined features that enhance the effectiveness of these activities. For example, Nadeem and colleagues (2013) identify as particularly valuable continuing training close to the time when new skills are to be put into practice, the application of new skills to cases, a focus on skill building and mastery, problem solving related to implementation barriers, adaptation of treatments to meet circumstantial needs, planning for how to sustain the trained skills, and promotion of engagement and accountability. Worker-specific collection of performance data and feedback can be a helpful improvement tool.

The impact of coaching on the actual use of program practices has been demonstrated in varied contexts, including K–12 teaching and medical health coaching³ (see, e.g., Kraft and Blazar, 2018; Kresser, 2017; National Academies of Sciences, Engineering, and Medicine, 2017, 2018b). A theme in this work is that coaching and training can be effective if they incorporate such key features as targeting specific skills practitioners need and helping them link those skills to direct applications. For example, the authors of a meta-analysis of the impact of coaching on teachers found that training alone, even when it included integrated demonstrations, practice opportunities, and feedback, resulted in little applied transfer of innovative practices (Joyce and Showers, 2002). However, when ongoing coaching was provided within classroom environments, large gains were seen in the use and application of practices. Similarly, a study of training workshops for mental health care providers showed that feedback, consultation, and coaching provided as follow-up on material presented in the workshop were essential for improving adoption of the new practices, the development and retention of skills, and outcomes for clients (Herschell et al., 2010). A study of the implementation of new practices in community-based mental health and social service settings reinforces the finding that supportive coaching environments and systematic quality feedback are associated with favorable outcomes even beyond those related to fidelity, such as reduced practitioner turnover and no impact on increasing practitioner burnout (Aarons, Fettes, et al., 2009; Aarons, Sommerfeld, et al., 2009). Thus while these approaches require time and expertise, they appear to have clear benefits for effective implementation.

Quality and Outcome Monitoring Systems

The collection of information about quality and outcomes is vital to the continuous improvement that fuels effective implementation, and can be done in

³A medical coach supplements care given by the physician by providing patient education and supporting patients in adhering to prescribed care or treatments; see, e.g., <https://www.ama-assn.org/practice-management/payment-delivery-models/why-your-medical-practice-needs-health-coach>.

a variety of ways. Effective monitoring requires a multipurpose data infrastructure that includes systems for monitoring implementation quality and intervention and community-level outcomes, as well as the integration of other sources of relevant data. Quality monitoring systems collect data on implementation or scale-up, including the elements of fidelity (see Chapter 8) and other implementation outcomes as noted in Figure 9-1 and discussed by Proctor and colleagues (2011). Monitoring an array of implementation outcomes can ensure that quality benchmarks are being met and gives early indication of the extent to which intervention and community-level outcomes should be expected. For example, if intervention fidelity is low, it may be useful to increase practitioner supports during program training or coaching or to refine practitioner recruitment and selection criteria. Likewise, if reach is low, community leaders and implementation teams may seek to increase program adoption through the community, train more practitioners, or involve the support of community members and partners to address access problems or stigmas that may be associated with seeking support. Similar strategies could be used to address warning signs in other implementation outcomes.

Intervention and community-level outcome monitoring is a community-wide assessment process for monitoring the well-being of children and youth; its purpose is to identify trends or flag issues across different geographic areas and to contribute to assessments of the progress of programs and practices designed to bring about change. Researchers can use the data collected through such an infrastructure to continually improve a program or practice over time as they learn how the intervention functions in diverse contexts (Chambers, Glasgow, and Stange, 2013). The data can also provide feedback to practitioners and other stakeholders, who can use it to strengthen their contributions to the implementation process.

Community outcome monitoring systems are a critical element of a public health approach to promotion of child well-being and prevention of MEB problems.⁴ Such public health surveillance systems—which typically collect information about aspects of the health and well-being of children and adolescents—provide local assessment and monitoring data that can be used to prioritize needs, select evidence-based programs, and monitor program results. They identify the existence of problems, their effects, trends in their incidence, and the results of interventions (Rivara and Johnston, 2013). Such systems are also critical to implementation research, allowing scholars to pinpoint problems to be addressed, provide a basis for sound choices of interventions, and assess program impacts (Spoth et al., 2013). The Society for Prevention Research has described the key features of successful community monitoring systems (see Box 9-2). Spoth and colleagues (2013) also highlight the importance of using repeated

⁴For more information on community monitoring systems, see <https://www.preventionresearch.org/advocacy/community-monitoring-systems>.

assessments to monitor progress toward goals once a plan for implementing promotion and prevention programming is in place. The ideal may be to collect data and provide real-time feedback to participants continually so that implementation considerations and improvement opportunities remain closely connected.

BOX 9-2

Features of Successful Community Monitoring Systems

1. Provides the community with accurate estimates of well-being for the entire population of children and adolescents.
2. Encourages widespread participation of community members in the design, maintenance, and use of the system.
3. Identifies key indicators of well-being shown by research to be important, including measures of youth functioning and of the factors influencing development.
4. Integrates all available data, both survey-based and archival (routinely collected record data from various systems).
5. Generates information for decision makers and community members that is easy to understand and readily usable to answer specific questions.
6. Provides timely data about trends in well-being and in risk and protective factors that predict youth outcomes.
7. Provides the basis for priority setting and decision making regarding choices of programs, policies, and practices to improve youth well-being.

SOURCE: Adapted from Mrazek et al. (2004, p. iv).

It is essential that both relevant MEB outcomes and the prevalence of risk and protective factors be included in these measures, and that local-level data be collected to capture variations in the incidence of MEB problems and the presence of risk and protective factors across communities and neighborhoods (Fagan, Hawkins, and Catalano, 2008). Local variations in need and risk can be quite marked, as demonstrated by data from the Communities That Care Youth Survey (Arthur et al., 2007; Briney et al., 2012; Fagan, Hawkins, and Catalano, 2008). For example, a study comparing two high school populations from the same city showed that elevated risk factors at one high school included poor family management, parental attitudes favorable toward substance use, friends' use of drugs, and prevalence of favorable attitudes toward drug use (Briney et al., 2012). Elevated risk factors at the other high school indicated a need for programs to reduce community disorganization, academic failure, and interaction with antisocial peers.

Once a monitoring system is in place, periodic reassessment will identify changes in levels of MEB outcomes and risk and protective factors, which can in turn be used to assess progress in reducing problems and provide early warning

of emerging problems related to, for example, an economic downturn, rapid population growth, or other influences. Selection of the survey instrument, procedures for administering the survey and scoring the data, and training for all stakeholders who will use the data are all critical to the utility of a community monitoring system. Surveys that have been or could be used for this purpose include

- the Communities That Care Youth Survey (Beyers et al., 2004; Bond et al., 2005; Catalano et al., 2012; Fagan, Hawkins, and Catalano, 2008; Fleming et al., 2019; Glaser et al., 2005; Hemphill et al., 2011; Oesterle et al., 2012);
- Monitoring the Future (Johnston et al., 2010);
- the Centers for Disease Control and Prevention’s Youth Risk Behavior Survey;
- the European School Survey Project on Alcohol and Other Drugs (Hibell et al., 2009);
- the Global Student Health Survey (World Health Organization, n.d.); and
- the Early Development Index (Catalano et al., 2012; Janus and Offord, 2007).

We note also that a considerable amount of data is routinely collected as children and youth go about their lives, and much of these data have potential utility for researching and monitoring MEB health and development. Electronic data capture systems are used in health care, schools, and other child care and services settings. The opportunity to use big data techniques⁵ for observational research has not yet been well utilized for MEB health-related research, but use of these techniques is likely to increase in this context (Van Poucke et al., 2016). See Chapter 11 for further discussion of quality and outcome monitoring.

Communications and Media Systems

The presence of digital media in daily life, particularly among children and youth, provides the opportunity to include targeted outreach as part of almost any kind of large-scale MEB health program. Existing research suggests that mass media could contribute to efforts both to strengthen prosocial behavior and to prevent MEB problems in families and schools.

A 2010 review of studies on the impact of media campaigns designed to affect public health showed that mass media—both radio and television—can have a significant impact on a wide variety of health behaviors (Wakefield,

⁵While there is no one best definition of the term “big data,” it is generally used to refer to extremely large sets of digital data that cannot be digested without advanced analytic techniques (National Academies of Sciences, Engineering, and Medicine, 2019, pp. 2–10).

Loken, and Hornik, 2010). The authors found evidence that such campaigns may both influence individuals' decisions about their behavior and have indirect effects—for example, through the influence of people directly exposed to the campaign on others not exposed to it, or by increasing general support for both norms and public policies. Campaigns appear to have increased effectiveness when products and services to support health behavior change are concurrently available through community-based programs and, more broadly, policies are in place to support changes in targeted health behaviors. Media campaigns targeting smoking have been studied especially thoroughly, and have been shown to both promote quitting and discourage young people from starting the habit, but effects have been found in other areas as well.⁶ The Triple P system of interventions has also developed universal media-based strategies. The premise of these strategies is that media have the potential to influence aspects of child and adolescent development by directly affecting young people or by influencing parents' behavior and shaping norms and public policies (Sanders and Prinz, 2008). More recently, researchers have focused on the potential value of communicating through existing, or natural, community, social, and professional networks (Palinkas et al., 2011; Valente et al., 2015). (See Chapter 10 for discussion of technology-based developments.)

SUMMARY

By 2009, researchers had identified many approaches that can be effective in improving MEB health and development and began to focus on the challenges of implementing those approaches at scales broad enough to benefit large populations. In the past decade, researchers have learned more about what goes into effective adaptation of programs, tracking of fidelity, and other elements of this complex process. There is more to learn about how to support and sustain implementation systems, but it is clear that successful implementation of an MEB health promotion or prevention program at a population scale is a complex endeavor that depends on the involvement of multiple partners to create system capacity:

- Community members provide relationship building, support culturally relevant adaptation, provide communication and feedback, and partner with researchers and service providers.
- Service providers execute the program strategies and provide feedback on program fit, delivery, and reception.

⁶Behaviors for which effects were found included physical activity, nutrition, cardiovascular disease prevention, birth rate reduction, HIV infection reduction, cervical cancer screening, breast cancer screening, immunization, diarrheal disease, and organ donation, seat belt use, and reduction of drunk driving. However, for some behaviors, such as promoting parenting strategies for reducing drug use, media campaigns were not effective (Wakefield, Loken, and Hornik, 2010).

- Funders provide or help secure sustained resources.
- Policy makers secure resources as well as political and community support, and act in partnership with local service providers and researchers.
- Purveyors and intermediary organizations oversee program delivery, provide expertise, collect evaluation data and feedback from practitioners and clients, and collaborate with local service agencies, community members, and researchers.
- Researchers generate and improve the program design to meet community needs, analyze data and collaborate with service providers and purveyors to fine tune the program and address problems, monitor program fidelity, conduct evaluations, and analyze results.

These stakeholders work together to develop and operate the complex system that makes implementation possible.

Key elements that strengthen organizational infrastructure for the implementation system include

- leadership and implementation teams (including their collaboration and coordination within community coalitions);
- workforce development systems;
- quality and outcome monitoring systems; and
- communications and media systems.

CONCLUSION 9-1: Effective implementation of a well-researched program to foster healthy mental, emotional, and behavioral development at scale depends on an interactive system that provides the capacity to implement and continuously improve the program. Key elements of such a system include

- **active engagement of a diverse array of partners (community members, service providers, funders, policy makers, purveyors/intermediaries, and researchers);**
- **a well-trained workforce that is provided with ongoing professional development opportunities;**
- **active leadership and management (via implementation teams) within organizations responsible for delivering the program;**
- **the development of strong community coalitions that can muster sustained support for the program and provide community-level leadership;**
- **continuous fidelity monitoring and feedback;**
- **a system for monitoring the quality and outcomes of implementation efforts, barriers to successful implementation,**

trends in risk and protective factors and other influences on MEB development, and other relevant data;

- **learning through evaluation and improvement; and**
- **multiple methods of communication to publicize program objectives and share them with stakeholders and the community at large.**

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Part IV

Next Steps

We reviewed a considerable body of work that demonstrates the complex influences on mental, emotional, and behavioral (MEB) health and evidence for interventions that can operate across life stages and generations and across settings, using a variety of approaches to both promote healthy development and prevent disorders. We have explored emerging research on what is necessary to make such interventions effective at scale. The final question is how the United States can take advantage of this wealth of knowledge. In Part IV, we lay out a vision for a national approach to MEB health and describe specific ideas for pursuing that agenda. We begin, in Chapter 10, with a review of progress made in the past decade to foster MEB health and some of the challenges that remain. In Chapter 11, we outline a national agenda for making MEB health a priority and discuss the research needed to support sustained progress.

Exploring Recent Progress

Before considering next steps for fostering mental, emotional, and behavioral (MEB) health in children and youth, it is important to reflect on what has been accomplished in the decade since the publication of the 2009 National Research Council and Institute of Medicine report (National Research Council and Institute of Medicine, 2009). This chapter first looks at a sampling of programs that have been implemented or expanded at the federal and state levels, as well as efforts of private foundations and growing interest on the part of U.S. businesses, to illustrate the progress that has been made. It then focuses on new opportunities for promotion of MEB health that have been created by advances in technology. The last part of the chapter considers challenges that remain.

A SAMPLING OF PROMISING EFFORTS

Since 2009, both federal and state resources have been expended on developing new interventions to improve MEB health in children and youth, as well as conducting rigorous evaluations, replicating proven interventions, and adapting and disseminating them in new contexts. Important initiatives have also been undertaken by private foundations and the business community.

Federal Initiatives

The federal government has many programs focused on the MEB health of children and youth, supported by several agencies. One of these agencies is the Substance Abuse and Mental Health Services Administration (SAMHSA), an agency within the U.S. Department of Health and Human Services. SAMHSA's mission is fostering public health efforts to advance behavioral health, and the agency has many programs designed to advance that mission.¹ SAMHSA and the other federal agencies with youth-related MEB health programs have emphasized the importance of building an evidence base for these programs (Interagency Working Group on Youth Programs, n.d.) and have provided funding for

¹See <https://www.samhsa.gov/about-us>.

replication, adaptation, innovation, and evaluation. In 2017, for example, the U.S. Department of Education launched the Education Innovation and Research (EIR) grant program, part of a larger effort called Investing in Innovation. EIR supports the development, implementation, and scaling of innovative and evidence-based programs in coordination with state and local efforts through grants to both new and ongoing projects. In funding new projects, it focuses on launching, iterating, and refining interventions that have the potential to be scaled up; the criteria for funding ongoing projects include rigorous evaluation that justifies replication and scaling (U.S. Department of Education, 2015).

Another federal program that includes a focus on building the evidence for interventions is the Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program, discussed in Chapter 6. MIECHV, created by the Patient Protection and Affordable Care Act of 2010, is designed to improve maternal and child health, prevent child abuse, encourage positive parenting, and promote child development and school readiness through home visits with pregnant women and parents of young children (Paulsell, Del Grosso, and Supplee, 2014). Grants are given to states, tribal organizations, and nonprofit organizations, and grantees choose from a list of evidence-based service delivery models (states are allowed to use up to 25 percent of that funding for other programs). Grantees are required to demonstrate measurable improvement in at least four of six focus areas:

1. improvement in maternal and newborn health;
2. reduction in child injuries, abuse, and neglect;
3. improved school readiness and achievement;
4. reduction in crime or domestic violence;
5. improved family economic self-sufficiency; and
6. improved coordination and referral for other community resources and supports.

In addition to providing funds for home visitation programs directly, MIECHV funds a research and development platform. In 2017, for example, MIECHV awarded The Johns Hopkins University \$1.3 million for the development of a network of researchers and practitioners to increase knowledge about the implementation and effectiveness of home visitation programs (Health Resources and Services Administration, n.d.). Examples of additional federal initiatives aimed at fostering MEB health are listed in Table 10-1.

TABLE 10-1 Examples of Federal Initiatives to Foster MEB Health

Initiative	Focus Area(s)	Funding Supports	Agency
Investing in Innovation Fund (i3)	Educational access, achievement, and completion	<ul style="list-style-type: none"> • Replication • Adaptation • Innovation • Evaluation 	U.S. Department of Education
Teen Pregnancy Prevention Initiative	<ul style="list-style-type: none"> • Teen pregnancy and prevention of sexually transmitted infections • Associated sexual risk behaviors 	<ul style="list-style-type: none"> • Replication • Innovation • Evaluation 	U.S. Department of Health and Human Services
Maternal, Infant and Early Childhood Home Visiting Program (MIECHV)	<ul style="list-style-type: none"> • Maternal health • Child health 	<ul style="list-style-type: none"> • Replication • Innovation • Evaluation 	U.S. Department of Health and Human Services
Social Innovation Fund (SIF)	<ul style="list-style-type: none"> • Youth development • Economic opportunity • Healthy futures 	<ul style="list-style-type: none"> • Replication • Adaptation • Innovation • Evaluation 	Corporation for National and Community Service
Trade Adjustment Assistance Community College and Career Training (TAACCCT)	<ul style="list-style-type: none"> • Postsecondary education programs 	<ul style="list-style-type: none"> • Replication • Innovation • Evaluation 	U.S. Departments of Labor and Education
Workforce Innovation Fund	<ul style="list-style-type: none"> • Job training • Workforce development 	<ul style="list-style-type: none"> • Adaptation • Innovation • Evaluation 	U.S. Departments of Labor, Education, and Health and Human Services
Permanency Innovations Initiative (PII)	<ul style="list-style-type: none"> • Reducing long-term foster care 	<ul style="list-style-type: none"> • Innovation • Evaluation 	U.S. Department of Health and Human Services

SOURCE: See <https://youth.gov/evidence-innovation/investing-evidence>.

Finally, it is important to note that while federal efforts to promote MEB health and prevent MEB disorders and to evaluate their results are expanding rapidly, there has been significantly less federal emphasis on including MEB outcomes in the evaluation of programs whose principal focus is poverty, nutrition, and related areas. Many such programs are, nonetheless, likely to have important MEB outcomes.

