

Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Committee on the Prevention of Mental Disorders and Substance Abuse
Among Children, Youth and Young Adults:
Research Advances and Promising Interventions

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, *Editors*

Board on Children, Youth, and Families
Division of Behavioral and Social Sciences and Education

NATIONAL RESEARCH COUNCIL AND
INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
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PREPUBLICATION COPY—Uncorrected Proofs

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NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This study was supported by Grant No. NO1-OD-4-2139, Task Order #181 between the National Academy of Sciences and the Department of Health and Human Services. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the organizations or agencies that provided support for the project.

Library of Congress Cataloging-in-Publication Data

TK

or

International Standard Book Number-13: 978-0-309-XXXXX-X

International Standard Book Number-10: 0-309-XXXXX-X

Additional copies of this report are available from National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, <http://www.nap.edu>.

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Printed in the United States of America

Suggested citation: National Research Council and Institute of Medicine. (2009). *Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities*. Committee on Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions. Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors. Board on Children, Youth, and Families, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

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Acknowledgments

This report is the work of the Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Families: Research Advances and Promising Interventions, a project of the National Research Council (NRC) and the Institute of Medicine (IOM). The expertise and hard work of the committee were advanced by the support of our sponsors, the contributions of able consultants and staff, and the input of outside experts. The majority of funding for this project was provided by the Center for Mental Health Services of the Substance Abuse and Mental Health Services Administration (SAMHSA), with supplementary funding from the National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA), and the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The guidance and support of Anne Matthews-Younes and Paul Brounstein, SAMHSA; Robert Heinessen, NIMH; Elizabeth Robertson, NIDA; and Vivian Faden, NIAAA, were much appreciated.

Throughout this process, the committee benefited from presentations or written input by individuals with a range of perspectives (see Appendix B). The committee is thankful for the useful contributions of these many individuals. We would like to thank those who wrote papers that were invaluable to the committee's discussions: Tom Dishion, University of Oregon; Daniel Eisenberg, University of Michigan; Pauline E. Ginsberg, Utica College; Mark Greenberg, Pennsylvania State University; J. David Hawkins, University of Washington; Kamilah Neighbors, University of Michigan; Ron Prinz, University of South Carolina; Anne W. Riley, Johns Hopkins University; Herbert Severson, Oregon Research Institute; Brian

Smith, University of Washington; Hill Walker, Oregon Research Institute; and Hirokazu Yoshikawa, Harvard University. We are also thankful to those who assisted committee members with literature searches, background research, or analyses, including Mark Alter, Columbia University; Christine Cody, Oregon Research Institute; Alaatin Erkanli, Duke University Medical Center; Erika Hinds, University of Oregon; Armando Pina, Arizona State University; and Joan Twohey-Jacobs, University of La Verne. We also thank Casey Family Programs for their travel support.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the National Research Council (NRC). The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for 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: Sherry Glied, Mailman School of Public Health, Columbia University; Larry A. Green, University of Colorado Health Science Center, Denver, CO; Mark T. Greenberg, Prevention Research Center, Pennsylvania State University; Deborah Gross, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University, School of Nursing and School of Medicine, Rush University; Peter S. Jensen, President's Office, The REACH Institute (REsource for Advancing Children's Health), New York, NY; Sheppard G. Kellam, Center for Integrating Education and Prevention Research in Schools, American Institutes for Research, Baltimore, MD; Bruce G. Link, Mailman School of Public Health, Columbia University; Patricia J. Mrazek, Independent Consultant, Bethesda, MD; Estelle B. Richman, Secretary's Office, Pennsylvania Department of Public Welfare; and Huda Y. Zoghbi, Departments of Pediatrics, Molecular and Human Genetics, Neurology, and Neuroscience, Baylor College of Medicine.

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by Floyd E. Bloom, Professor Emeritus, Department of Molecular and Integrative Neuroscience, Scripps Research Institute, and Richard G. Frank, Department of Health Care Policy, Harvard University Medical School. Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully

considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

The committee appreciates the support provided by members of the Board on Children, Youth, and Families, under the leadership of Bernard Guyer, and we are grateful for the leadership and support of Rosemary Chalk, director of the Board on Children, Youth, and Families.