State and Local Initiatives

States and communities have increasingly focused on implementing and evaluating evidence-based interventions to promote MEB health in the past decade. These initiatives have been diverse and have been funded through varying mechanisms and sources. They do, however, share an emphasis on expanding the evidence base for promotion of MEB health and prevention of MEB disorders, and on using this evidence base to implement programs in communities more effectively. Several examples of such initiatives are described below.

California

In 2004, California voters approved Proposition 63—the Mental Health Services Act—which legislated a 1 percent tax on all California personal incomes over \$1 million to support the delivery of accessible, effective, and culturally competent prevention and mental health services for children and adults in each of the state’s 58 counties (Felton, Cashin, and Brown, 2010). Twenty percent of these funds is allocated to Prevention and Early Intervention (PEI) programs, which aim to reduce risk for mental illness and provide early treatment for mental health problems so as to reduce negative consequences, such as out-of-home placement, involvement with the justice system, and school dropout. The remaining funds are directed to such programs as Assertive Community Treatment, outreach and engagement, information technology, education and training, and innovation. In one county, 33 evidence-based PEI interventions, such as Triple P (Positive Parenting Program), have been delivered to children and adolescents, with the majority of youth showing improvement in psychological distress (Ashwood et al., 2018).

California Proposition 64—the California Marijuana Legalization Initiative—included guidance on how the tax revenue collected from legal marijuana sales should be directed. The tax revenue is first used to cover costs of administering and enforcing the measure. Next it is distributed to drug research, treatment, and enforcement, including an initial \$10 million, increasing by \$10 million annually until 2022, for grants to local health departments and community-based nonprofits for initiatives including mental health and substance use disorder treatment (California Office of the Attorney General, 2015). Additional revenue will also be distributed to youth drug education, prevention, and treatment initiatives (California Office of the Attorney General, 2015). The Child and Adolescent Health Measurement Initiative has released

recommendations for how these grants can be used to promote family and community resilience (Child and Adolescent Health Measurement Initiative, 2019).

Colorado

A portion of the money raised by Colorado's taxes on legal marijuana is used for community-based substance abuse prevention and health promotion programs. During 2016–2017 and 2017–2018, more than \$16.1 million of marijuana-related revenue was used to implement a model called Communities That Care (described in Chapter 8) in 48 communities across the state (Colorado Department of Public Health and Environment, n.d.). The effectiveness of Communities That Care has been validated on multiple levels: randomized controlled trials have demonstrated significant and sustained effects; the program has been implemented successfully in numerous communities, with fidelity to core components; and those findings have been replicated in independent trials (Communities That Care, n.d.).

Massachusetts

In 2016, the Massachusetts State Legislature convened the Special Legislative Commission on Behavioral Health Promotion and Upstream Prevention to address behavioral health needs, including opiate addiction, in the state.² Made up of 24 community leaders with expertise in behavioral health, prevention, public health, addiction, mental health, criminal justice, health policy, epidemiology, and environmental health, the commission was tasked with identifying “evidence-based practices, programs and systems to prevent behavioral health disorders and promote behavioral health across the commonwealth.” It identified as primary goals identifying what is working, securing funding for effective programs, and thereby reducing the rates of behavioral disorders (PromotePrevent, n.d.). The commission issued a report in 2018 outlining a plan for promoting MEB health and preventing MEB disorders, and offering recommendations focused on investment in addressing behavioral problems early in young children and adolescents by applying an integrated behavioral health approach and on building the infrastructure for prevention and promotion (Cantwell, 2018).

Ohio

Ohio's Joint Study Committee on Drug Use Prevention Education was charged with collecting information about comprehensive prevention education

²For more information, see <https://www.promoteprevent.com>.

and making recommendations for substance use prevention education and other efforts in the state. The commission was a multidisciplinary group that included law enforcement officials; elected officials; and experts representing public education, prevention policy, and nonprofit entities. Its report, released in 2018, offers recommendations for providing annual age-appropriate prevention education in grades K–12 in Ohio schools, identifies best practices, and includes an inventory of effective programs (Ohio Attorney General’s Office, 2018).

Oregon

The PAX Good Behavior Game, an evidence-based program that promotes self-regulation, social-emotional learning, and a positive educational environment, has been implemented in classrooms in several Oregon counties. Funders supporting the implementation of this program include the Oregon Youth Development Council, Coordinated Care Organizations (networks of Medicaid providers), local departments of public health, and other community groups. (See Chapter 4 for a more detailed discussion of the Good Behavior Game.)

Pennsylvania

The Evidence-based Prevention and Intervention Support Center (EPISCenter) is supported by the Department of Drug and Alcohol Programs, the Department of Human Services, and the Commission on Crime and Delinquency, along with the Prevention Research Center at Penn State University. The focus of the EPISCenter is on implementing evidence-based programs in communities in order to promote youth development and reduce delinquency, violence, and substance use. To this end, the EPISCenter conducts original research and also provides assistance to communities for implementing and sustaining initiatives. The EPISCenter has developed an eight-step process for translating programs from the research laboratory into communities (see Figure 10-1). The first four steps represent the research activities that occur before programs are implemented in the field, while the last four steps are the translation and implementation activities that bring the programs to fruition in communities.

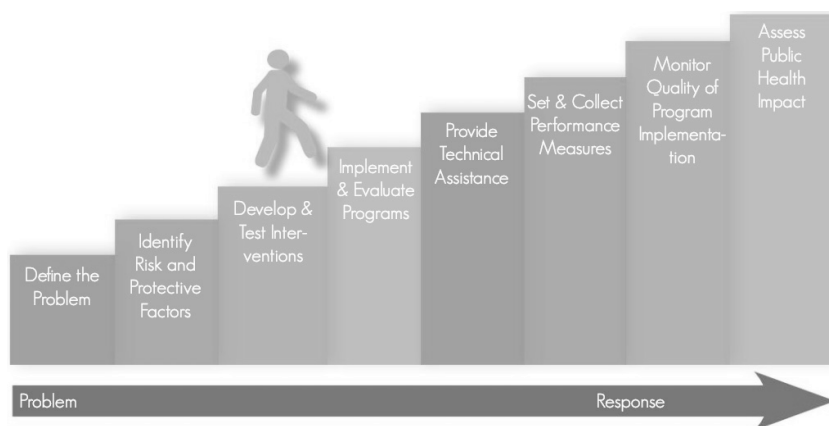


FIGURE 10-1 Translating from science to practice.
SOURCE: EPISCenter (2014).

Other State Initiatives

Like the federal government, states have a variety of policies that target other goals but can influence MEB outcomes for children and adolescents. For example, approximately 40 states, including the District of Columbia, now have universal preschool education as part of their public education systems, although eligibility, availability, and other characteristics of these programs vary (Rock, 2018). New York and California have increased minimum wage requirements. Early research suggests positive effects on workers and jobs, but effects on MEB outcomes for children and youth have not been evaluated. Efforts at the local and tribal level are also playing an important part (see, e.g., Chamberlain et al., 2016; Cwik et al., 2016).

Efforts of Private Foundations

Private foundations are also supporting efforts to build the research base and use it to implement initiatives that promote MEB health.

Evidence2Success

Evidence2Success, an initiative of The Annie E. Casey Foundation, is a framework for bringing public systems and community leaders together to improve children's well-being (The Annie E. Casey Foundation, n.d.). The initiative provides a roadmap for efforts of cities and states to engage communities in implementing evidence-based programs and provides tools to facilitate the process. These tools include a survey with which to collect data on local youth and to highlight areas in which programs should focus their efforts, a blueprint that matches the communities' strengths and needs with relevant evidence-based

programs, and public financing strategies to help generate or secure sustainable sources of funding for programs. Evidence2Success has been implemented in four sites.

Moving the Needle

Arnold Ventures (formerly the Laura and John Arnold Foundation) has established a number of programs designed to build the evidence base for social interventions and encourage policy makers to make decisions based on sound research and reliable evidence. One of these programs is Moving the Needle, a \$15 million initiative announced in 2016. Its purpose is to provide funding for the implementation of effective social programs in order to make progress on problems including poverty, education, and crime. The policy team at Arnold Ventures performed a systematic review of programs and identified approximately a dozen that are supported by robust evidence. Government and nonprofit organizations can submit proposals for implementing these programs in their communities. Grantees must use existing resources (e.g., federal funding) to implement a program, with Arnold Ventures providing funds for technical assistance. All grantees must agree that their programs will participate in a randomized controlled trial whose results will be used to determine whether the effects found in previous studies can be replicated (Arnold Ventures, 2016).

The Pew-MacArthur Results First Initiative

The Pew-MacArthur Results First Initiative is a joint project of the Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation. The program uses a cost–benefit analysis model that helps states identify which programs do and do not work; calculate potential returns on investment; rank programs based on costs, benefits, and risks; and predict the impact of different policy options. Results First supports this process with tools that help policy makers assess costs and benefits more accurately and formalize the use of data and evidence in decision making. In 2014, Results First released a report identifying and examining five key components of evidence-based policy making: program assessment, budget development, implementation oversight, outcome monitoring, and targeted evaluation (Pew-MacArthur Results First Initiative, 2014).

Role of the Business Community

Many U.S. businesses are devoting increased attention to ways in which they can have a positive impact on their employees' health and well-being; on the local communities in which they are situated; and for larger entities, on such social goods as promoting the public health (Fuller and Raman, 2019; Gilbert, Houlahan, and Kassoy, 2015). This is a developing area, and relatively few such efforts address MEB health directly. However, companies are increasingly aware of the

financial benefits of addressing issues that affect employees and their families, such as reducing the costs of employee health care. Many business enterprises, large and small, have also recognized the importance of health, both physical and behavioral, for employees and their families; support for mental health is increasingly being acknowledged as an important component of comprehensive employee wellness programs, an approach that has demonstrated benefits (Osilla et al., 2012). Although such efforts seldom extend to consideration of child development outcomes and lifetime behavioral health for employees' families, the health and well-being of communities has become a growing focus for many businesses and business groups, such as the Business Roundtable, a voluntary association of business leaders that includes promoting expanded opportunity for all in its mission.³

Many businesses also have significant resources to invest in their communities, and have begun to address their collective role in fostering better social and economic outcomes through targeted national initiatives, as well as through community support programs. Government policies, such as parental leave or minimum wage policies, can be used to encourage businesses to consider community and social issues, to provide businesses with resources and information, and to lead them to adopt family-supportive actions.

Research shows that employees with children who are physically and mentally healthy have fewer distractions and are able to be more productive in the workplace. By contrast, in many cases, employees whose children have chronic and disabling behavioral problems frequently find that either they or their spouse must quit their job to provide care and supervision for their child (National Academies of Sciences, Engineering, and Medicine, 2015). Given that 40 percent of the child population manifests a diagnosable behavioral disorder by age 25, this factor undoubtedly adds to employee turnover, a costly dimension of workforce maintenance (National Research Council and Institute of Medicine, 2009). Moreover, employees who have a child with a chronic health disorder are themselves at considerable risk for anxiety, depression, substance use, and other mental health disorders (Boat, Filigno, and Amin, 2017). These conditions have the potential to significantly undermine employee effectiveness.

Opportunities for business to directly support employee parents and improve the MEB development and health of their children include a number of evidence-based policies and practices. For example, paid maternity and paternity leave (see Chapter 6) have been shown to improve parent-child attachment and result in better child and family outcomes. When mothers do return to work, support for breastfeeding also encourages valued employees to stay on the job and eases their stress (Centers for Disease Control and Prevention, 2005, n.d.). Although such supports are becoming more common as more states adopt policies to encourage them, they are still inaccessible to many women. Similarly, child care that is stable and nurturing is of benefit for both children and their employee parents. Thus, the

³For more information, see <https://www.aspeninstitute.org/blog-posts/what-role-business-society>.

direct provision of child care or support for child care that is convenient and maximizes parent–child interaction also appears to contribute to positive child development outcomes (National Academies of Sciences, Engineering, and Medicine, 2018).

It is also worth noting that a healthy, thriving population can yield both strong employees and reliable customers. Poverty and unemployment are disturbingly prevalent in both urban and rural areas. Fully 40 percent of children in the United States grow up in households with incomes below 200 percent of the federal poverty line (National Academies of Sciences, Engineering, and Medicine, 2015). Children who end up in prison, become addicted, or experience a lifetime of poverty will not benefit business interests. In short, because children’s MEB health is a significant factor in the status of both potential employees and consumers within a population, efforts to foster the healthy MEB development of children and youth can have an impact on business opportunities and growth. One obstacle to business engagement in this area is that children are not the major purchasers of products. Children’s wishes do, however, drive consumer decisions. The children of today will also be the purchasers of tomorrow, and their health outcomes will help to determine consumer resources and attitudes.

Business efforts to promote employee and community well-being are promising. While many of these efforts do not explicitly target MEB outcomes, they still promote healthy MEB development in children and youth indirectly. A few examples are highlighted in Box 10-1.

TECHNOLOGY-BASED DEVELOPMENTS

Many technological developments of the past decade have application to fostering MEB health. Interventions that use computer, mobile, gaming, and Internet technologies have a number of advantages: they can be delivered at low cost; are convenient; minimize staff burden; can deliver content while maintaining fidelity; and are appealing, particularly to adolescents. All of these advantages may make digital interventions easier to implement and sustain relative to traditional interventions.

Researchers have begun to explore the effectiveness of digital interventions in addressing MEB health among adults. For example, studies of their use with adults have suggested potential benefits in preventing the onset of major depressive episodes (Buntrock et al., 2014; Karyotaki et al., 2017). Initial reports are promising; for example, computerized cognitive-behavioral therapy produced a higher rate of recovery compared with standard face-to-face treatments. These results suggest that digital interventions may be viable alternatives to more traditional forms of intervention, with the potential advantage of substantially lower marginal costs (Coker et al., 2016).

BOX 10-1**Using Business to Promote Employee and Community Well-being**

The U.S. Chamber of Commerce Foundation, supported by the Robert Wood Johnson Foundation, launched the **Health Means Business** campaign in 2017. This campaign engages leaders from business, government, nonprofits, health systems, academia, and the media in exploring critical links between business bottom lines and health outcomes that can be achieved by promoting healthy communities. This effort has featured a number of company programs addressing healthy MEB development and related goals, such as better nutrition, food security, and the creation of more play spaces (U.S. Chamber of Commerce Foundation, 2017).

Conscious capitalism has been defined as “ethically grounded free enterprise” (Arthur W. Page Center, 2019). It is a view that entrepreneurship, competition, and free trade are essential elements of a healthy economy, but that trust, compassion, and collaboration are also critical to success and the ability to make a positive impact on the world. Key to this approach is the idea that a conscious culture builds care and trust between a company’s team members and its stakeholders (Conscious Capitalism San Diego, n.d.; Mackey and Sisodia, 2014).

Done Good, a consumer organization, enlists consumer members who will redirect a percentage of their spending to brands that are committed to reducing poverty and improving the environment. The organization is supported by a small commission on sales from selected companies, which the companies promote online.

Benefit corporations are legally recognized companies that seek to promote the welfare of their communities as well as employee togetherness, improved workspaces, and such family support programs as company day care centers. To date, 34 states, the District of Columbia, and Puerto Rico have enacted legislation allowing businesses in their jurisdictions to organize as benefit corporations (Barnes, Woulfe, and Worsham, 2017). This status protects these corporations from legal challenges to activities designed to protect social and environmental values from profit-oriented shareholder concerns.

B Corps are for-profit entities that have opted to have their operations evaluated for potential certification by B Lab. Businesses that meet standards of transparency, accountability, and performance receive certification, which covers both treatment of workers and the environment, as well as whether and how the organization supports the community (B Lab; Storper, 2015). More than 2,700 companies in 60 countries have received certification (B Lab, n.d.).

There is also some evidence that Internet and mobile interventions can be used effectively with young people. The fields of eHealth (the provision of health services supported by electronic processes and communication) and mHealth (the provision of health services supported by mobile devices) have developed and grown because technology is ubiquitous, particularly among youth; encourages

active engagement; allows for a flexible and personalized environment; and is a primary means by which many adolescents obtain information and communicate (Lenhart, 2012). Adolescents' heavy use of technology can make it a motivating medium for health services targeting this population. In 2013, for example, 77 percent of youth ages 12–19 owned a cell phone, and a significant majority were texting daily. Notably, those living in lower-income households are just as likely as their better-resourced peers—and in some cases more so—to use their cell phones to access the Internet (Madden et al., 2013).

The evidence for technology-based interventions for promotion of MEB health in youth is still emerging, but initial results suggest that such interventions are promising. For example, a systematic review showed the feasibility of using text messaging and apps to promote such behaviors as clinic attendance, contraceptive use, physical activity and weight management, human papillomavirus vaccination, smoking cessation, and sexual health behaviors among adolescents (Badawy and Kuhns, 2017). Approximately half of the studies reviewed demonstrated significant improvement in these behaviors. Other studies have shown the efficacy of technology-based approaches targeting MEB disorders including depression, bipolar disorder, anxiety disorders, self-harm, conduct disorder, eating disorders and body image issues, schizophrenia, psychosis, and insomnia, as well as suicide prevention (Ali et al., 2015; Huguet et al., 2018; Marsch and Borodovsky, 2016; Perry et al., 2016; Vigerland et al., 2016).

Other forms of technology show promise as well. For example, a recent meta-analysis of web-based interventions to address depression in adolescents and young adults found the interventions to be efficacious in the short term and to have a positive impact on symptoms of depression and anxiety in adolescents developing or diagnosed with those disorders (Pennant et al., 2015; Välimäki et al., 2017). Another meta-analysis covering Internet-based depression treatment for both adolescents and adults in nonclinical settings showed such treatment to be as effective as other forms of behavioral therapy and more effective than comparison conditions, such as physical activity and psychoeducation (Huguet et al., 2018). Other work has supported these findings, and has indicated that technology-based approaches for providing peer-to-peer support and suicide prevention services show promise (Ali et al., 2015; Perry et al., 2016; Vigerland et al., 2016). Early findings also suggest that therapeutic video games have potential in engaging adolescents with anxiety and reducing clinically measurable symptoms of that disorder; technology-based programs have been used to target substance use as well (Champion et al., 2013; Marsch and Borodovsky, 2016).

Overall, these results suggest that technology is a promising tool for promoting healthy MEB development, and its potential for delivering interventions at significantly lower cost relative to other approaches is reason to actively investigate its use. However, there are limitations to consider as well. For one, attrition is a major issue with digital interventions. Only a small proportion of users actually complete most digital interventions, although advocates for such interventions point out that the absolute numbers of users who complete the interventions are large given the interventions' wide reach (Hardesty, 2012).

Another potential limitation is the fact that digital interventions have most frequently been tested with well-educated, highly motivated adults. The interventions tested may be less effective in real-world settings, where people may lack access to Internet-enabled devices or the knowledge or motivation to use the Internet.

On the other hand, digital interventions have the capacity to address disparities and bring health care to difficult-to-reach populations. For example, digital technologies have been used to address health issues in communities affected by war and other disasters (Knaevelsrud et al., 2015; Ruzek and Yeager, 2017; Ruzek et al., 2016), and to reach rural Latinos (Chavira et al., 2017) and Latinos nationally (Muroff et al., 2017; Pratap et al., 2017), as well as international populations of young people (Barrera, Wickham, and Munoz, 2015). They have also demonstrated success in delivering well-child care to low-income urban populations (Coker et al., 2016; Mimila et al., 2017). The use of technologies that can reach large numbers of individuals is especially attractive given the relative lack of health care resources in many diverse communities, including a dearth of providers who speak languages other than English in the United States. These technologies may therefore help reduce health disparities (Muñoz, 2010). This is an important consideration given research indicating not only that individuals with fewer resources have less access to health care interventions, but also that even when provided access to such interventions, they may benefit less from them relative to those with more resources.

At the same time, it is important to examine empirically whether certain segments of the population are less likely to benefit from technology-based interventions. For example, higher socioeconomic status at the country and individual levels was found to be associated with greater abstinence levels in an online smoking intervention study conducted in Spanish and English (Bravin et al., 2015). An additional concern associated with digital interventions is the possibility that third-party payers could use the evidence that digital tools are effective in preventing and treating MEB disorders to restrict reimbursement for in-person health care. Thus, it is essential to take into account the substantial impact of poverty on health status and on responsiveness to health interventions discussed in other parts of this report in decision making about the use of new intervention modes to reach greater proportions of all individuals with need.

ONGOING CHALLENGES

The programs discussed above highlight progress that has been made. We close by illustrating some of the questions that arise in the scaling up of programs that have demonstrable beneficial effects on children's MEB development.

Trade-offs

The Nurse–Family Partnership (NFP) National Service Office is a national network of nurses who visit the homes of young pregnant women and

continue those visits through the children's second birthday.⁴ This 40-year-old program has been the subject of three randomized controlled trials examining its effects on maternal and child health and child development, as well as numerous other evaluations and studies (Nurse–Family Partnership, 2017, 2018b). It has been disseminated to nearly all U.S. states, along with Canada and several European countries. The NFP website lists more than 34,000 families enrolled in 594 U.S. counties (Nurse–Family Partnership, 2018a). This is an impressive number, but it falls far short of population needs, considering that more than 20 percent of U.S. children live in families whose income falls below the federal poverty level (National Academies of Sciences, Engineering, and Medicine, 2015). Of those families eligible for home visitation programs, approximately half decline to enroll, and many of those who decline are identified as most in need (Goyal et al., 2014). Moreover, many participants do not remain engaged for the duration of home visitation programs (Holland et al., 2018).

As with many programs that progress to broad dissemination, this program's effect sizes diminish with replication, even when the program is delivered with fidelity (Miller, 2015). Scaled-up delivery of NFP costs about \$4,500 per child for each of the 2 years. An important challenge for implementation science and practice will be determining the extent to which cost, program complexity, and the infrastructure required for effective implementation will limit or permit rapid, broader dissemination of this and similar programs.

Home visiting programs, including NFP, served 156,000 families across the United States in 2017, reaching some families in 22 percent of rural and 36 percent of urban communities; these results were achieved with \$1.5 billion appropriated through the Affordable Care Act over 5 years (Health Resources and Services Administration, n.d.). At this funding level, it appears that only a small percentage of the more than 5 million children ages 0–3 living in homes eligible for Medicaid and the Children's Health Insurance Program are reached (National Academies of Sciences, Engineering, and Medicine, 2015).

Reach Out and Read, a universal, low-cost early childhood and family intervention, is widely available and accepted by families of infants and young children through their primary health care well-child visits. This program aims to improve children's communication skills and school readiness by encouraging daily time for story reading from the earliest months of life. Documented outcomes include improved receptive language, earlier reading, expanded vocabulary, and better school readiness, all of which are potential contributors to school success, which is a well-known resilience factor. There is evidence for sustained positive effects of this program through age 14 (Gilkerson et al., 2018; Thakur et al., 2016). Studies also document enhanced parent–child engagement and a reduction in maternal depression (Kumar et al., 2016). Home reading activates brain areas supporting brain imagery and narrative comprehension (Hutton et al., 2015). There is also evidence that this relatively low-cost program can boost an array of other factors in academic success and resilience factors,

⁴For more information, see <https://www.nursefamilypartnership.org>.

including IQ and early language and reading skills, and may improve children's social-emotional development as well (Mendelsohn et al., 2018).

The program is guided by a nonprofit organization, which in 2016 reported a budget of \$12 million. It distributed books to 4.7 million families, is embedded in 6,080 health care sites in all 50 states (particularly in practice sites that serve low-resourced families), and has an annual cost of \$20 per family served (Reach Out and Read, n.d.).

Positive Behavioral Intervention and Support is a school-based strategy for promoting prosocial behavior using behavioral rules and systems of reward for appropriate social behavior. This program has shown benefit in improving both academic and social behavior (Bradshaw, Mitchell, and Leaf, 2010; Horner et al., 2009). It has been implemented in 21,000 schools and reached 10,500,000 students (Sugai, Horner, and McIntosh, 2016). This is but one of a number of school-based universal interventions (in addition to the Good Behavior Game) that have been disseminated in school settings to reach large numbers of children at a low cost.

The above programs reflect very different approaches to improving MEB development. One choice is to implement high-cost, relatively complex programs whose positive impact on MEB development has been demonstrated using rigorous research methodology, but whose reach thus far has been limited. An option at the other extreme is to invest in programs that are less complex, intensive, and costly but have been widely disseminated in venues where infrastructure is already in place. These approaches may have a smaller impact on MEB outcomes for each individual child and family but affect a greater number of children overall. These choices represent trade-offs that need to be understood and factored into the selection of interventions; the same is true of policies that may improve MEB health.

Additional research will help in determining whether one approach has greater benefits or confirm that each has merit for different objectives. Being able to quantify and compare the impacts of programs based on both effectiveness and reach will be important for future program dissemination efforts. It is also important to note that this description of the dissemination of evidence-based interventions is necessarily incomplete. There is no registry of the implementation and reach of such interventions, let alone evidence on the degree to which implementation is sustained or beneficial outcomes are achieved. Such a registry is needed. A growing repository of data on the reach of interventions would make it easier to assess the fit of a particular approach, which is key to effective implementation and sustainability, as discussed in Part III of this report. Such a data repository would also support analysis of correlations among such factors as geography (cities, states, or regions) and measures of MEB and physical disorders among young people.

Financing

Many of the inner-city neighborhoods challenged by multigenerational poverty were created through structural racism in employment and housing policies, most notably the redlining of African American neighborhoods by the Federal Housing Authorities from the 1930s to 1970 and subsequent redlining by commercial banks, veterans' programs, and other employment programs (Sampson and Wilson, 2013). City services and investment were removed from minority communities, and assets were allowed to decline over decades (Reece et al., 2015). Cleveland, Ohio, is representative of northern cities in which a small number of redlined communities resulting from policies enacted in the middle of the 20th century now account for a three-fold increase in black infant mortality, a six-fold increase in gun deaths, and a three-fold increase in school dropout compared with city averages. No single risk factor other than residence in one of these neighborhoods accounts for these changes (Reece et al., 2015).

Mental health promotion and prevention activities for children and adolescents, some two-generation community development approaches, and school-based interventions are among the approaches that can support the populations affected by these stark circumstances. Communities That Care and the Good Behavior Game, discussed in Chapters 8 and 4, respectively, are two well-regarded examples. Yet lack of consistent funding in many low-resource communities has limited their access to such programs (National Academies of Sciences, Engineering, and Medicine, 2015).

Traditional sources of funding are inadequate for health promotion and prevention for a variety of reasons (National Academies of Sciences, Engineering, and Medicine, 2019). For example, health insurance and health care resources are directed almost exclusively to treatment rather than promotion or prevention, despite evidence of their benefits. Indeed, community-delivered services that are classroom- or home-based are usually excluded from health insurance reimbursement. Philanthropic funding for such programs has been fragmented and insufficient and has not been consistently available to these neighborhoods. Moreover, available funding and programs too often are not coordinated in the service of carefully articulated goals; even Medicaid policies vary from state to state. Box 10-2 describes several innovative financing solutions with the potential to generate sustainable and effective support for community-based prevention programs.

BOX 10-2 Innovative Financing Solutions

A number of alternative payment mechanisms for health care have been proposed. In one approach, health systems are paid a fixed amount per patient per month and are therefore motivated to reduce inappropriate health care costs, and in the long term to reduce intensive forms of health care use. Such approaches have been effective in Medicaid programs, for example, targeting adults with extensive morbidity, but have not been used for objectives specifically related to children, their parents, or healthy mental, emotional, and behavioral (MEB) development. Nonetheless, such incentives can also operate on MEB-related goals (Kelleher et al., 2015; Makni, Rothenburger, and Kelleher, 2015).

Another approach is social impact bonds or social impact investing, more broadly known as pay-for-performance contracting, which can increase private equity and foundation investments in prevention. This approach to investment allows a variable rate of payout for accomplishing a specific prevention goal desired by a government authority through more effective implementation and sustaining of evidence-based interventions, such as a reduction in the numbers of children placed in special education or foster care or a reduction in juvenile justice recidivism. While promising for specific interventions and particular subsets of the population, however, such investments are likely valuable only for issues that involve high costs and for which savings are concentrated in one agency or budget. Broad-based community programs have yet to find a way to use such investing at scale.

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A Comprehensive, National Approach

The committee's primary charge was to consider how the United States can take advantage of foundational and newer evidence to become "a society in which young people arrive at adulthood with the skills, interests, assets, and health habits needed to live healthy, happy, and productive lives in caring relationships with others" (National Research Council and Institute of Medicine, 2009, p. 13), a goal that the 2009 report suggested was within reach. Implicitly, the committee was also tasked with considering why that goal has not yet been realized. To carry out this charge, we have looked across research from the past decade and examined how it builds on what was previously known. In Parts I, II, and III of this report, we examine influences on mental, emotional, and behavioral (MEB) development and means of designing, testing, and implementing effective strategies for promoting it. In this closing chapter, we discuss how this body of knowledge can be leveraged effectively to promote MEB health and prevent MEB problems in children and youth—to help all young people flourish. We begin with our conclusions about what is needed to substantially improve MEB health in children and adolescents. We then present our recommendations for making this happen and a research agenda to address gaps in the evidence about interventions and the best ways to change outcomes at a population level. We close with a look at aspirations for a future in which healthy MEB development is a national priority.

AN INTEGRATED APPROACH TO PROMOTING MEB HEALTH

Our review of the biological and environmental influences on MEB development revealed that MEB development is more complex and interactive than was understood a decade ago. Even a brief, simplified sketch of the influences discussed in Chapter 2 suggests the complexity of the interactions involved. When a baby is born, her MEB development has already been shaped both by her own genes and by aspects of her parents' lives, from the food her mother has eaten and the air she has been breathing to both parents' own mental and emotional health, the nature of their employment, and the characteristics of the city and neighborhood in which they live. As a child grows, her development is further shaped by her family's emotional interactions and economic

circumstances, the quality of her schooling, her physical surroundings and lifestyle, and more. At the same time, she helps to shape her own environment and circumstances in an ongoing interactive process. New research has also shown that each of these factors may influence how other factors affect this child: perhaps the mother's economic situation compromises her nutrition while she is pregnant, prevents her from leaving a home with an abusive partner, or contributes to a preterm delivery. Or perhaps she lives in a safe neighborhood with ample access to healthy food. Such factors in turn both influence her child's developing brain and affect later learning and development through the dynamic interplay of environment and genes.

The increasingly sophisticated picture of the interrelated influences on MEB development that emerges from the research reviewed in this report provides a rich context for research on strategies for promoting MEB health and preventing MEB problems in children and youth, described in Part II of this report. The chapters in Part II examine evidence for strategies targeting both risk and protective factors that influence multiple outcomes, and ways to promote healthy development and resilience. They describe interventions that can be implemented universally at home and in health care and education settings, as well as a range of policy tools that can be effective. Overall, we found that effective strategies designed to support individuals and families, populations, and multiple generations are critical to achieving significant benefits. Figure 11-1 (which appears in Chapter 1 as Figure 1-4) illustrates the importance of looking both across the life course and across intervention settings, highlighting the need for an array of diverse types of interventions to address threats to healthy MEB development, especially in communities challenged by poverty and inequity. Particularly promising are strategies aimed at treating maternal depression, improving parenting practices and school climate, providing guidance in the context of well-child health care, and coordinating related community resources.

Part III explores the state of research regarding what is required to implement such strategies effectively across populations. While the science of implementation is still developing, current work indicates that effective implementation encompasses careful research to identify the core components that make an intervention or policy work and then how an effective intervention can be put to work in diverse settings and communities and on a large scale. Coordination of effective partnerships, local resources, and innovative approaches to providing the supports needed to scale up and sustain effective approaches are key, as are ongoing evaluation, adaptation, and improvement based on continued monitoring of MEB outcomes and other data.

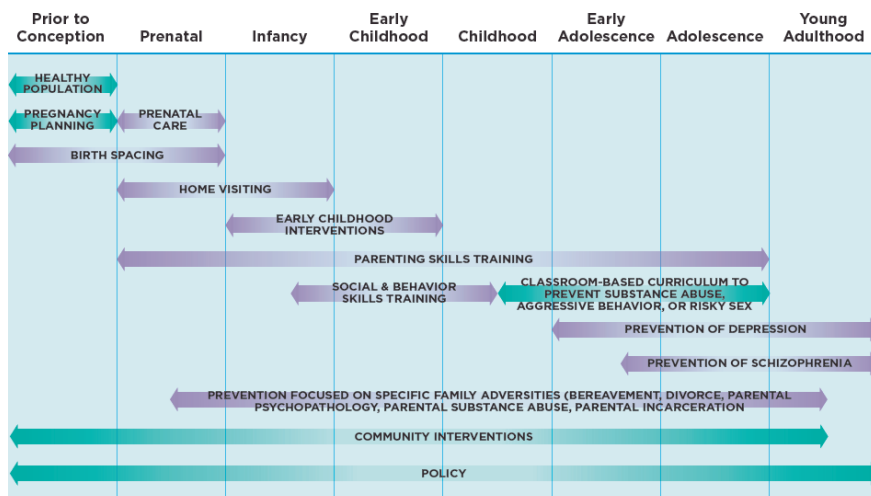


FIGURE 11-1 Interventions across the life course.

From the body of work reviewed for this study, it is clear that achieving meaningful improvements in MEB health and development will require an integrated approach that leverages the full range of findings from this research and the full range of entities that can contribute.

CONCLUSION 11-1: A productive approach to promoting healthy mental, emotional, and behavioral (MEB) development and preventing MEB disorders would take into account

- a sophisticated understanding of the influences on development, which encompass both proximal factors, including neurobiological processes, the quality of relationships, parental psychopathology, and the physical environment, and more distal factors at the community and societal levels, such as poverty and racism;
- opportunities for interventions throughout the course of development, from prior to conception to young adulthood and across generations;
- evidence about the effectiveness of promotion and prevention strategies that operate at the individual, family, community, and societal levels, with particular attention to the value of coordinating strategies rather than targeting single objectives; and
- evidence that effective implementation of evidence-based strategies requires identification of the needs to be addressed,

articulation of core intervention components that have been found to be effective and how they function, understanding of the context in which those components are to be implemented, careful planning for local adaptation and evaluation, and the capacity to sustain and improve the interventions at the scale needed.

Much of the research we have discussed points clearly to the key influence of broad societal factors, such as poverty, inequality, and discrimination, on MEB health and development. While the influence of these societal factors and the associated consequences for the lives of children and their families is obvious to any observant person, establishing empirical evidence of the links between such broad, distal factors and MEB development requires tracing numerous specific associations and building the case. Today, that case has been made. The totality of the evidence shows that broad societal factors both contribute significantly to constellations of risk factors and poor developmental outcomes and limit what can be accomplished with a single program or policy, even if it is very effective.

Because many of the greatest threats to young people's healthy MEB development are concentrated in neighborhoods and rural areas of high intergenerational poverty, it follows that a great opportunity to advance the MEB health of America's young people will come from transforming these neighborhoods and rural areas into communities where children can flourish. Success over the next 10 years will be limited unless concerted attention is paid to the specific challenges in these geographic areas of need and to disorders and lack of flourishing that are evident across the population of children and youth in the United States. However, evidence supporting the effectiveness of specific measures to promote MEB health by tackling the constellation of risks—including poverty, income inequality, and discrimination—that affect lower-income children and youth is more limited; this is discussed below. Therefore, targeted research is needed to establish such links.