Finally, numerous National Academies' staff played meaningful roles that contributed to the production of this report. Ann Page, with the IOM Board on Health Care Services, provided useful guidance and suggestions during the launch of the study. Bridget Kelly, who initially joined the team as a policy fellow, was convinced to stay on to assist with innumerable analytic and writing tasks that were consistently handled with the utmost competence. Along with Bridget, Margaret Hilton served as a reviewer of project abstracts, and Hope Hare helped set up an abstract database. Wendy Keenan was an asset to the team from the very first day by helping with a range of research, analysis, contracting, and logistical challenges. In addition, Matthew Von Hendy and Bill McLeod, research librarians, provided invaluable assistance with literature searches and references. Jay Labov provided a very insightful review of an earlier draft of the neuroscience chapter. A final thanks is due to Mary Ann Kasper, who managed numerous administrative details during our multiple meetings, workshops, and conference calls.

Kenneth E. Warner, *Chair*
Thomas Boat, *Vice Chair*
Mary Ellen O'Connell, *Study Director*
Committee on the Prevention of Mental
Disorders and Substance Abuse Among
Children, Youth and Young Adults

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Preface

This report calls on the nation—its leaders, its mental health research and service provision agencies, its schools, its primary care medical systems, its community-based organizations, its child welfare and criminal justice systems—to make prevention of mental, emotional, and behavioral disorders and the promotion of mental health of young people a very high priority. By all realistic measures, no such priority exists today. The report therefore urges action at the highest levels to ensure that public health decision makers and the public understand the nature and magnitude of this problem; that research to prevent it is carefully coordinated and well funded; and that institutions and communities have the resources and the responsibility to promote the implementation of prevention interventions that can address shortfalls in the public response.

Mental, emotional, and behavioral disorders incur high psychosocial and economic costs for the young people who experience them, for their families, and for the society in which they live, study, and will work. Yet there is a significant imbalance in the nation's efforts to address such disorders. People await their emergence and then attempt to treat them, to cure them if possible, or to limit the damage they cause if not. This happens with any number of expensive interventions, ranging from psychiatric care to incarceration. Myopically, we devote minimal attention to preventing future disorders or the environmental exposures that increase risk.

This report builds on a highly valued predecessor, the 1994 Institute of Medicine (IOM) report entitled *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*. That report provided the basis for understanding prevention science, elucidating its then-existing

research base, and contemplating where it should go in the future. This report documents that an increasing number of mental, emotional, and behavioral problems in young people are in fact preventable. The proverbial ounce of prevention will indeed be worth a pound of cure: effectively applying the evidence-based prevention interventions at hand could potentially save billions of dollars in associated costs by avoiding or tempering these disorders in many individuals. Furthermore, devoting significantly greater resources to research on even more effective prevention and promotion efforts, and then reliably implementing the findings of such research, could substantially diminish the human and economic toll. This could be done, but as Hadorn¹ has observed, the basic tendency is to focus on “the rule of rescue . . . the powerful human proclivity to rescue endangered life.” As a society, we suffer from a collective health care myopia: we have not yet figured out how to balance rescue—which is after-the-fact treatment—with the less dramatic but often far more cost-effective and socially desirable prevention of the onset of a problem.

The very definition of prevention is itself a problem. The authors of the 1994 IOM report emphasized the need for clear definitions to guide the field. The authors proposed a new typology of prevention: *universal interventions*, which address the population at large, *selective interventions*, which target groups or individuals with an elevated risk, and *indicated interventions*, which target individuals with early symptoms or behaviors that are precursors for disorder but are not yet diagnosable. In essence, this typology of prevention was proposed as a set of interventions to target individuals and populations that do not currently have a disorder, with variations in exactly who is targeted. Yet ardent proponents of prevention, including members of the 1994 IOM committee, do not wish to exclude the prevention of disease relapse or disability from their conception of prevention.