A comprehensive exploration of these issues was beyond this committee's charge, but work in this area is ongoing. A 2019 National Academies report, *A Roadmap to Reducing Child Poverty* (National Academies of Sciences, Engineering, and Medicine, 2019), examines the evidence regarding the costs of child poverty to society, as well as programs and policies that can reduce the number of U.S. children living in poverty. These issues are a key context for the present report, but our focus is on what can be done now to improve MEB health and development while society continues to work on the underlying causes of adversity, such as poverty, racism, and adverse experiences, affecting children and youth.

CONCLUSION 11-2: Meaningful improvement in the mental, emotional, and behavioral (MEB) health of children and youth at the population level will require coordinated national leadership to establish and mobilize support for a national agenda that integrates

existing and new federal, state, and local resources, both public and private, to promote healthy MEB development universally and mitigate the effects of unhealthy influences for all children and youth, with particular attention to geographic areas of concentrated disadvantage.

Before presenting our recommendations for pursuing this national agenda, we note that while this committee worked independently to develop conclusions and recommendations focused on MEB health, we were struck by the parallels between our thinking and the conclusions and recommendations of numerous other National Academies committees. Table 11-1 shows areas addressed by conclusions and recommendations from a sampling of relevant National Academies reports published in the past 10 years; a fuller version of this table, included as Appendix A, shows the relevant conclusions and recommendations from these reports. We wish to highlight that of the 19 reports listed, 11 address the importance of coordinating efforts and systems to develop an integrated approach to promoting the health and well-being of children, youth, and families; 16 address the critical importance of accurate and comprehensive data collection to inform policy makers and the public about the status of populations, the services they are provided, and outcomes of those services; and 7 identify the key role of poverty and concentrated disadvantage.

The confluence of these messages both supports and amplifies this committee's recommendations with respect to fostering MEB development and health. The fact that so many reports have made similar recommendations that have yet to be fully implemented highlights the urgency of adopting a new tack. The kinds of interventions that can support and promote healthy MEB development are intimately linked to multiple sectors, including education, health, social and human services, and business, and to public health objectives. And as noted above, the risks and challenges associated with economic disadvantage in the United States influence not only growing children's MEB health but also their physical health and development, their academic achievement, and their entry into the world of work. It is our hope that our recommendations can be considered vital components of a broader effort to address these urgent national challenges. We would not advocate waiting to accomplish goals for MEB health until other measures needed to foster children's health and well-being are in place, but believe that the accumulated weight of the conclusions and recommendations presented in the body of work summarized in Table 11-1 and the evidence documented in this report is sufficient to motivate rapid and unwavering pursuit of healthy MEB development for every child and youth.

TABLE 11-1 Confluence of National Academies Recommendations Relating to Health and Well-Being and Public Health Monitoring

Date	Report	Conclusions or Recommendations Related to		
		Coordination of Efforts	Monitoring	Effects of Poverty/Disadvantage
2009	<i>Adolescent Health Services: Missing Opportunities</i>	x	x	
2010	<i>Accounting for Health and Health Care: Approaches to Measuring the Sources and Costs of Their Improvement</i>		x	
2011	<i>For the Public's Health: The Role of Measurement in Action and Accountability</i>		x	
2012	<i>Primary Care and Public Health: Exploring Integration to Improve Population Health</i>		x	
2014	<i>Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2</i>		x	
2014	<i>Implementing Juvenile Justice Reform: The Federal Role</i>	x	x	
2015	<i>Vital Signs: Core Metrics for Health and Health Care Progress</i>		x	x
2015	<i>Mental Disorders and Disabilities Among Low-Income Children</i>			x
2015	<i>Investing in the Health and Well-Being of Young Adults</i>	x	x	

TABLE 11-1 Continued

Date	Report	Conclusions or Recommendations Related to		
		Coordination of Efforts	Monitoring	Effects of Poverty/ Disadvantage
2016	<i>Advancing the Power of Economic Evidence to Inform Investments in Children, Youth, and Families</i>	x		
2016	<i>Parenting Matters: Supporting Parents of Children Ages 0–8</i>	x	x	
2016	<i>Ending Discrimination Against People with Mental and Substance Use Disorders: The Evidence for Stigma Change</i>	x		x
2017	<i>Communities in Action: Pathways to Health Equity</i>	x	x	x
2018	<i>Transforming the Financing of Early Care and Education</i>		x	
2019	<i>A Roadmap for Reducing Child Poverty</i>		x	x
2019	<i>The Promise of Adolescence: Realizing Opportunity for All Youth</i>	x	x	
2019	<i>Strengthening the Military Family Readiness System for a Changing American Society</i>	x	x	
2019	<i>Monitoring Educational Equity</i>	x	x	x
2019	<i>Vibrant and Healthy Kids: Aligning Science, Practice, and Policy to Advance Health Equity</i>	x	x	x

RECOMMENDATIONS: A NATIONAL AGENDA FOR IMPROVING THE MEB HEALTH OF CHILDREN AND YOUTH

Figure 11-2 illustrates how interventions at multiple levels can be layered to form a robust response to improve the MEB health of children and youth. Universal promotion and prevention efforts provide a foundation that serves the broadest populations. Screening for risk or concerning behaviors and early intervention address the needs of individuals or groups of children and families; risk mitigation, treatment, and rehabilitation serving individuals and families provide help for those who do not benefit from promotion and prevention efforts. Meaningful improvements in MEB health are within reach if efforts at these levels are supported and sustained, if available resources across sectors are coordinated around carefully defined shared goals, and if concerted attention is paid to the challenges of scaling up promising health promotion and disorder prevention strategies at the universal, selective, and indicated levels.

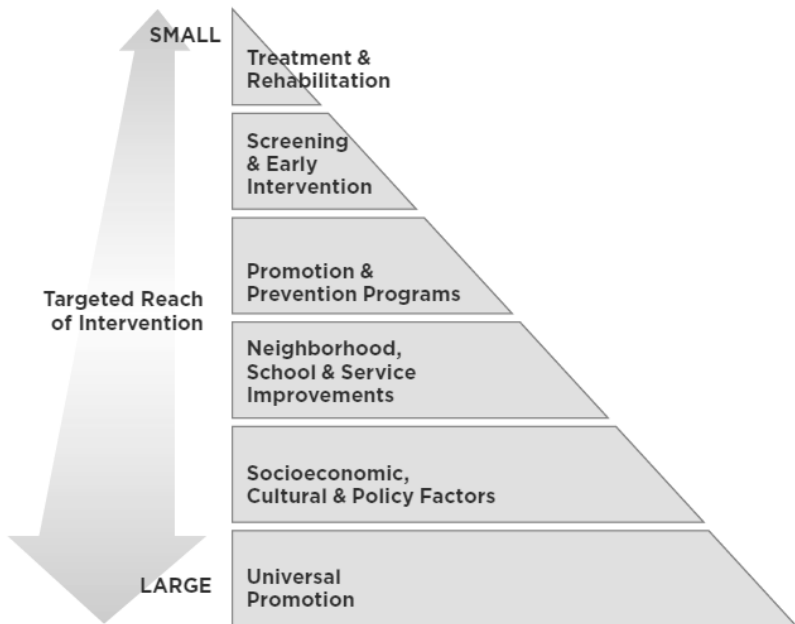


FIGURE 11-2 Elements of a comprehensive, integrated intervention strategy.

The relevant agencies of the federal government—led by the U.S. Department of Health and Human Services—are well positioned to lead an effort to take advantage of the benefits a comprehensive, integrated strategy could bring. They have the capacity to set the agenda for such a national effort; to garner public support for this agenda; and to enlist public and private entities at the national, state, and local levels, including other government agencies such as the Department of Education, foundations, professional organizations, and advocacy organizations (Cruden et al., 2016).

In conceiving this approach, we were inspired by the example set by the Decade of the Brain from 1990 to 1999, during which the National Institutes of Health mobilized research and public health support to foster research on the brain and greater public understanding of its importance. This effort is credited with generating remarkable progress in neuroscience, including the development of new subspecialties and therapies for neurological disorders and recognition of risks to brain development (Jones and Mendell, 1999; Shonkoff and Levitt, 2010). A similarly broad-based effort to improve MEB health—which could be organized under the rubric of Decade of Children and Youth and led by the U.S. Department of Health and Human Services—would be designed to (1) raise awareness of the social and economic gains that would be realized by improving environments, strengthening families, and supporting healthy child development, and (2) engage multiple sectors of society as a coalition to carry out this work. We are not recommending simply another time set aside to educate the public about a set of issues, but a decade of concentrated action. Because of the urgency of the need, we stress to the relevant agencies the importance of laying out the elements of this agenda now and building them over time. A genuine cultural change will be needed to support this agenda. We offer recommendations in three areas: federal leadership and partnership, implementation and scale-up, and monitoring.

Federal Leadership and Partnership

Given the numerous issues that compete for the attention of policy makers at every level of government, the MEB health of children, youth, and families will not become a national priority by happenstance. Federal agencies are in the best position to articulate the reasons why MEB health deserves national attention and the nature of necessary efforts. Federal leadership will be essential if MEB health is to become a true priority, and the relevant federal agencies can also play a leading role in guiding policy, engaging public and private partners, and directing resources to those efforts. We direct our recommendations to federal agencies whose purview encompasses child welfare and child, youth, and family health: we suggest that the U.S. Department of Health and Human Services take the lead but that the U.S. Department of Education and other relevant agencies also be an integral part of the effort so their objectives can be aligned and their resources coordinated.

RECOMMENDATION 1: Relevant federal agencies should lead and collaborate with agencies at the state and local levels, as well as private partners, including national and local foundations and the business community, in coordinating a highly visible national effort to make the promotion of healthy mental, emotional, and behavioral (MEB) development a national priority, such as by designating a Decade of Children and Youth. These agencies should

- articulate specific national goals and objectives in support of healthy MEB development throughout the life cycle, encompassing health promotion and disorder prevention;
- develop an integrated plan for longitudinal data collection and coordination and analysis of federal surveys, administrative data, and vital statistics that provides a comprehensive approach to measuring and tracking child and adolescent MEB health; and
- encourage and support the integration and coordination of new and existing efforts to pursue those goals and objectives at the federal, state, and local levels, using coordinating and convening capacities, pooling of resources, funding of outcomes analyses, regulatory options, and other powers and incentives.

RECOMMENDATION 2: Relevant federal agencies should use their program creation, regulatory, and other policy capabilities to promote healthy mental, emotional, and behavioral (MEB) development and mitigate risks to MEB health by, for example,

- developing and disseminating guidance for use by states and local jurisdictions in delivering effective promotion and prevention interventions—including preconception, prenatal, and postnatal care services; two-generation (including parent MEB health and parenting) interventions; preschool and school interventions; and universal screening for risk and protective factors—and in ensuring access to affordable treatment for parents and children to reduce risk;
- developing both guidance and targeted accountability measures for use by states and local jurisdictions to identify effective ways of reducing the exposure of children and families to risks—such as lead and air particulate matter; ineffective and inequitable disciplinary practices; unsafe sex and unintended pregnancies; use of tobacco, alcohol, and other drugs; traumatic experiences; and negative living conditions, including exposure to violence, unstable housing, food

- insufficiency, and underemployment—that can contribute to unhealthy MEB development;**
- **promoting coverage of behavioral health services for children and caregivers, especially those needed during pregnancy and the postpartum period and those offered by parenting programs, in reimbursement for private health insurance and Medicaid, encompassing both behavioral health promotion and risk prevention;**
 - **setting expectations for the adoption and evaluation of programs known to enhance social and emotional development in schools, in health care settings, and in communities;**
 - **supporting consistent policies on accreditation, certification, and licensing requirements for a multidisciplinary workforce oriented toward healthy MEB development in children and youth; and**
 - **supporting and collaborating with local and state initiatives that contribute to healthy MEB development.**

A thorough review of the mechanisms that government agencies could use to pursue these objectives was beyond the scope of this committee's work; we do not provide specific guidance on a comprehensive plan for strengthening child and adolescent MEB health through federal policy. However, there is much on which to build. For example, the National Prevention, Health Promotion and Public Health Council, acting under the direction of the Surgeon General of the United States, articulated a National Prevention Strategy in 2011 (National Prevention Council, 2011). This strategy laid out strategic directions and priorities for federal agencies that include establishing healthy and safe community environments, eliminating health disparities, and fostering mental and emotional well-being. In turn, the Centers for Disease Control and Prevention has articulated a collaborative approach for government entities and others that are pursuing those priorities, Health in All Policies (HiAP). This approach “integrates and articulates health considerations into policymaking across sectors to improve the health of all communities and people. HiAP recognizes that health is created by a multitude of factors beyond healthcare and, in many cases, beyond the scope of traditional public health activities” (Centers for Disease Control and Prevention, 2016).¹ Resources associated with HiAP include a guide for state and local governments, a clearinghouse policy resource center, and compendia of experiences from local public health departments, and evidence-based prevention and cross-sector approaches.

Other innovations by federal agencies provide examples of collaborative leadership:

¹See <https://www.cdc.gov/policy/hiap/index.html>.

- Medicaid waivers for screening and treatment of maternal depression during pediatric visits. Many states have taken advantage of guidance from the Centers for Medicare & Medicaid Services on the use of Medicaid funds to support maternal treatment during pediatric visits (Wachino, 2016).² This guidance is critical to the support of the nearly half of young mothers living in poverty who experience depression during the first year of their child's life.
- Guidance from the Office of the National Coordinator for Health Information Technology (ONC) on telehealth that encourages positive interactions among family members and clinicians (Bobinet and Petito, 2015).³ The ONC provided new guidance to encourage increased access for rural families and those with limited physical access to medical services, among others, with special attention to the need for families to communicate about well-being.
- Medicaid waivers for states to coordinate home visiting, maternal opioid services, and early intervention for children. Illinois was among the first states to commit to piloting cross-sector services to address maternal addiction and early childhood developmental outcomes in an innovative program (Illinois Department of Healthcare and Family Services, 2018).⁴

Implementation and Scale-Up

Progress in successfully scaling up interventions for which research has produced evidence of effectiveness will be essential for improving MEB development among children and youth at the population level. Ongoing research in implementation science is providing new insights into best practices for implementing interventions at scale, and as discussed below, this research deserves continuing support. Although many questions about the implementation process remain unanswered, research to date has provided a strong basis for intensified efforts to take effective interventions to scale and carefully study their results.

RECOMMENDATION 3: Relevant federal agencies should support rapid progress in the development and dissemination of effective mental, emotional, and behavioral (MEB) interventions for delivery to large populations by providing funding and other resources to, for example,

²See <https://www.medicaid.gov/federal-policy-guidance/downloads/cib051116.pdf>.

³See <https://www.healthit.gov/sites/default/files/DesigningConsumerCenteredTelehealthVisit-ONC-WHITEPAPER-2015V2edits.pdf>.

⁴See <https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Waivers/1115/downloads/il/il-behave-health-transform-fs.pdf>.

- **support research and demonstration projects to determine the effectiveness of promising interventions for MEB health promotion, prevention of MEB disorders, and population screening at large scales, including the implementation of effective in-person and digital interventions;**
- **support states and local jurisdictions in developing cross-sector partnerships among schools, employers, the health care system, community-based organizations, and others to advance the scale-up of effective promotion and prevention interventions;**
- **support states and local jurisdictions in developing innovative funding mechanisms that can be sustained through changes in political leadership or funding shortfalls;**
- **use economic evaluation tools and other methods to analyze such factors as costs and availability of funding, benefit/cost ratio, level of complexity, and need for supportive infrastructure; and**
- **document needs and develop strategies for sustainability over time.**

Partnerships among agencies and levels of government and among public and private entities will be the most important aspect of these efforts. The focus of this report is research that has emerged in the past 10 years, but we illustrate in Table 11-2 how efforts at the federal level could cascade to the state and local levels, and how public and private efforts could be integrated to serve the overall objectives of a national agenda. We highlight policies for which evidence indicates potential to ameliorate risks to or promote MEB health at a broad scale, but our primary emphasis is the importance of coordinating efforts and integrating available resources.

A blueprint for this broad-based effort could begin with three objectives:

1. Raise public awareness of the critical importance of healthy child, youth, and family MEB development and ways to foster it.
2. Build stable coalitions across sectors and entities.
3. Address funding and capacity challenges.

Raise Public Awareness

The tobacco control movement is a model for how effective public health advocacy can mobilize society to improve health. This and numerous other National Academies reports (refer to Table 11-1 and Appendix A) have documented in detail what children and adolescents need to develop successfully and the harm experienced by them and society at large when these conditions are not in place. However, there has to date been no successful effort—such as the

tobacco control movement—to educate the public, policy makers, and the leaders of all sectors of society about the nurturing conditions that children and adolescents need and how those conditions can be achieved. If the progress we envision over the next 10 years occurs, it will be because many more people and organizations—as well as policy makers, other leaders, and the research community—become aware of the needs of children and youth, families, neighborhoods, and schools, and because these partners all take steps to support effective strategies that can promote MEB health and reduce MEB problems with a plan that integrates all such efforts. Such mobilization can be achieved if, over the next 10 years, more resources are devoted to educating the public and policy makers about what is needed and what is possible. This education can be provided through stepped-up public education efforts on the part of the Surgeon General, the Centers for Disease Control and Prevention (CDC), the Substance Abuse and Mental Health Services Administration (SAMHSA), other federal agencies, foundations, and advocacy organizations. Coordinated efforts can build public support for policies, practices, and programs that will advance the nurturing conditions needed to improve child and adolescent MEB development.

Build Stable Coalitions Across Sectors and Entities

Every major sector of society has an impact on the well-being of children and adolescents. Chapters 4, 5, and 6, respectively, describe possibilities for supporting MEB health through the public education system,⁵ the health care system, and the use of government policies at multiple levels, while Chapter 10 examines why the business community has a growing interest in supporting families and healthy MEB development. Other community organizations also have a vital role to play. For example, organized religions have traditionally provided leadership to build cooperation and support for healthy development in communities and can have an important influence on the promotion of programs, policies, practices, and values that are needed to help neighborhoods prioritize efforts to promote healthy MEB development.

⁵We do not ignore the contributions of private schools, which educate approximately 10 percent of U.S. students in preschool through grade 12, but because they are by definition independent of the majority of education and other policies, we emphasize public schooling (<http://www.capenet.org/facts.html>).

TABLE 11-2 An Integrated Approach to Promoting MEB Health

Mechanism	Federal/National Level	State Level	Local/Community Level
Public Health Approaches/Coordination	<p>Federal entities, including HHS, CDC, and the Departments of Education and Justice:</p> <ul style="list-style-type: none"> • Establish national priorities • Spearhead a public health campaign at federal, state, and local levels • Establish structures for coordinating across agencies and governmental levels 	<p>State agencies, including Medicaid, public health, and education:</p> <ul style="list-style-type: none"> • Support and amplify public health messages • Coordinate with federal efforts, adapting them to optimally address the needs of their populations • Establish structures for coordinating and partnering with local entities 	<p>Local government bodies, institutions, and agencies:</p> <ul style="list-style-type: none"> • Adapt objectives of a national public health campaign to meet local needs • Establish structures for coordination among social service agencies, public schools, health care systems, businesses, and other community partners • Identify lead entities or agencies to provide the resources and personnel needed to drive the coordination effort (e.g., United Way, children’s hospitals, major business enterprises) • Support the development of community coalitions

TABLE 11-2 Continued

Mechanism	Federal/National Level	State Level	Local/Community Level
Funding and Other Incentives	<p>Provide resources for national programs and to states and communities to support</p> <ul style="list-style-type: none"> • Priority attention to the needs of underresourced urban and rural areas • Building of capacities necessary for successful and sustainable scale-up • Demonstration projects to determine the effectiveness and scalability of interventions • Research addressing MEB health promotion and mitigation of risks • Further development of new, more effective and scalable interventions • Population-level monitoring of outcomes to support learning about what works and decisions about program priorities 	<ul style="list-style-type: none"> • Support community surveillance • Encourage coverage of promotion and prevention efforts as core health insurance benefits • Set expectations for effective school-wide programs designed to enhance social-emotional learning • Support effective programs, such as home visiting, and tracking of program outcomes • Adopt funding mechanisms that can be sustained through political changes in leadership or funding shortfalls 	<ul style="list-style-type: none"> • Provide incentives for community planning and program implementation, and for cross-sector participation in program design and implementation • Support collaboration to tailor interventions to the cultural and physical needs of the community • Adopt funding mechanisms that can be sustained through changes in political leadership or funding shortfalls

Table 11-2 Continued

Mechanism	Federal/National Level	State Level	Local/Community Level
Regulation and Policy	<p>Provide research-based guidance for local jurisdictions to use in setting MEB-related policies related to</p> <ul style="list-style-type: none"> • Interventions, e.g., prenatal care services, two-generation (including parenting) interventions, preschool interventions, and universal screening for MEB development, including risk and protective factors • Exposure to risks, e.g., lead and air particulate matter; school suspensions and expulsions; unsafe sex and unintended pregnancies; use of tobacco, alcohol, and other drugs; and traumatic experiences • Coverage of behavioral health by private health insurance and Medicaid • Accreditation, certification, and licensing requirements 	<ul style="list-style-type: none"> • Mirror federal MEB health-related policies regarding health promotion and prevention of risk, and adapt to state needs, preferences, and resources • Create model state-wide programs and track outcomes that can be shared with other states 	<ul style="list-style-type: none"> • Mirror federal and state MEB health-related policies • Monitor adverse experiences and childhood trauma at the local level • Make data on needs and outcomes of interventions fully transparent to the public • Place high priority on policies that serve under-resource populations

TABLE 11-2 Continued

	for a multidisciplinary, child-oriented workforce that promotes healthy MEB development		
Mechanism	Federal/National Level	State Level	Local/Community Level
Private Entity Contributions	<ul style="list-style-type: none"> • Collaborate in developing a common agenda for the advancement of healthy MEB development that integrates efforts and resources • Establish giving priorities that align with national priorities for promoting MEB health • Collaborate across national, state-, and local-level constituencies in pursuing approaches to foster healthy MEB development 	<ul style="list-style-type: none"> • Establish funding priorities that align with national priorities for promoting MEB health • Collaborate with and support other state and local-level public and private funders in pursuing MEB priorities • Identify corporations, health care systems, and other community partners to collaborate in promoting MEB-related initiatives at the regional and state levels 	<p>Local leaders:</p> <ul style="list-style-type: none"> • Identify and engage local foundations and other potential funders, such as business enterprises and health systems, to participate in program planning, implementation, and evaluation <p>Local-level foundations:</p> <ul style="list-style-type: none"> • Partner with local authorities to target neighborhoods that lack resources to address adverse environments for healthy MEB development

Thus, coalitions across public and private entities at the local, state, and national levels will be critical to the success of a Decade of Children and Youth. Child and adolescent MEB disorders are interrelated, but approaches to addressing these problems, including funding, currently are largely fragmented, with different agencies and organizations working on different problems and potential solutions. Strategies for addressing these problems tend to focus narrowly on the proximal influences on each problem, with less attention to the more distal influences that affect all of these problems, such as poverty and discrimination in disadvantaged neighborhoods and communities. Moreover, the organizations that are working to address individual problems seldom speak with one voice about which strategies to implement and how. For example, many foundations target children's well-being, but they rarely work from consensus as to what would have the greatest impact on children's MEB development. At the same time, reforms in one sector of society, such as the provision of effective parenting interventions by health care organizations, will improve the success of other sectors, such as schools, that benefit when parents are more effective in nurturing their children's self-regulation. Lead organizations that are well resourced can provide substantial help in developing strong coalitions that can sustain an effort over the long time horizons needed to make substantial progress. Private entities such as foundations can play important roles in this regard.⁶

Address Funding and Capacity Challenges

Accomplishing the objectives detailed in this report will undoubtedly require new thinking about resources both for programs and research and for the implementation of policies designed to foster healthy MEB development, as well as improved ways to use existing resources. As discussed in Part III of this report, effective implementation of strategies focused on MEB health requires significantly greater capacity and commitment than generally has been recognized. We have emphasized throughout this report that ad hoc approaches targeting specific problems in isolation have less population impact than integrated approaches that can yield far greater benefits, as well as savings in some areas. Moreover, financial support for program initiation and maintenance, including necessary infrastructure costs, needs to encompass funding for research to assess outcomes systematically and to support ongoing improvement. Given that competition for funds to support public policy initiatives is stiff, whether at the federal, state, or local level, attention to creating and implementing interventions that are affordable at scale is a priority. Economists have developed increasingly sophisticated ways to assess the costs and economic benefits to society of financing promotion and prevention efforts, which can be used to

⁶For further discussion of coalition building, see <https://evolution-institute.org/creating-a-grand-coalition-to-foster-human-wellbeing/>.

significantly bolster the case for investments in MEB health. A long-range perspective is needed.

Economic evaluations provide stakeholders with information about the costs and returns of investment in interventions intended to improve the well-being of children and youth. Such evaluations can help decision makers understand what level of investment is needed to attain impact, whether investment is a justifiable use of limited resources, who bears the costs and who receives economic benefits, and when returns are expected to accrue. This type of analysis—critical in demonstrating the value to society of attention to efforts to promote MEB health—is the subject of another National Academies consensus study, and this committee did not explore the issues involved in depth (National Academies of Sciences, Engineering, and Medicine, 2016). We note, however, that in the last decade, the demand for economic evaluation has grown as policy makers and researchers have sought more refined ways to assess the impact of interventions. We caution that more work is needed to apply such methods to large-scale interventions and policies and to determine whether findings at smaller scales are borne out at population levels. We also note that making the case for economic benefits, while often attractive, cannot in itself lead to adequate funding for expensive public policies, which will require both savings from smarter investing and a greater extended commitment to children, youth, families, and communities.

Nevertheless, progress in economic evaluation falls squarely within the movement toward evidence-based decision making and increased accountability with respect to public spending (Haskins and Margolis, 2015; Head, 2016; Jennings and Hall, 2012; Maynard, 2006; Siu, Bibbins-Domingo, and Grossman, 2015; White and VanLandingham, 2015). The Washington State Institute for Public Policy and the Pew-MacArthur Results First Initiative have helped broaden the focus of evidence-based policy making to include economic evidence about costs and the comparative return on investment of different policy options (Lee and Aos, 2011; Pew Center on the States, 2012).

Monitoring to Support Needs Assessment, Scale-Up, Improvement, and Research

As discussed in Chapter 9, the collection of information about quality and outcomes is vital to the continuous improvement that fuels effective implementation of interventions that can improve the health of populations. That discussion is oriented to what is needed in a particular implementation effort, but in the context of the national agenda we recommend here, more is possible, and more is needed. Both coordination of existing data sources and the collection of new data will be needed to support meaningful improvements in MEB health.

A significant amount of relevant data about children, youth, and families in the United States is collected by SAMHSA; the CDC; the education and criminal justice systems; health systems; and other entities at the local, state, and federal levels. These data can be harnessed to track a population's key MEB outcomes and identify specific populations that may need greater resources and new

strategies. There are also data available from the National Survey of Children's Health (NSCH) by state on positive mental health factors, family resilience, and parent-child connection and how these interact with adverse childhood experiences, poverty, and MEB health.² There are likely many ways to coordinate existing data from the NSCH, the U.S. census, and other sources to support valuable analyses. We note that the Maternal and Child Health Network has created a compendium of measures of child health used across agencies, focusing on such issues as family health and engagement and social determinants of health.³

A thorough assessment of available sources of data on how children and adolescents are developing and what their family, home, school, and community environments are like was beyond the scope of this study. It appears, however, that although existing data sources may be underused, the nation lacks sufficient data about the social-emotional development and MEB health of young people at the national, state, and local levels to support broad and significant improvement. At present, annual reports on representative samples of children and adolescents provide information about the levels of their MEB disorders, and data are collected annually on the proportion who live in poverty.

A census of localities of concentrated disadvantage for children in the United States would be a valuable basis for planning, but we were unable to find such an analysis. States have data on academic outcomes for students, and periodic reports on children's health—rates of obesity, asthma, substance use, and premature birth, for example, are available. A variety of surveillance and screening tools are used in jurisdictions across the country (see Appendix B), yet these efforts do not provide the comprehensive, timely data needed by government entities at all levels if they are to understand the challenges to healthy child and adolescent MEB development and the possibilities for fostering MEB health for all children and youth more effectively.

In considering the data collection and monitoring needed to support the national agenda we recommend, we considered the work of other National Academies committees on this topic; Box 11-1 lists objectives for data collection related to developmental health and well-being identified by National Academies committees in the past decade.

We also considered the benefits Canada has found in a monitoring system called the Early Learning Development Instrument (EDI), described in Box 11-2. EDI clearly demonstrates how carefully collected national, state, and local data can support meaningful improvement in MEB health and development (although

²See <http://www.childhealthdata.org>.

³See <http://www.mch-measurement.org>; see also <http://www.childhealthdata.org> for existing variables collected by the NSCH and national and state data and local-area estimates that are or could be made available.

because it relies on teacher reports and census data for children in kindergarten, it does not provide data on early childhood).

The United States needs an improved system for coordinating and collecting data on child and adolescent well-being and the conditions that affect it. Policy makers and the public need information about the status of the nation's young people if they are to fully understand risks to MEB development and possibilities for improving MEB health. To support efforts to promote MEB health, prevent MEB disorders, and address related problems, therefore, regular collection and coordination of data on indicators of mental, social-emotional, and behavioral development and health at the national, state, and local levels is needed. These data would be used to understand patterns and trends, identify areas of need and vulnerable populations, and support analysis and evaluation of the impact of policies and interventions over time.

BOX 11-1

**The National Academies of Sciences, Engineering, and Medicine's
Committees' Messages about Data Collection**

- Systematic collection of data on health and health services, as well as coordination of data collection requirements across related federal funding streams, is needed to take advantage of and build on existing databases and new data sources.
- Such a system should track population health and coordinate information about the determinants of developmental health, including poverty and related conditions and parenting and family factors.
- Additional research is needed on the measurement of social and environmental determinants of health.
- Multiple stakeholders should be involved in the development of health outcome indicators that are standardized for national, state, and local use.
- An annual report on disparities should inform policy makers and the public about trends in this area.

An inventory of existing health and health care databases is a necessary precursor to the ongoing development of a consolidated platform for population health assessments for children and youth.

BOX 11-2
The Early Learning Development Instrument (EDI)

EDI is a questionnaire developed by researchers for assessing the development of young children across populations.^a Kindergarten teachers complete the questionnaire, which assesses physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills (Human Early Learning Partnership, 2018). The data thus collected are used to measure vulnerability at a population level and support schools, local government, and private entities in providing supports and services. Early childhood coalitions, child development workers, school representatives, ministries of child and family development, and researchers have all used the data (Human Early Learning Partnership, 2016). Reports based on the data include maps showing how the percentages of vulnerable children on each of the measures vary geographically, and even by school, so that resources can be targeted. Twelve of the 13 Canadian provinces and territories have now used EDI for at least one round of population-level screening, which has expanded the pool of data available for analysis of trends and areas of vulnerability. EDI has also been used at a population level, in a modified form, in Australia^b and other countries.

^aFor more about EDI, see <http://earlylearning.ubc.ca/edi> and <https://edi.offordcentre.com/about/history-of-the-edi>.

^bFor more information, see <http://www.aedc.gov.au/about-the-aedc-data-collection-tool-australian-version-of-the-early-development-tool>.

RECOMMENDATION 4: The U.S. Department of Health and Human Services should collaborate with states and local jurisdictions to conduct a comprehensive assessment of existing sources of data useful for tracking population trends and other key data on the mental, emotional, and behavioral (MEB) health and development of children and youth, the factors that influence it, and current efforts to promote MEB health and address MEB problems. Based on the results of this assessment, the agency should develop a plan for coordinating existing data and initiating additional data collection efforts to build the capacity to track

- the status of young people's MEB development at intervals over the developmental course, including both indicators of disorder and evidence of cognitive development, social-emotional growth, and flourishing in life activities;
- children's exposure to risks for unhealthy MEB development at the family, community, and societal levels, including adverse experiences at home, such as the presence of a seriously

- depressed parent, or at school, or influences promoting concerning behaviors, such as the consumption of unhealthful food, the use of nicotine-delivery products and such substances as alcohol and marijuana, and exposure to entertainment media that promote social exclusion, violence, or prejudice;
- access by children, youth, and families to effective health promotion and protective interventions, including preconception and prenatal health care for parents and care for children and youth from infancy through young adulthood; and
- effective programs and policies, including how many such efforts are under way, what interventions are being implemented, how many people they are reaching, who benefits and who does not, and whether they are achieving their intended impact.

RECOMMENDATION 5: The U.S. Department of Health and Human Services' plans for coordinating the monitoring of the mental, emotional, and behavioral (MEB) health of the U.S. population should include building the capacity to

- track both key data, using (or developing) standardized indicators of positive MEB development and health, and efforts to improve MEB outcomes;
- collect indicator data universally at the local level and aggregate these data to the community, state, regional, and national levels;
- share data across all levels, encompassing both locale-specific data documenting community efforts, including those of the public education system, and national and state data, for use in formulating policy;
- coordinate existing data collection efforts, including community monitoring systems and public health systems for surveillance and screening, at all levels; and
- support regular reporting and analysis of results to identify progress toward improvement goals.

A nonpartisan, nonprofit organization akin to the National Bureau of Economic Research, which played a key role in the development of economic indicators for the nation during the Great Depression in the 1930s, or an entity within the federal government could take the lead in coordinating the collection of relevant data, which could also serve other policy objectives related to children, youth, and families. Although a detailed plan for such a monitoring system is beyond the scope of this report, Appendix B outlines elements that will be critical to the usefulness of such a system for supporting a national agenda to promote

MEB health and describes several programs that illustrate its potential benefits. The plan we suggest is ambitious, but no nation or jurisdiction can attain population-level improvements in the well-being of its young people if it does not monitor and evaluate how they are doing.

A RESEARCH AGENDA

Although a strong foundation of research on which to base the launching of a Decade of Children and Youth exists today, ongoing support for discovery and application research will be essential to continued progress. We first identify key priorities for future research and then briefly discuss two opportunities with particular relevance to researchers interested in MEB health and development.

Research Priorities

Federal support for research relevant to MEB health has tended to focus on treatment and prevention of specific disorders at the expense of investigations of the social and environmental determinants of health and well-being and efforts to promote MEB health population wide (Murray et al., 2015). Our proposed research agenda outlines targets for research in health promotion and risk prevention and their potential impact on the incidence and prevalence of MEB disorders, as well as further progress in the science of program implementation.

We suggest that the greatest progress is likely to come from projects that feature pooled, cross-sector expertise and resources and from population-level studies where scope and ability to track outcomes across phases of development are adequate. Strategies for combining funding from multiple federal agencies and private sources may need to be developed to support studies that are sustained long enough to document the relationships between implementation processes and program outcomes, including tracking of the long-term outcomes, and carried out at a population scale, sampling across multiple communities. We also highlight the importance of work across these topics that identifies testable theoretical models based on hypotheses about core components of interventions and the factors that mediate or moderate them in diverse settings.

Our first priority is to continue building on the strong body of work already emerging about ways to promote healthy development at the population level. We recognize as well the importance of emerging possibilities for reaching populations through school-based interventions and the health care system. Our research priorities also reflect the importance of understanding macro-level influences on MEB development and the challenges of population-level implementation of effective programs.

Research Priority 1: Design and evaluation of interventions to promote healthy MEB development among children and youth at the population level.