While acknowledging the legitimacy of this perspective, our committee thinks that the disproportionate emphasis on treatment of existing conditions needs to be corrected. We propose a new emphasis on true prevention, which for the purposes of this report we define as occurring prior to the onset of disorder, as well as mental health promotion, discussed immediately below. We do not disparage society’s emphasis on treatment and indeed think that in the domain of mental health, far more resources should be devoted to the effort. Rather, we want to highlight the critical need for a more proactive, preventive focus on mental health.

The primary charge for this committee is prevention, but we add to our focus the emerging field of mental health promotion, an important

¹Hadorn, D.C. (1991, May 1). Setting health care priorities in Oregon: Cost-effectiveness meets the rule of rescue. *Journal of the American Medical Association*, 265(17), 2218-2225.

and largely ignored approach toward building healthy development in all young people. Prevention emphasizes the avoidance of risk factors; promotion strives to promote supportive family, school, and community environments and to identify and imbue in young people protective factors, which are traits that enhance well-being and provide the tools to avoid adverse emotions and behaviors. While research on promotion is limited, emerging interest and involvement in it and the potential it holds for enhancing health warrant its inclusion in the consideration of how the nation can improve its collective well-being.

The committee's focus on young people and the stigma associated with the term "mental disorder" led us to adopt the term "mental, emotional, and behavioral disorders" to encompass 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 and exert significant costs on the young people themselves, the people affected by them, and society at large. The term "mental, emotional, and behavioral disorders" encompasses mental illness and substance abuse, while including a somewhat broader range of concerns associated with problem behaviors and conditions in youth.

One factor lurks in the background of every discussion of the risks for mental, emotional, and behavioral disorders and antisocial behavior: poverty. Poverty in the United States often entails a range of material hardships, such as overcrowding, frequent moves (which often mean changes of school), poor schools, limited health care, unsafe and stressful environments, and sometimes lack of adequate food. All of these imperil cognitive, emotional and behavioral development. Although not the focus of this report, there is evidence that changes in social policy that reduce exposure to these risks are at least as important for preventing mental, emotional and behavioral disorders in young people as other preventive interventions. We are persuaded that the future mental health of the nation depends crucially on how, collectively, the costly legacy of poverty is dealt with.

As chairs of the committee that has produced this report, we have benefited immensely from the commitment, energy, and effort of two groups of people. We are grateful to the committee members, who demonstrated devotion to the subject of this report and to the arduous task of developing it. All committee members contributed to the writing of the report, and the "think tank" nature of our innumerable meetings, conference calls, and e-mail exchanges played enormously important roles in shaping both the structure and content of the report. We are deeply indebted, as well, to the National Academies' staff, who performed at a consistently high level all of the myriad tasks that are essential to compiling a large and complex

report such as this one. One staff member is particularly deserving of mention: Mary Ellen O’Connell, the study director, is the consummate Jill of all trades. From the inception of the study to the crossing of the final *t*, she directed all aspects of the committee’s work with insight and across-the-board competence. We admire her incredible work ethic and express our jealousy at her apparent ability to work without sleep.

Kenneth E. Warner, *Chair*
Thomas Boat, *Vice Chair*
Committee on the Prevention of Mental
Disorders and Substance Abuse Among
Children, Youth and Young Adults

Acronyms

ABCD	Assuring Better Children's Health and Development
ABFM	American Board of Family Medicine
ACF	Administration for Children and Families of the U.S. Department of Health and Human Services
ACGME	Accreditation Council for Graduate Medical Education
ADAMHA	Alcohol, Drug Abuse, and Mental Health Administration, the predecessor to the Substance Abuse and Mental Health Services Administration
ADHD	attention deficit hyperactivity disorder
AHRQ	Agency for Health Research and Quality of the U.S. Department of Health and Human Services
AILS	American Indian Life Skills
AIM	Awareness, Intervention, and Methodology
AMERSA	Association for Medical Education and Research in Substance Abuse
ASPE	Office of the Assistant Secretary for Planning and Evaluation of the U.S. Department of Health and Human Services
ATP	Adolescent Transitions Program
AUD	alcohol use disorder
CAPT	Regional Centers for the Application of Prevention Technologies of the Substance Abuse and Mental Health Services Administration
CBA	cost-benefit analysis
CBPR	Community Based Participatory Research