Promising research targets include

- interventions that foster MEB development across multiple domains, such as whole-community efforts that focus on individual, family, school, and neighborhood outcomes and mitigate the effects of adverse childhood events;
- enhancement of birth outcomes, focusing on parental health during the preconception and prenatal periods, to optimize neurobehavioral development;
- strengthening of the behavioral and mental health and parenting skills of caregivers and parents, and the creation of safe and supportive community environments for both caregivers/parents and children;
- benefit/cost analysis of healthy parenting programs in obstetric and pediatric settings;
- universal interventions in sites that children encounter routinely and continually, such as preschools, schools, and primary care child health facilities;
- development of biological measures (biomarkers) with which to identify potential candidates for social, psychological, and medical interventions and to track intervention outcomes;
- improved understanding of interactions among genes and environmental variables and the mechanisms mediating social and emotional outcomes across the developmental spectrum to better support the design of interventions;
- assessment of the timing, dose, and duration of interventions to optimize short- and long-term outcomes; and
- the use of digital technology in population-based interventions.

Research Priority 2: Design, evaluation, and implementation of effective school-based interventions.

Promising research targets include

- mechanisms to support social-emotional learning, including mindful awareness approaches;
- rigorous trials of school-based interventions for children and youth at all levels, from preschool to higher education, to better shape these interventions and document the size and duration of their effects, as well as how they affect social, cognitive, and emotional learning;
- identification of the core elements of and amount of exposure to social-emotional learning programs needed to promote sustainable growth in

- social and emotional skills during the preschool and school years and across types of programs and services;
- rigorous trials of interventions designed to improve instruction and classroom management in ways that can improve MEB health, as well as academic success;
 - strategies for scaling up proven preschool models in partnership with underresourced communities to ensure acceptability and feasibility;
 - optimal intervention doses, effects of continuous prevention interventions that span K–12, and the use of whole-school promotion and prevention approaches;
 - methods for delivering a multitiered system of support in all K–12 schools to coordinate the implementation of evidence-based universal, selective, and indicated prevention interventions;
 - prevention and reduction of disruptive behavior, anxiety and traumatic stress, drug use, bullying, depression and suicide, dating violence, and school dropout in education settings; and
 - interventions for the early childhood and primary and secondary school workforce to promote their own health and well-being and their ability to support the MEB health of students.

Research Priority 3: Development of successful two-generation interventions in health care through exploration of the effectiveness and sustainability of program models for improving MEB development.

Promising research targets include

- development and assessment of programs to improve preconception and prenatal parental physical and mental health;
- implementation research on scaling up of effective parenting approaches in pediatric practice;
- evaluations of outcomes of parenting enhancement programs in obstetric and well-child care;
- identification of core elements of effective interventions; and
- development of digital tools that teach and reinforce healthy practices and increase supportive communication.

Research Priority 4: Strategies to improve MEB development through attention to social, racial, and economic disparities.

Promising research targets include

- population wide trends and variation in MEB health outcomes by subgroups, particularly for underresourced communities and those at highest risk, and community partnerships intended to implement

culturally and contextually sensitive interventions that address disparities in MEB outcomes;

- long-term outcomes and scale-up potential for effective MEB health promotion and prevention activities for children and adolescents living in underresourced communities;
- impacts of economic development programs, such as livable wage laws, paid parental leave, Earned Income Tax Credit enrollment programs, and Housing Choice Voucher programs on MEB health and development;
- challenges to the implementation, widespread adoption, and sustainability of effective approaches for populations experiencing disparities in MEB outcomes;
- interventions for the child-serving workforce to enhance equity in promotion of the MEB health of all children; and
- identification and evaluation of practices that foster healthy MEB development among diverse cultural groups to determine whether implementation of these practices could decrease disparities and benefit other groups.

Research Priority 5: Design and evaluation of implementation strategies.

Promising research targets include

- identification of core intervention elements and mechanisms of effects to promote intervention fidelity and adaptation in scale-up;
- evaluation of digital tools that counteract “drift” and can be implemented widely as tested in outcome studies;
- infrastructure required to ensure the success and sustainability of interventions, with emphasis on strategies for workforce development;
- design of quality implementation and improvement plans for intervention scale-up;
- decision making about potential trade-offs, such as intervention effectiveness versus reach to achieve population-level management;
- strategies for scaling programs across diverse settings and delivering them effectively, including use of digital technology and tiered intervention structures;
- benefit/cost relationships when interventions are brought to scale;
- identification of incentives that drive favorable implementation outcomes among organizations and systems;
- strategies for blending funding from diverse federal agencies to support implementation at the population level;
- projects that feature cross-sectional expertise and resources to reach all children in need; and
- projects that address the development and use of population-level data systems to identify needs and track outcomes of interventions/projects.

Research Opportunities

Two ongoing developments in social and behavioral research offer opportunities to generate study data relevant to MEB health and development more effectively and efficiently.

Alternative Research Designs and Methods

Research examining the efficacy, effectiveness, and implementation of interventions designed to improve MEB outcomes in young people has consisted largely of randomized controlled trials. These strong research designs have major advantages, but also are costly and time-consuming, and they do not always reflect outcomes in real-world settings. In the case of rapidly changing technologies, such as trials of digital interventions, the operating systems or the social media outlets used may be obsolete by the time the study is published.

One issue that has generated controversy in a number of scientific disciplines is the question of what evidentiary standards should be applied in identifying interventions as clearly efficacious and effective, and thus deserving of policy support and public resources for scale-up. Some have argued that randomized controlled trials should be the standard because it is only by randomly assigning participants to receive or not receive a treatment that researchers can conclusively eliminate sample bias (see Lee et al., 2017, for a discussion). Others have noted that such trials are not ideal or even suitable for some types of research, such as that associated with broad dissemination of previously studied interventions throughout whole communities (Biglan, Ary, and Wagenaar, 2000; Bothwell et al., 2016; Sullivan, 2011). Given the cost and time demands of randomized controlled trials, developing and improving efficient methods for generating evidence represents an important contribution. Significant progress has been made in applying to MEB prevention research alternative research designs that can yield sound findings in contexts akin to the real-world settings where programs are implemented. Some research designs and methods have the potential to reduce cost and improve timeliness as well. A number of well-established methods beyond randomized controlled trials are promising for the study of influences on MEB health and development and the implementation of interventions, including

- pragmatic (real-world) clinical trials,
- comparative effectiveness trials,
- hybrid designs that blend components of efficacy and effectiveness trials,
- trials targeting health policy outcomes,
- carefully structured pre–post observations,
- interrupted time series designs,
- quality improvement research, and

- learning collaboratives that allow for testing and sharing of ideas and resources at multiple sites in the design and implementation of interventions.

Leveraging of New Kinds of Data

As discussed above, an important aspect of the development of the kind of monitoring system needed to support improvements in MEB health will be careful attention to the optimization and coordination of possibilities in the availability of new or existing large-scale data sources and their analysis. This kind of coordination will be beneficial for researchers as well, opening up new possibilities for linking different types of data. We note also that data generated for other purposes may include elements that are applicable and can be repurposed to answer questions relevant to MEB health and development. Information of many sorts is now routinely collected using expanding digital technologies, and most types of records are digitized. One result of these developments is the collection of extremely large datasets that generally can be accessed only using data mining technologies, often referred to as “big data,” which can be of use to researchers interested in MEB health and its promotion. Such administrative data are collected at the local, state, and national levels, such as by social service agencies, school districts, health care systems, and the like (e.g., the census, tax records, juvenile justice records), and can be linked to answer questions about how interventions for promoting MEB health may influence such outcomes as school attendance, arrest rates, and emergency room visits. These data are potentially valuable for directly answering relevant questions or for generating hypotheses that can be tested in more traditional research. Development of a workforce trained to support collaboration among promotion and prevention investigators and those with informatics expertise will be increasingly important to accelerate research that can inform efforts to foster healthy MEB development.

An even more rapidly growing resource is data collected on children, families, and communities through sensors in homes, smartwatches, phones, cars, and many other devices. Other potentially valuable resources include, for example, medical record data and data gleaned from social media platforms, as long as individuals’ privacy is protected and researchers attend to the development of ethical standards for this rapidly evolving research avenue. Ongoing improvements in data collection, mining, and management are supporting new ways of exploring key public health questions in which social scientists and data scientists collaborate to generate hypotheses that can be tested or to identify populations in need of intervention. A promising possibility that requires further development is the use of natural language processing to identify risks for patient suicide in electronic health records (Pestian et al., 2016; Simon et al., 2018) and machine learning algorithms are offering other possibilities for mining large datasets (Gallo et al., 2015; Imel et al., 2019; Wang et al., 2016).

As new analytic tools for mining large datasets continue to be developed, it will be critical to adhere to ethical standards regarding privacy, and be mindful of

the need to consider adapting procedures and standards in light of new technological possibilities. Protection of the privacy of identifiable data must be a high priority, the ownership of personal data must remain with the individual, and the right of individuals to delete their own data must be maintained.

ASPIRATIONS FOR A DECADE OF CHILDREN AND YOUTH

We close with an overview of what would be different from today at the end of a Decade of Children and Youth in which supporting healthy MEB development and working to ensure that every child and adolescent had the opportunity to meet her potential was a national priority:

- Scientists, educators, business leaders, health care systems, human services agencies, and policy makers together would have recognized the critical importance of measuring and tracking the MEB health and development of young people, and of responding to identified needs at the federal, state, and local levels through the allocation of necessary resources.
- Local, state, and national public health campaigns would have raised broad awareness of the need for improved MEB outcomes for children and youth and the social and economic gains that result. These campaigns would have used monitoring data to demonstrate the advantages of living in communities that have made substantial improvements.
- Communities would have been empowered to organize across sectors, with support from state and federal governments, to effectively address child and family wellness and address disparities.
- Families would have been supported in making advantageous decisions about bearing and rearing their children and prioritizing their children's healthy MEB development, with support from neighborhoods and communities.
- Child care providers and educators would have systematically taken advantage of opportunities to advance the MEB health and development of the children entrusted to them.
- Health care providers would have assumed an obligation to promote fetal as well as child health and development by attending to the MEB health of prospective and actual parents and children and by promoting healthy parenting, neighborhoods, and communities.
- Businesses would have invested in the well-being of employees and supported their employees' families and neighborhoods, recognizing that the healthy MEB development of children, youth, and families is "good business."

- Government entities would regularly use data on MEB development in considering policies and funding streams with the potential to promote healthy neighborhoods and family nurturance of children, working across the federal, state, and community levels to implement effective programs and assess their outcomes.
- Scientific efforts to understand and track the social and environmental determinants of healthy MEB development would have been prioritized by an array of funders. Information about genetic and environmental susceptibility to adverse MEB outcomes would have been used in the development of effective interventions and the monitoring of outcomes for individual children, as well as populations of children.
- The Decade of Children and Youth campaign would have resulted in identifiable and continuous improvement of the MEB development and health of young people; recognition of the family, community, and societal advantages of these efforts; and a national resolve to continue investments in a better future as the United States became a world leader in child wellness advocacy.

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Appendix A

Related Reports of the National Academies of Sciences, Engineering, and Medicine

Date	Report	Sampling of Relevant Messages
2009	<i>Adolescent Health Services: Missing Opportunities</i>	<p>RECOMMENDATION 3: Providers of adolescent primary care services and the payment systems that support them should make disease prevention, health promotion, and behavioral health—including early identification, management, and monitoring of current or emerging health conditions and risky behavior—a major component of routine health services.</p> <p>RECOMMENDATION 4: Within communities—and with the help of public agencies—health care providers, health organizations, and community agencies should develop coordinated, linked, and interdisciplinary adolescent health services.</p> <p>RECOMMENDATION 11: The Federal Interagency Forum on Child and Family Statistics should work with federal agencies and, when possible, states to organize and disseminate data on the health and health services, including developmental and behavioral health, of adolescents. These data should encompass adolescents generally, with subreports by age, selected population characteristics, and other circumstances.</p>
2010	<i>Accounting for Health and Health Care: Approaches to Measuring the Sources and Costs of Their Improvement</i>	<p>RECOMMENDATION 1.1: Work should proceed on two projects that are distinct but complementary in nature. One accounts for inputs and outputs in the medical care sector; the other involves developing a data system designed to track current population health and coordinate information on the determinants of health (including but not limited to medical care).</p>
2011	<i>For the Public's Health: The Role of Measurement in Action and Accountability</i>	<p>RECOMMENDATION 2: The committee recommends that the Department of Health and Human Services support and implement the following to integrate, align, and standardize health data and health-outcome measurement at all geographic levels:</p> <ol style="list-style-type: none"> a. A core, standardized set of indicators that can be used to assess the health of communities. b. A core, standardized set of health-outcome indicators for national, state, and local use.

Date	Report	Sampling of Relevant Messages
		<p>c. A summary measure of population health that can be used to estimate and track health-adjusted life expectancy for the United States.</p> <p>RECOMMENDATION 3: The committee recommends that the Department of Health and Human Services produce an annual report to inform policy makers, all health system sectors, and the public about important trends and disparities in social and environmental determinants that affect health.</p> <p>RECOMMENDATION 7: The committee recommends that the Department of Health and Human Services work with relevant federal, state, and local public-sector and private-sector partners and stakeholders to facilitate the development of a performance measurement system that promotes accountability among governmental and private-sector organizations that have responsibilities for protecting and improving population health at local, state, and national levels.</p>
2012	<p><i>Primary Care and Public Health: Exploring Integration to Improve Population Health</i></p>	<p>RECOMMENDATION 1: To link staff, funds, and data at the regional, state, and local levels, HRSA and CDC should join efforts to undertake an inventory of existing health and health care databases and identify new data sets, creating from these a consolidated platform for sharing and displaying local population health data that could be used by communities.</p>
2014	<p><i>Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2</i></p>	<p>FINDING 5-1: Four social and behavioral domains of health are already frequently collected in clinical settings. The value of this information would be increased if standard measures were used in capturing these data.</p> <p>FINDING 7-1: Standardized data collection and measurement are critical to facilitate use and exchange of information on social and behavioral determinants of health. Most of these data elements are experienced by an individual and are thus collected by self-report. Currently, EHR vendors and product developers lack harmonized standards to capture such domains and measures.</p> <p>RECOMMENDATION 7-2: The Office of the Director of the National Institutes of Health (NIH) should develop a plan for advancing research using social and behavioral determinants of health collected in electronic health records. The Office of Behavioral</p>

Date	Report	Sampling of Relevant Messages
		<p>and Social Science Research should coordinate this plan, ensuring input across the many NIH institutes and centers.</p> <p>RECOMMENDATION 7-3: The Secretary of Health and Human Services should convene a task force within the next 3 years, and as needed thereafter, to review advances in the measurement of social and behavioral determinants of health and make recommendations for new standards and data elements for inclusion in electronic health records. Task force members should include representatives from the Office of the National Coordinator for Health Information Technology, the Center for Medicare & Medicaid Innovation, the Agency for Healthcare Research and Quality, the Patient-Centered Outcomes Research Institute, the National Institutes of Health, and research experts in social and behavioral science.</p>
2014	<p><i>Implementing Juvenile Justice Reform: The Federal Role</i></p>	<p>RECOMMENDATION 3-3: OJJDP should take a leadership role in local, state, and tribal jurisdictions with respect to the development and implementation of administrative data systems by providing model formats for system structure, standards, and common definitions of data elements. OJJDP should also provide consultation on data systems as well as opportunities for sharing information across jurisdictions.</p> <p>RECOMMENDATION 5-2: OJJDP should initiate and support collaborative partnerships at the federal, state, local, and tribal levels and should use them strategically to advance the goal of a developmentally appropriate juvenile justice system.</p>
2015	<p><i>Vital Signs: Core Metrics for Health and Health Care Progress</i></p>	<p>This report provides a detailed analysis of measurement of individual and population health outcomes and costs, identifying fragilities and gaps in available systems, and considering approaches and priorities for developing the measures necessary for a continuously learning and improving health system. It notes, “Substantial disparities exist among and within subpopulations in the United States with respect to the relative impact of each of the domains of influence on health and health care, including disparities by race, ethnicity, income, education, gender, geography, and urban or rural populations. In the aggregate, this issue represents one of the greatest health and health care challenges faced by the nation.”</p>

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Date	Report	Sampling of Relevant Messages
		<p>RECOMMENDATION 4: With the engagement and involvement of the Executive Office of the President, the Secretary of the Department of Health and Human Services should develop and implement a strategy for working with other federal and state agencies and national organizations to facilitate the use and application of the core measure set.</p> <p>RECOMMENDATION 5: The Secretary of the Department of Health and Human Services should establish and implement a mechanism for involving multiple expert stakeholder organizations in efforts to develop as necessary, maintain, and improve each of the core measures and the core measure set as a whole over time.</p>
2015	<p><i>Mental Disorders and Disabilities Among Low-Income Children</i></p>	<p>Poverty is a risk factor for child disability, including disability associated with mental disorders. At the same time, child disability is a risk factor for family poverty. In times of economic hardship in the United States, more children with mental disorder-related disabilities will qualify for benefits because they meet the income eligibility threshold.</p> <p>Children living in poverty are more likely than other children to have mental health problems, and these conditions are more likely to be severe. Low-income families containing a child with a disability may be particularly vulnerable in times of economic hardship. Access to Medicaid and income supports via the SSI disability program may improve long-term outcomes for both children with disabilities and their families.</p>
2015	<p><i>Investing in the Health and Well-Being of Young Adults</i></p>	<p>RECOMMENDATION 6-1: State and local public health departments should establish an office to coordinate programs and services bearing on the health, safety, and well-being of young adults. If a separate office is not established for young adults, these responsibilities should be assigned to the adolescent health coordinator.</p> <p>RECOMMENDATION 6-2: Each community should establish a multi-stakeholder private-public coalition on “Healthy Transitions to Adulthood,” with the goal of promoting the education, health, safety, and well-being of all young adults. State or local public health agencies should take the lead in convening these coalitions.</p> <p>RECOMMENDATION 8-2: Federal and state</p>

Date	Report	Sampling of Relevant Messages
		governments should continue encouraging programs that serve marginalized populations to make better use of administrative data for describing the overlap of populations across service systems and young adults' trajectories into and out of these systems, and for evaluating policies and programs affecting young adults.
2016	<i>Advancing the Power of Economic Evidence to Inform Investments in Children, Youth, and Families</i>	This committee assessed available means of establishing economic evidence to support investments in health and well-being interventions and promotion. The report details methods and makes recommendations to program developers, funders, policy makers, etc. about the use of this economic evidence.
2016	<i>Parenting Matters: Supporting Parents of Children Ages 0–8</i>	<p>RECOMMENDATION 1: The U.S. Department of Health and Human Services, the U.S. Department of Education, state and local agencies, and community-based organizations responsible for the implementation of services that reach large numbers of families (e.g., health care, early care and education, community programs) should form a working group to identify points in the delivery of these services at which evidence-based strategies for supporting parents can be implemented and referral of parents to needed resources can be enhanced. Based on its findings, the working group should issue guidance to service delivery organizations on increasing parents' access to evidence-based interventions.</p> <p>RECOMMENDATION 2: The U.S. Department of Health and Human Services, the Institute of Education Sciences, the Patient-Centered Outcomes Research Institute, and private philanthropies should fund research focused on developing guidance for policy makers and program administrators and managers on how to scale effective parenting programs as widely and rapidly as possible. This research should take into account organization-, program-, and system-level factors, as well as quality improvement. Supports for scaling efforts developed through this research might include cost tools, measurement toolkits, and implementation guidelines.</p>
2016	<i>Ending Discrimination Against People with Mental and Substance Use Disorders: The</i>	RECOMMENDATION 2: The U.S. Department of Health and Human Services should evaluate its own service programs and collaborate with other stakeholders, particularly the criminal justice system and government and state agencies, for the purpose of identifying and eliminating policies, practices, and

Date	Report	Sampling of Relevant Messages
	<i>Evidence for Stigma Change</i>	procedures that directly or indirectly discriminate against people with mental and substance use disorders.
2017	<i>Communities in Action: Pathways to Health Equity</i>	<p>CONCLUSION 3-2: Based on its review of the evidence, the committee concludes that health inequities are the result of more than individual choice or random occurrence. They are the result of the historic and ongoing interplay of inequitable structures, policies, and norms that shape lives.</p> <p>RECOMMENDATION 4-1: A public–private consortium should create a publicly available repository of evidence to inform and guide efforts to promote health equity at the community level. The consortium should also offer support to communities, including technical assistance.</p> <p>RECOMMENDATION 6-4: Through multi-sectoral partnerships, hospitals and health care systems should focus their community benefit dollars to pursue long-term strategies (including changes in law, policies, and systems) to build healthier neighborhoods, expand access to housing, drive economic development, and advance other upstream initiatives aimed at eradicating the root causes of poor health, especially in low-income communities. Hospitals and health systems should also advocate for the expansion of efficient and effective services responding to health-related social needs for vulnerable populations and people living in poverty.</p>
2018	<i>Transforming the Financing of Early Care and Education</i>	RECOMMENDATION 10: The federal government should align its data collection requirements across all federal early care and education (ECE) funding streams to collect comprehensive information about the entire ECE sector and sustain investments in regular, national, data collection efforts from state and nationally representative samples that track changes in the ECE landscape over time to better understand the experiences of ECE programs, the ECE workforce, and the developmental outcomes of children who participate in ECE programs.
2019	<i>A Roadmap for Reducing Child Poverty</i>	CONCLUSION 4-6: The Earned Income Tax Credit, the Child Tax Credit, the Supplemental Nutrition Assistance Program (SNAP), and to a lesser extent Social Security are the most important programs for reducing Supplemental Poverty Measure (SPM)-based child poverty. SNAP and Social Security are the most important programs for reducing deep

Date	Report	Sampling of Relevant Messages
		<p>poverty among children. Tax credits are the most important means of keeping children above near-poverty. Health care programs account for more than one-third of total federal expenditures on children but are not properly accounted for in the SPM poverty measure.</p> <p>CONCLUSION 7-3: Evidence suggests that paid family and medical leave increases parents' ability to continue in employment and has positive impacts on children's health, although it might also reduce employment among women potentially eligible for such leave.</p> <p>RECOMMENDATION 9-4: Relevant federal departments and agencies should prioritize research and experimentation designed to find ways to mitigate the effects of contextual factors that impair the effectiveness of current programs to combat child poverty. These contextual factors include (1) detrimental neighborhood conditions, (2) racial and social discrimination, and (3) adverse consequences of the criminal justice system.</p> <p>RECOMMENDATION 9-8: The Bureau of Labor Statistics and the U.S. Census Bureau should move expeditiously to evaluate a health-inclusive poverty measure of the kind illustrated in this report.</p> <p>RECOMMENDATION 9-9: Federal and state executive agencies and legislatures should ensure that child anti-poverty assistance programs require and include adequate resources for regular monitoring of program operations and child outcomes, as well as for rigorous program evaluation and research on ways to improve program effectiveness.</p>
2019	<i>The Promise of Adolescence: Realizing Opportunity for All Youth</i>	<p>RECOMMENDATION 7-2: Improve access to comprehensive, integrated, coordinated health services for adolescents.</p> <p>RECOMMENDATION 7-5: Improve federal and state data collection on adolescent health and well-being, and conduct adolescent-specific health services and disseminate the findings.</p> <p>RECOMMENDATION 8-5: Foster greater collaboration between the child welfare, juvenile justice, education, and health systems.</p>

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Date	Report	Sampling of Relevant Messages
2019	<i>Strengthening the Military Family Readiness System for a Changing American Society</i>	<p>RECOMMENDATION 3: The U.S. Department of Defense should more fully identify, analyze, and integrate existing data to longitudinally track population-based military child risk and adversity, while also ensuring the privacy of individual family member information.</p> <p>RECOMMENDATION 10: To enhance the effectiveness and efficiency of the Military Family Readiness System, the U.S. Department of Defense should investigate innovations in big data and predictive analytics to improve the accessibility, engagement, personalization, and effectiveness of policies, programs, practices, and services for military families.</p>
2019	<i>Monitoring Educational Equity</i>	<p>RECOMMENDATION 4: Governmental and philanthropic funders should work with researchers to develop indicators of the existence and effectiveness of systems of cross-agency integrated services that address context-related impediments to student success, such as trauma and chronic stress created by adversity. The indicators and measures should encompass screening, intervention, and supports delivered not only by school systems, but also by other child-serving agencies.</p>
2019	<i>Vibrant and Healthy Kids: Aligning Science, Practice, and Policy to Advance Health Equity</i>	<p>CONCLUSION 5-1: The current health care system focuses mainly on clinical goals and addresses the multiple other determinants of health in fragmented and highly variable ways. Despite high-quality clinical care, the health status of America’s children and young families is far worse than in comparable developed countries. U.S. health care provides only limited attention to integration of health care for the whole family, health care across the life course, or integration of mental and behavioral health with the rest of health care.</p> <p>CONCLUSION 6-1: Increasing the economic resources families have available to meet basic needs when children are young (including prenatally) will improve children’s health and has the potential to reduce health and developmental disparities in early childhood.</p> <p>RECOMMENDATION 4-2: Federal, state, local, tribal, and territorial agencies, along with private foundations and philanthropies that invest in research, should include in their portfolios research on the</p>

Date	Report	Sampling of Relevant Messages
		<p>development of interventions that are culturally sensitive and tailored to meet the needs of subgroups of children known to be vulnerable, such as those living in chronic poverty, children from immigrant backgrounds, children in foster care, and children with incarcerated parents.</p> <p>RECOMMENDATION 4-3: To strengthen and expand the impact of evidence-based home visiting programs federal, state, local, tribal, and territorial agencies overseeing program implementation should continue to strengthen programmatic coordination and policy alignment between home visiting, other early care and education programs, and medical homes.</p> <p>RECOMMENDATION 5-3: The U.S. Department of Health and Human Services, state, tribal, and territorial government Medicaid agencies, health systems leaders, and state and federal policy makers should adopt policies and practices that improve the organization and integration of care systems, including promoting multidisciplinary team-based care models that focus on integrating preconception, prenatal, and postpartum care with a whole-family focus, development of new practice and payment models that incentivize health creation and improve service delivery, and structures that more tangibly connect health care delivery systems to other partners outside of the health care sector.</p> <p>RECOMMENDATION 8-1: Policy makers and leaders in the health care, public health, social service, criminal justice, early care and education/education, and other sectors should support and invest in cross-sector initiatives that align strategies and operate community programs and interventions that work across sectors to address the root causes of poor health outcomes. This includes addressing structural and policy barriers to data integration and cross-sector financing and other challenges to cross-sector collaboration.</p>

Appendix B

Strengthening Monitoring for MEB Health

The challenges of effectively monitoring influences on mental, emotional, and behavioral (MEB) health and development, outcomes for children and youth, and related information are significant. This Appendix supplements the recommendations offered in Chapter 11 with exploration of three areas in which monitoring can be strengthened: effective measurement of key indicators, surveillance and screening, and use of big data.

EFFECTIVE MEASUREMENT OF KEY INDICATORS

The measurement of indicators useful for effectively monitoring MEB health and development among children and youth poses several challenges. One is that not all of the tools used to measure indicators for adults work well with populations of children and adolescents. Development is most fluid during childhood and adolescence, so variables may change swiftly. Children are more sensitive than adults to environmental and social influences because of rapid changes in their physiology and neurodevelopment. Assessments and reporting are often done by a parent or other proxy rather than through self-report, as is done with many adult outcome metrics. Because most children are relatively healthy, many measures have a “ceiling effect” if they do not take into account long-term developmental resilience and vulnerability. And children suffer from different morbidities than adults, which may be reflected in their developmental status.

Another challenge is that the purpose of indicators of healthy development varies by the level at which they are used. Individual measures of development are useful for assessing the trajectory of a specific child’s development in ongoing surveillance, such as in primary care practice or school, and should be linked with specific promotion, prevention, or treatment services for children and their families. Community-level measures, such as child development surveys at the school or health system level, are most useful for improvement efforts in neighborhoods or by educational, social, and health services.

A related issue is that there are no well-defined indicators that are universally shared for many important factors and outcomes of interest. Even

when the indicators and their purposes are well defined, the collection of data on these indicators may not be feasible in some scenarios. For example, a lack of personnel, time, or funding may prevent a school from having the ability to collect and report on indicators of students' healthy development accurately and adequately.

SURVEILLANCE AND SCREENING

Surveillance (purposeful observation by a skilled professional) and screening (formal data gathering using a standardized tool) are important methods for identifying problems and opportunities in individuals and populations. Both can be carried out in universal, selective, and indicated modes. Targeting venues that serve all children, such as schools and health care, will create efficiencies for broad application of surveillance and screening.

The 2009 National Research Council and Institute of Medicine report (National Research Council and Institute of Medicine, 2009) includes a chapter on screening for prevention, which is organized around adaptations of World Health Organization guidelines for screening in health care to identify risks to healthy MEB development or for detection of prodromal, concerning behaviors. In the intervening decade, greater attention has been paid to screening and surveillance. Prominent screening programs to date have targeted early identification of MEB health conditions, such as autism spectrum disorder in preschool-age children (Zwaigenbaum et al., 2015) and depression in adolescents (Siu and U.S. Preventive Services Task Force, 2016). Screening for risks of behavioral disorders—for example, screening parents and youth for recollection of adverse childhood experiences—has also received increasing attention in the past decade (Briggs et al., 2014; Finkelhor et al., 2013), as has surveillance for adverse experiences of young children (Bethell, Simpson, and Solloway, 2017).

Venues for these surveillance and screening activities include health care settings but also child care settings, preschools, and schools (Dowdy, Ritchey, and Kamphaus, 2010). For example, as discussed in Chapter 11, population-based screening of 5-year-olds in schools in British Columbia has provided feedback to schools and communities about the status of physical, social, and behavioral dimensions of development in their local environment (Guhn et al., 2016). Screening at the community level has been embedded in home visitation. For example, home visitors screen for postpartum depression, providing an opportunity for early treatment of mothers with the rationale that parenting capabilities will be enhanced (Ammerman et al., 2010). See Box B-1 for several examples of existing screening programs.

BOX B-1
Examples of Screening Programs That May Be Useful in Efforts to Foster Healthy MEB Development

1. The Early Development Instrument includes social and emotional components and is administered every 2 to 3 years in British Columbia kindergartens (see Chapter 11). The program has been administered in seven waves of administration over the past two decades that have included approximately 40,000 children per cycle (Human Early Learning Partnership, 2018).
2. Instruments commonly used for social-emotional screening of children and youth in health care practices, schools, and other settings include the Ages and Stages Questionnaire-Social Emotional Component and the Strengths and Difficulties Questionnaire. These screening tools are increasingly administered longitudinally and universally in primary child care practices and in educational settings. Results are used to identify children in need of special supports and services.
3. The Screening, Brief Intervention, and Referral to Treatment (SBIRT) (Tanner-Smith and Lipsey, 2015) instrument is a brief evidence-based inventory that identifies adolescents with early substance use and uses strategies for preventing substance use disorders. SBIRT has been successfully delivered in primary care (Ridenour et al., 2015; Sterling et al., 2015).
4. Screening tools for children's strengths and resilience have been described, but their use in institutional settings such as education and health care has been largely in a research context.

Since 2009, there has also been a focus on surveillance to identify the need for interventions to mitigate adverse consequences of social determinants in health care (Garg and Dworkin, 2016). Teachers may conduct surveillance for symptoms of attention deficit-hyperactivity disorder and other behavioral disorders, as well as social determinants of a child's well-being. The American Academy of Pediatrics Bright Futures guidelines (Hagan, Shaw, and Duncan, 2017) recommend (in their fourth iteration) surveillance questions during well-child visits for such family risk factors as food insecurity, living situation, child care, excessive screen time, interpersonal violence, and household tobacco/alcohol/substance use, as well as such protective factors as reading to the infant or child, school success, providing opportunity for physical activity, and healthy nutrition. This level of surveillance is recommended as a universal component of practice, as impediments to healthy MEB development occur at all family socioeconomic levels. Evidence suggests that screening for social determinants of health in pediatric practice can result in allocation of greater community resources for families with need, compared with usual care (Garg et

al., 2015), and improve child health (Gottlieb et al., 2016); electronic screening may result in higher rates of disclosure of needs (Gottlieb et al., 2014).

Guidelines for Selecting and Implementing Screening Programs

The setting or context for screening should include capabilities for providing feedback to parents or the child (when old enough). Ideally, feedback would occur in real time, at the point of encounter. The setting should also provide or be linked to resources for following up on screening results that are concerning, with more detailed assessment and intervention as indicated. For many families, referral to another point of service may be overwhelming. For this reason, programs that can identify needs through screening and respond to those needs in a comprehensive fashion within the same setting are in a more advantageous position to gain family acceptance and compliance with intervention plans (Jaycox et al., 2009).

Screening should use validated tools and acceptable processes for the population undergoing needs assessment. The tool should be developmentally and educationally appropriate. For example, picture response options can be helpful for younger children. Brief, rather than lengthy, surveys are usually preferable, particularly for screens that are administered repetitively over time. Paper surveys have been popular in the past, but online screening at kiosks has proven to be efficient and accepted by most families, and has the advantage of collecting data and providing feedback to the family within the context of a single visit. Online screening also allows for easy reporting of group or population data and can be used for purposes of health services improvement or research (with deidentified data). The environment for entering information should be private and free from distraction to the extent possible. Universal screening has the advantage of avoiding or lessening stigmatization of individuals or families.

Well-trained screening personnel should support this function. Individuals who can professionally explain the rationale for screening, the process for completion of screening, and follow-up steps can enhance consistent participation by parents and/or children and the quality of screening input. Longitudinal screening has advantages over one-time screens in terms of assessing consistency of responses, as well as being able to track trajectories.

Guidelines for determining who is to be screened, how often screening should occur, who interacts with parents and/or children concerning the screening process, and how the results of screening will be managed should be in place and understood by all personnel involved. Quality improvement of screening programs in health care has augmented outcomes remarkably (Beers et al., 2017).

Screening in School Settings

Screening to identify students who have MEB health needs has long been carried out in school settings (Dowdy, Ritchey, and Kamphaus, 2010). In the context of a school's multitiered system of support, universal and indicated screening can be used to detect the mental health needs of individual students or

even of the student body for both prevention and treatment (Walker, 2010). Instruments such as the Behavior Assessment System for Children-2 Behavioral and Emotional Screening System (Kamphaus and Reynolds, 2007) can be used in schools to assess for risk of emotional and behavioral problems. School surveys that focus on positive youth development, such as the California Healthy Kids Survey-Social and Emotional Health Survey, are also available (You et al., 2014). Another emerging area for monitoring in schools is assessment of the organizational school climate, which has been shown to be associated with students' self-esteem, mental health, bullying, and such outcomes as absenteeism and suspensions (Bear et al., 2011; Thapa, 2013). The rapidly increasing prevalence of anxiety problems treated in college counseling services (Center for Collegiate Mental Health, 2017) has prompted offerings of screening for this disorder, which might be considered in middle and high school settings.

Screening in Health Care Settings

A report from the American Academy of Pediatrics addresses the growing need to screen for behavioral and emotional problems or health in child primary care settings, as well as for changes in health care practice and systems to respond to this need (Weitzman and Wegner, 2015). The benefits of screening programs may extend beyond those originally targeted. For example, screening for maternal depression has been characterized as an opening to address the social determinants of a child's health (Schor, 2018). The recognition of anxiety and depression in a large proportion of parents of children with disabling and life-threatening chronic health disorders has led to recommendations for parent screening (Quittner et al., 2016). For example, the Cystic Fibrosis Foundation recommends that CF Care Center personnel annually offer the Generalized Anxiety Disorder 7-Item scale and Patient Health Questionnaire-9 screening tools to parents and encourages the use of the Psychosocial Assessment Tool (Kazak et al., 2015) to identify family psychosocial risks. A related effort has been the experimental screening of children with chronic diseases and their families for school attendance and academic barriers, with the goal of improving school success for these children as an important resilience factor (Filigno et al., 2017). Screening of children for behavioral health problems and risks in the emergency room has been successful and may be important when families are disconnected from primary care systems (Williams, Ho, and Grupp-Phelan, 2011).