CBT	cognitive-behavioral therapy
CD	conduct disorder
CDC	Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services
CDISC	Computerized Diagnostic Interview Schedule for Children
CEA	cost-effectiveness analysis
CHAMP	Chicago HIV Adolescent Mental Health Program, renamed the Collaborative HIV Adolescent Mental Health Program when expanded beyond Chicago
CHAMP-SA	Collaborative HIV Adolescent Mental Health Program South Africa
CMHS	Center for Mental Health Services of the Substance Abuse and Mental Health Services Administration
CMS	Centers for Medicare and Medicaid Services of the U.S. Department of Health and Human Services
CPC	Child-Parent Centers
CRISP	Computer Retrieval of Information on Scientific Projects of the National Institutes of Health
CSAP	Center for Substance Abuse Prevention of the Substance Abuse and Mental Health Services Administration
CTC	Communities That Care
DALY	Disability-Adjusted Life Year
DBD	disruptive behavior disorders
DHA	docosahexaenoic acid
DSM-IV	<i>Diagnostic and Statistical Manual of Mental Disorders</i> , 4th Edition
ED	U.S. Department of Education
EIFC	Early Intervention Foster Care
EPA	Eicosapentaenoic Acid
EPSDT	Early and Periodic Screening, Diagnostic, and Treatment
ESOL	English for Speakers of Other Languages
FY	Fiscal Year
GBG	Good Behavior Game
GSMS	Great Smoky Mountains Study
HFA	Healthy Families America
HFNY	Healthy Families New York
HHS	United States Department of Health and Human Services

HRSA	Health Resources and Services Administration of the U.S. Department of Health and Human Services
ICD-9	International Statistical Classification of Diseases and Related Health Problems, 9th edition
IDEA	Individuals with Disabilities Education Act
IES	Institute of Education Sciences of the U.S. Department of Education
IOM	Institute of Medicine
LIFT	Linking Interests of Families and Teachers
LST	Life Skills Training Program
MCHB	Maternal and Child Health Bureau of the U.S. Department of Health and Human Services
MDE	major depressive episode
MEB	mental, emotional, and behavioral
MI	Motivational Interviewing
MPP	Midwestern Prevention Program
MTF	Monitoring The Future
MTFC	Multidimensional Treatment Foster Care
NAMHC	National Advisory Mental Health Council
NASHP	National Academy of State Health Policy
NBP	New Beginnings Program
NCAST	Nursing Child Assessment Satellite Training
NCLB	National No Child Left Behind Act of 2001
NCS	National Comorbidity Survey
NCS-R	National Comorbidity Survey Replication
NECON	New England Coalition for Health Promotion and Disease Prevention
NFP	Nurse-Family Partnership
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NICHD	National Institute of Child Health and Human Development
NIDA	National Institute on Drug Abuse
NIH	National Institutes of Health of the U.S. Department of Health and Human Services
NIJ	National Institute of Justice of the U.S. Department of Justice
NIMH	National Institute of Mental Health

NRC	National Research Council
NREPP	National Registry of Evidence-Based Programs and Practices of the Substance Abuse and Mental Health Services Administration
NSDUH	National Survey on Drug Use and Health
ODD	oppositional defiant disorder
OJJDP	Office of Juvenile Justice and Delinquency Prevention of the U.S. Department of Justice
PALS	Positive Attitudes Toward Learning in Schools
PATHS	Promoting Alternative Thinking Strategies
POP	Penn Optimism Program
PPN	Promising Practices Network
PPP	Penn Prevention Program
PROSPER	Promoting School-community-university Partnerships to Enhance Resilience
PRP	Penn Resiliency Program
PSMG	Prevention Science and Methodology Group
PTC	Parenting Through Change
PTSD	posttraumatic stress disorder
PUP	Prohibition of Youth Possession, Use, or Purchase of Tobacco
QALY	quality-adjusted life year
SAMHSA	Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services
SBD	sleep-related breathing disorder
SCHIP	State Children's Health Insurance Program
SDB	sleep-disordered breathing
SDFS	Safe and Drug-Free Schools Program of the U.S. Department of Education
SEL	Social and Emotional Learning
SFP	Strengthening Families Program
SPR	Society for Prevention Research
SSDP	Seattle Social Development Program
SSHS	Safe Schools Healthy Students Program of the U.S. Departments of Health and Human Services, Education, and Justice
TANF	Temporary Assistance for Needy Families
TLFB	Timeline Follow Back