Screening Concerns and Barriers

Family concerns about screening programs include labeling and potential stigmatization of children, which has been of particular concern in communities already burdened by racial, social, and economic disadvantage. Universal screening might mitigate some of this concern. Another concern is the inability of programs and systems to respond effectively to needs identified by screening.

Perhaps the greatest concern at this time is the ability to support and sustain screening programs financially. In health care, screening is generally not a reimbursable service, by either private or public payers. The Centers for Medicare & Medicaid Services has approved payments for maternal depression screening in well-child care, but payment is dependent on state decisions to provide these payments. Most states currently do not reimburse this activity. Some child health care screening may be included in Early and Periodic Screening, Diagnosis, and Treatment service payments, but most activity in this program targets assessment of physical development. The Patient Protection and Affordable Care Act included a stipulation that payment for child health care recommendations be included in the Bright Futures guidelines, but implementation of payments never materialized. Recommendations of the United States Preventive Services Task Force (USPSTF) are a basis for reimbursement, but recommendations are limited to health care settings, and have not addressed most efforts to foster healthy MEB development or prevent adverse influences on MEB development. The USPSTF has issued statements that the evidence regarding efforts to screen for and/or prevent alcohol misuse, autism, child maltreatment, adolescent depression, illicit drug use, speech and language delays, and suicide risk is inconclusive. Only education to prevent initiation of tobacco use in children and adolescents and screening for adolescent depression are recommended. For these reasons, creating a strong evidence base for MEB health promotion and risk prevention interventions in children is urgent.

Although schools have been viewed as ideal venues for screening and MEB risk interventions, public school systems are evaluated based on students' academic performance and other factors, and not on their students' MEB outcomes. Screening or surveillance for MEB risks and early behavioral disorders are not widespread in schools, but examples include the Tulane Early Childhood Collaborative and the Early Learning Development Instrument, in which measurement leads to mobilization of resources and engagement with diverse stakeholders in child development.

Many states now conduct annual assessments of adolescents' behaviors, including both problem and, to a lesser extent, prosocial behaviors. The Youth Risk Behavior Surveillance monitors some MEB-related adolescent behaviors. One example of county-level surveillance of social determinants of health is the Los Angeles Department of Public Health's Community Health Assessment survey, a population-based random telephone survey of children and adults in the county's households, including institutionalized and homeless individuals with cell phone access, which is provided in multiple languages. Surveillance at the county level includes characterizations of children (school readiness, television viewing, access to mental health services, teen and parent substance use, physical health), parenting (parent support, child care, breastfeeding), households (employment, food insecurity), and neighborhoods (sense of belonging, crime, access to parks, concerns about climate change, air quality). (See Los Angeles County Department of Public Health, 2017, for more information.)

Nevertheless, there is not currently consistent measurement of child and adolescent development across the United States. In areas in which youth are routinely assessed, such as the Monitoring the Future survey or Youth Risk Behavior Survey, the data provide a valuable tool for policy makers and investigators.

BIG DATA

Most research in social and behavioral sciences has involved the generation of data to answer particular questions, but data that have been generated for other purposes may contain elements that are applicable and can be repurposed to answer questions in the social and behavioral realms. Increasingly, large volumes of data collected by electronic systems, often referred to as “big data,” are available for research purposes and such data may play a crucial role in the development of a national monitoring system for children’s MEB health.

Data sources that may be useful in efforts to address social and behavioral issues include those that are local (e.g., social services, school system, health care system), statewide, or national. Data sources might include administrative data, aggregated individual child or family data, census data, tax records, juvenile justice records, and national surveys. Data from social media and other Internet activity, if collected with sufficient privacy protections, may also be informative. Another example is electronic medical record data related to social determinants of health, for example, in narrative social worker notes, which could be mined using natural language processing to identify risks and other patterns (Pestian et al., 2016, 2017). Analyzing large data sources may be particularly useful for generating hypotheses. Scientists from disciplines including social and behavioral science fields can collaborate to define project objectives, and consider varied perspectives on ways to harvest useful information from new data sources (Mathematica, 2018).

Communities concerned with healthy development lack readily available tools for measuring salient attributes, and also lack resources or systems for collecting, analyzing, and reporting data on child development. Investments in shared infrastructure for data management will be essential. Hospitals, schools, and social service organizations such as United Way may be most skilled in data collection and management.

Continued investment in measurement science for children is critical. Assessment tools developed in laboratories play an important role but support will be needed as well for emerging frontiers and challenges, including digital monitoring of children and their development; the development of algorithms for processing large amounts of monitoring data and other tools for detecting patterns, connections, and other pertinent information; the integration of records across service sectors that care for children; and the continued development of safeguards to ensure confidentiality and privacy in coordinated records. As system processing improves, some measures and monitoring devices may be useful for both individual tracking of the developmental status of children over time and,

when aggregated, community- and societal-level tracking. Recognition of the importance of developmental indicators for children and youth is growing; examples including the Vital Signs project of the National Academy of Medicine and the 500 Cities project of the Centers for Disease Control and Prevention and the Robert Wood Johnson Foundation illustrate the valuable role they can play.

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Appendix C

Biographical Sketches of Committee Members and Staff

Thomas F. Boat, M.D. (*Chair*) is the dean emeritus of the College of Medicine at the University of Cincinnati and a professor of pediatrics in the Division of Pulmonary Medicine at the Cincinnati Children's Hospital Medical Center. Earlier, he was the director of the Cincinnati Children's Hospital Research Foundation and chair of the Department of Pediatrics at the University of North Carolina in Chapel Hill. More recently, he has worked at local and national levels to improve child health research efforts, subspecialty training, and clinical care. He has a special interest in issues posed by children's mental health for pediatric care, research, and training, and he is working in Cincinnati and nationally to promote children's behavioral health. He is a member of the National Academy of Medicine. He is also a member of the Association for the Accreditation of Human Research Protection Programs and served as president of its board of directors. He has also served as chair of the American Board of Pediatrics and as president of both the Society for Pediatric Research and the American Pediatric Society. He has an M.D. in pediatric pulmonology from the University of Iowa.

William A. Aldridge II is an advanced implementation specialist and director of The Impact Center at the Frank Porter Graham Child Development Institute at the University of North Carolina at Chapel Hill. He is also on the Board of Directors of the National Prevention Science Coalition, adjunct assistant professor in Health Policy and Management at UNC Gillings School of Global Public Health, and affiliate faculty member at Pennsylvania State's Edna Bennett Pierce Prevention Research Center. His work includes active implementation support and evaluation research on the implementation and scale-up of evidence-based prevention and well-being strategies in community settings and state, regional, and national service systems. He is a recipient of the Translational Science Award for the Society for Prevention Research. He is a member of the American Psychological Association, the Society for Prevention Research, and the Society for Implementation Research Collaboration. He has a Ph.D. in clinical psychology

from the University of North Carolina at Chapel Hill, and he is a licensed psychologist in North Carolina.

Alix Beatty (*Study Director*) is a senior program officer with the Board on Behavioral, Cognitive, and Sensory Sciences in the Division of Behavioral and Social Sciences and Education (DBASSE). She previously served as the study director for an evaluation of the public schools of the District of Columbia. Her other work in DBASSE has covered a wide range of topics, including consensus studies and workshops on educational assessment and equity, child and adolescent education and development, public health, climate change, and a decadal survey of social and behavioral sciences for national security. Prior to joining DBASSE, she worked on the National Assessment of Educational Progress and College Board programs at the Educational Testing Service. She has a B.A. in philosophy from Williams College and an M.A. in history from Bryn Mawr College.

Anthony Biglan is a senior scientist at the Oregon Research Institute. He conducts research on the development and prevention of child and adolescent problem behavior, focusing on comprehensive interventions that have the potential to prevent the entire range of child and adolescent problems. His work has included studies of the risk and protective factors associated with tobacco, alcohol, and other drug use, high-risk sexual behavior, and antisocial behavior. He has conducted numerous experimental evaluations of interventions to prevent tobacco, alcohol, and other drug use, high-risk sexual behavior, antisocial behavior, and reading failure through family, school, and communitywide interventions. He is a former president of the Society for Prevention Research. He has an M.A. and a Ph.D., both in social psychology, from the University of Illinois at Urbana-Champaign.

Richard Catalano, Jr. is the Bartley Dobb professor for the study and prevention of violence in the School of Social Work, a research affiliate at the Center for Studies in Demography & Ecology, and the cofounder of the Social Development Research Group, all at the University of Washington. His work focuses on discovering risk and protective factors for positive and problem behavior, designing and evaluating programs to address these factors, and using this knowledge to understand and improve prevention service systems in states and communities. He is the co-developer of the Social Development Model; several parenting programs, including “Guiding Good Choices”; the school-based program “Raising Healthy Children”; and the community prevention approach “Communities That Care.” He is a recipient of the award of excellence from the National Prevention Network, a practitioner organization, and the presidential award from the Society for Prevention Research, a scientific organization. He has a bachelor’s degree from the University of Wisconsin and a master’s degree and a Ph.D. from the University of Washington, all in sociology.

Frances A. Champagne is a professor in the Department of Psychology at The University of Texas at Austin and an adjunct associate professor in the Department of Psychology at Columbia University. As a psychologist and behavioral neuroscientist, her research is in the fields of molecular neuroscience, maternal behavior, and the epigenetic effects of early developmental experiences. Her main research interest concerns how genetic and environmental factors in early life interact to shape behavioral development and the consequences of epigenetic variation for the transmission of traits across generations. She is a recipient of the Director's New Innovator Award of the National Institutes of Health. She has a B.A. in psychology from Queen's University in Canada and an M.Sc. in psychiatry and a Ph.D. in neuroscience from McGill University.

Jennifer Frank is an assistant professor in the Department of Educational Psychology, Counseling, and Special Education in the College of Education at Penn State University. Her work focuses on developing and evaluating school-based prevention practices that modify the social ecology of risk (school-family-peer-individual factors) that gives rise to high-incidence disabilities and preparing the next generation of school-based professionals to implement high-quality prevention practices in school settings. Her work strives to be interdisciplinary and draws from diverse theoretical and methodological approaches to understand the determinants of risk and resilience. The ultimate goal of her teaching, research, and service activities is to create optimal social contexts to support academic learning that are sustainable in real-world settings. Her current research interests include school-based prevention, positive behavior supports, innovative statistical and experimental methods to validate evidence-based interventions, social-emotional learning, and mindfulness-based interventions. She has a Ph.D. from the University of Wisconsin–Madison.

Patricia Jennings is a professor in the Department of Curriculum, Instruction, and Special Education at the Curry School of Education and Human Development at the University of Virginia. She studies the social and emotional dynamics of educational settings and develops and tests social and emotional learning curricula and interventions for students in pre-K through 12th-grade school settings. Her basic research covers social and emotional competencies, the life span developmental effects of childhood trauma, and adult perception of stress and coping. She is particularly focused on applying mindfulness-based approaches to improving teacher and student emotional awareness and self-regulation, improving teaching and learning environments, and using this research to improve pre-service teacher education at the pre-K and elementary levels. She is a recipient of the Cathy Kerr Award for Courageous and Compassionate Science by the Mind & Life Institute. She has a B.A. from Antioch College, an M.Ed. from St. Mary's College, and a Ph.D. from the University of California at Davis.

Sheryl Kataoka is professor-in-residence in the Division of Child and Adolescent Psychiatry at the University of California, Los Angeles (UCLA), where she also serves as the training director of the Child and Adolescent Psychiatry Fellowship. She is also an investigator with the UCLA Center for Health Services and Society, examining how schools and communities can support the emotional well-being of children and families. She is the site principal investigator for the Treatment and Services Adaptation Center for Resiliency, Hope and Wellness in Schools of the National Child Traumatic Stress Network. She has a B.S. and an M.S. in health services research from UCLA and an M.D. from the George Washington University School of Medicine and Health Sciences. She completed child psychiatry fellowship training at the UCLA Semel Institute.

Kelly J. Kelleher is the ADS Professor of Innovation at The Research Institute at Nationwide Children's Hospital. Dr. Kelleher is also Distinguished Professor of Pediatrics and Public Health at The Ohio State University's Colleges of Medicine and Public Health. As a pediatrician, his research interests focus on accessibility, effectiveness, and quality of health care services for children and their families, especially those affected by mental disorders, substance abuse, or violence. He has a long-standing interest in formal outcomes research for mental health and substance abuse services. He has an M.P.H. from the Johns Hopkins University School of Hygiene and Public Health and an M.D. from The Ohio State University College of Medicine.

Margaret Kelly serves as a senior program assistant on the Board of Children, Youth, and Families. Ms. Kelly has more than 20 years of experience working in the administrative field. She has worked for the private sector, federal government, and nonprofit organizations to include American University, Catholic University, the Census Bureau, International Franchise Association, the Department of Defense, and the University of the District of Columbia. Ms. Kelly has received numerous professional honors and awards throughout her career to include a Superior Performance of Customer Service Award; Sustained Superior Performance Cash Awards; Air Force Organizational Excellence Awards; and Certificates of Appreciation.

Erin Kellogg (*Research Associate*) is on the staff of the Board of Children, Youth, and Families. Prior to joining the board staff, she worked as a consultant for the Ohio Department of Medicaid on projects related to the state's Medicaid waiver programs. She has also worked as a policy analyst for both the Children's Defense Fund and Connecticut Voices for Children. She has an M.P.A. from The Ohio State University and an M.P.H. from the Yale School of Public Health.

Grace Kolliesuah is chief of the Bureau of Children and Families in the Ohio Department of Mental Health and Addiction Services. She oversees the implementation of Ohio's comprehensive array of statewide behavioral health

initiatives and services for children and families. She provides guidance and strategic direction to programs regarding planning, performance, and budgeting. She is also the principal investigator for several grants from the Substance Abuse and Mental Health Services Administration. Previously, she served as the project director for a federal Healthy Start Project, Caring for 2 at Columbus Public Health, and as a direct service child welfare supervisor and administrator with children protection agencies, serving medical fragile, abused, neglected, dependent, and delinquent children. She has a B.S. in business administration and an M.A. in urban studies and public administration from the University of Akron and a master's in social work from The Ohio State University. She is a licensed social worker.

Marguerita Lightfoot is a professor of medicine at the School of Medicine of the University of California, San Francisco (UCSF), as well as chief for the Division of Prevention Science and director of the Center for Prevention Studies and the UCSF Prevention Research Center. Her research focus is on improving the health and well-being of adolescents and young adults and on the development of efficacious interventions to reduce risk behaviors among vulnerable populations of adolescents. She conducts community-involved research that includes designing and implementing preventive interventions for delinquent adolescents, runaway and homeless youth, and youth living with HIV. She is particularly interested in developing cost-effective interventions that are easily translatable with utility in community settings, using new technologies. She has a Ph.D. and is a licensed psychotherapist.

Tamar Mendelson is a Bloomberg Professor of American Health at the Johns Hopkins Bloomberg School of Public Health. She has a joint appointment in psychiatry and behavioral sciences at Johns Hopkins Medicine, and she is co-leader of the risks to adolescent health focal area in the Bloomberg American Health Initiative. Her research addresses the development, evaluation, and implementation of prevention strategies to improve maternal and child mental health, with a focus on underserved urban populations. She focuses especially on the prevention of depression, anxiety, and trauma and the promotion of emotional and behavioral health among urban youth, with particular interest in the evaluation of mindfulness-based interventions. Her research adapts and tests evidence-based interventions so that they can be feasibly and sustainably embedded within systems that serve youth and families. She has a Ph.D. in clinical psychology from Duke University.

Ricardo F. Muñoz is distinguished professor of clinical psychology at Palo Alto University. He is also the founding director of i4Health (Institute for International Internet Interventions for Health), which works to provide health and mental health services to underserved communities by providing them with mobile apps and Internet-accessible interventions and resources. Previously, he was a

professor of psychology at the School of Medicine of the University of California, San Francisco, based at San Francisco General Hospital, where he served as chief psychologist. He specializes in the prevention and treatment of depression and in smoking cessation. He was inducted as a fellow of the American Association for the Advancement of Science “for distinguished contributions towards the prevention of major depression and the development of Internet interventions to improve mental health worldwide.” He has an A.B. in psychology from Stanford University and an M.A. and a Ph.D. in clinical psychology from the University of Oregon, Eugene.

Myrna M. Weissman is chief of the Division of Epidemiology at New York State Psychiatric Institute and Diane Goldman Kemper family professor of epidemiology in psychiatry at Columbia University. Her current research is on understanding the rates and risks of mood and anxiety disorders using methods of epidemiology, genetics, neuroimaging, and the application of these findings to develop and test empirically based treatments and prevention interventions. She directs a three-generation study of families at high and low risk for depression who have been studied clinically for up to 25 years and who are participating in genetic and imaging studies. She also directed a multi-center study to determine the effects of maternal remission from depression on offspring, and she is participating in several studies of the genetics of mood and anxiety disorders. She also directs a study of psychiatric disorders in a poor minority patient population in African American churches. She has a Ph.D. in chronic disease epidemiology from the Yale University School of Medicine.

BOARD ON CHILDREN, YOUTH, AND FAMILIES

The Board on Children, Youth, and Families (BCYF) is a nongovernmental, scientific body within the National Academies of Sciences, Engineering, and Medicine that advances the health, learning, development, resilience, and well-being of all children, youth, and families. The board convenes top experts from multiple disciplines to analyze the best available evidence on critical issues facing children, youth, and families. Our ability to evaluate research simultaneously from the perspectives of the biological, behavioral, health, and social sciences allows us to shed light on innovative and influential solutions to inform the nation. Our range of methods—from rapidly convened workshops to consensus reports and forum activities—allows us to respond with the timeliness and depth required to make the largest possible impact on the health and well-being of children, youth, and their families throughout the entire lifecycle. BCYF publications provide independent analyses of the science and go through a rigorous external peer-review process.