ACRONYMS

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TPRC	Transdisciplinary Prevention Research Centers of the National Institute on Drug Abuse
Triple P	Positive Parenting Program
USPHS	U.S. Public Health Service
WHO	World Health Organization
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children
WISC-R	Wechsler Intelligence Scale for Children, Revised
YRBSS	Youth Risk Behavior Surveillance System

Glossary

Adaptation: The modification of evidence-based interventions that have been developed for a single ethnic, linguistic, and/or cultural group for use with other groups.

Adoption: The selection and incorporation of a prevention program into a service system.

Alcohol abuse: The consumption of alcohol despite negative consequences.

Alcohol dependence: The persistent consumption of alcohol despite negative consequences, often with a physiological dependence characterized by tolerance and/or symptoms of withdrawal.

Alcohol use disorder: An inclusive term referring to either alcohol abuse or alcohol dependence.

Comorbidity: The presence of one or more disorders in addition to a primary disorder.

Confound: A variable in an experiment or trial that may be related to observed effects and therefore may limit the ability to make inferences about causal effects of the experimental variables.

Cost-benefit analysis: A method of economic analysis in which costs and outcomes of an intervention are both valued in monetary units, permitting a direct comparison of the benefits produced by the intervention with its costs.

Cost-effectiveness analysis: A method of economic analysis in which outcomes of an intervention are measured in nonmonetary terms. The outcomes and costs are compared with both the costs and the same outcome measure for competing interventions or an established standard

- to determine if the outcomes are achieved at a reasonable monetary cost.
- Cross-sectional study: A study to estimate the relationship between an outcome of interest and specified variables by comparing groups that differ on those variables at a single point in time.
- Developmental competence: The ability to accomplish a broad range of appropriate social, emotional, cognitive, and behavioral tasks at various developmental stages, including adaptations to the demands of different social and cultural contexts and attaining a positive sense of identity, efficacy, and well-being.
- Developmental competencies: Social, emotional, cognitive, and behavioral tasks that are appropriate at various developmental stages and in various social and cultural contexts.
- Developmental neuroscience: The study of the anatomical and functional development of the nervous system in humans and animal models. This encompasses the fields of molecular and behavioral genetics, molecular and cellular neurobiology, biochemistry, physiology, pharmacology, pathology, and systems-level neuroscience and applies methods ranging from molecular biology to imaging to functional studies of cognition and behavior.
- Dissemination: The distribution of program information with the aim of encouraging program adoption in real-world service systems or communities.
- Dissemination trial: A trial designed to experimentally test approaches and strategies to influence providers, communities, or organizations to adopt evidence-based prevention programs in real-world service settings.
- DSM-IV: The current edition of the *Diagnostic and Statistical Manual of Mental Disorders*, a handbook published by the American Psychiatric Association describing different categories of mental disorders and the criteria for diagnosing them.
- Effect size: A statistical measure of the strength of the relationship between two variables.
- Effectiveness: The impact of a program under conditions that are likely to occur in a real-world implementation.
- Effectiveness trial: A trial designed to test whether an intervention can achieve effects when delivered by a natural service delivery system (i.e., similar to the institutions or communities that are ultimately intended to implement the intervention). The emphasis is on demonstrating positive outcomes in a real-world setting using nonresearch staff to deliver the intervention.

Efficacy: The impact of a program under ideal research conditions.

Efficacy trial: A trial designed to test whether a new or significantly modified intervention has effects when it is delivered in a research environment by research staff under optimal conditions. Efficacy trials can take place in research or real-world settings but are typically delivered by trained research staff under the direction and control of the research team, using resources beyond what might be available in the natural course of service delivery. A trial is also considered an efficacy trial if an intervention is being tested by research staff with a new population or in an amended form.

Encouragement designs: Trial designs that randomize individuals to different modalities of recruitment, incentives, or persuasion messages to influence their choice to participate in one or another intervention condition.

Epidemiology: The study of factors that influence the health and illness of populations.

Epigenetics: Alterations in gene expression through mechanisms other than modifications in the genetic sequence.

Etiology: The cause of a disease or condition.

Externalizing: Problems or disorders that are primarily behavioral (e.g., conduct disorder, oppositional defiant disorder).

Fidelity: The degree to which an intervention is delivered as designed.

Genotype: An individual's genetic makeup.

Iatrogenic effect: An adverse effect caused by an intervention.

ICD-9: The current *International Statistical Classification of Diseases and Related Health Problems*, a classification system published by the World Health Organization and used to code disease as well as signs, symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or disease.

Implementation: The process of introducing and using interventions in real-world service settings, including how interventions or programs are adopted, sustained, and taken to scale.

Implementation trial: A trial designed to experimentally test approaches and strategies for successful utilization of evidence-based prevention programs in real-world service settings.

Incidence: The number, proportion, or rate of occurrence of new cases of a disorder in a population within a specified period of time.

Indicated prevention: Preventive interventions that are targeted to high-risk individuals who are identified as having minimal but detectable signs or symptoms that foreshadow mental, emotional, or behavioral disorder,

as well as biological markers that indicate a predisposition in a person for such a disorder but who does not meet diagnostic criteria at the time of the intervention.

Internalizing: Problems or disorders that are primarily emotional (e.g., anxiety, depression).

Longitudinal study: A study that involves repeated observations of targeted outcomes over a long period of time.

Main effect: The effect of an independent variable averaged over all levels of other variables in an experiment.

Mediator: A variable factor that explains how an effect occurs (i.e., the causal pathway between an intervention and an outcome).

Mental health promotion: Interventions that aim to enhance the ability to achieve developmentally appropriate tasks (developmental competencies) and a positive sense of self-esteem, mastery, well-being, and social inclusion and to strengthen the ability to cope with adversity.

Mental illness: A condition that meets DSM-IV diagnostic criteria.

Mental, emotional, and behavioral disorders: A diagnosable mental or substance use disorder.

Mental, emotional, and behavioral problems: Difficulties that may be early signs or symptoms of mental disorders but are not frequent or severe enough to meet the criteria for a diagnosis.

Meta-analysis: A statistical analysis that combines the results of several studies that address the same research question.

Moderator: A variable factor that influences how an intervention or mediator exerts its effect.

Natural experimental design: A naturally occurring opportunity to observe the effects of defined variables that approximates the properties of a controlled experiment.

Neural systems: Functionally integrated circuits in the nervous system that operate in the context of genetic and environmental influences to produce complex behaviors.

Nonexperimental studies: Observational research designs that do not include an experimental manipulation of variables by the researchers.

Odds ratio: The ratio of the odds of an outcome occurring in an experimental group to the odds of it occurring in a control group, a measure of the size of the effect of an intervention.

Pathogenesis: The mechanisms by which etiological factors cause a disease or disorder.

- Pathophysiology:** The disturbance of normal functions that are the result of a disease or disorder.
- Phenotype:** An individual's observed physical or behavioral characteristics.
- Polymorphism:** A variation in genetic sequence.
- Premorbid:** A sign or symptom that occurs before the development of disease.
- Pre-post studies:** Nonrandomized studies that evaluate an intervention on the basis of the changes that occur in the same subject from a baseline (the "pre" measurement) to after the intervention period (the "post" measurement).
- Prevalence:** The total number of cases of a disorder in a population.
- Prevention:** Interventions that occur prior to the onset of a disorder that are intended to prevent or reduce risk for the disorder.
- Prevention research:** The study of theory and practice related to the prevention of social, physical, and mental health problems, including etiology, methodology, epidemiology, and intervention.
- Prevention science:** A multidisciplinary field devoted to the scientific study of the theory, research, and practice related to the prevention of social, physical, and mental health problems, including etiology, epidemiology, and intervention.
- Preventionist:** A practitioner who delivers prevention interventions.
- Problem behaviors:** Behaviors with negative effects that are often signs or symptoms of mental, emotional, or behavioral disorders that may not be frequent or severe enough to meet the criteria for a diagnosis (e.g., aggressiveness, early alcohol use) but have substantial personal, family, and societal costs.
- Prodrome:** An early, nonspecific set of symptoms that indicate the onset of disease before specific, diagnosable symptoms occur.
- Protective factor:** A characteristic at the biological, psychological, family, or community (including peers and culture) level that is associated with a lower likelihood of problem outcomes or that reduces the negative impact of a risk factor on problem outcomes.
- Psychiatric disorder:** A condition that meets DSM-IV diagnostic criteria.
- Psychopathology:** Behaviors and experiences that are indicative of mental, emotional, or behavioral disorder or impairment.
- Qualitative data:** Research information that is descriptive but not measured or quantified for statistical analysis.
- Qualitative review:** A review of research evidence relevant to a research question that does not include new statistical analysis.
- Quantitative data:** Research information that is measured for statistical analysis.

Quasi-experimental studies: Experimental designs in which subjects are not randomly assigned to experimental and control groups.

Randomized studies: Experimental designs that randomly assign subjects (individuals, families, classrooms, schools, communities) into equivalent groups that are exposed to different interventions in order to compare outcomes with the goal of inferring causal effects.

Replication: The reproduction of a trial or experiment by an independent researcher.

Research funders: For purposes of this report, federal agencies and foundations that fund research on mental health promotion or prevention of mental, emotional, or behavioral disorders.

Resilience: The ability to recover from or adapt to adverse events, life changes, and life stressors.

Retrospective study: A study that looks back at the histories of a group that currently has a disorder or characteristic in comparison to a similar group without that disorder or characteristic to determine what factors may be associated with the disorder or characteristic.

Risk factor: A characteristic at the biological, psychological, family, community, or cultural level that precedes and is associated with a higher likelihood of problem outcomes.

Selective prevention: Preventive interventions that are targeted to individuals or to a subgroup of the population whose risk of developing mental, emotional, or behavioral disorders is significantly higher than average. The risk may be imminent or it may be a lifetime risk. Risk groups may be identified on the basis of biological, psychological, or social risk factors that are known to be associated with the onset of a disorder. Those risk factors may be at the individual level for nonbehavioral characteristics (e.g., biological characteristics such as low birth weight), at the family level (e.g., children with a family history of substance abuse but who do not have any history of use), or at the community/population level (e.g., schools or neighborhoods in high-poverty areas).

Substance abuse: The use of alcohol or drugs despite negative consequences.

Substance dependence: The persistent use of alcohol or drugs despite negative consequences, often with a physiological dependence characterized by tolerance and/or symptoms of withdrawal.

Substance use disorder: An inclusive term referring to either substance abuse or substance dependence.

Systematic review: A literature review that tries to identify, appraise, select, and synthesize all high-quality research evidence relevant to a research question.

Taxonomy: A system of names and classifications.

Translational research (type 1): The transfer of basic science discoveries into clinical research as well as the influence of clinical research findings on basic science research questions.

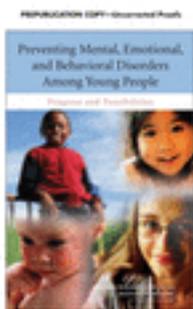
Translational research (type 2): The study of the real-world effectiveness and implementation of programs for which efficacy has been previously demonstrated.

Treatment: Interventions targeted to individuals who are identified as currently suffering from a diagnosable disorder that are intended to cure the disorder or reduce the symptoms or effects of the disorder, including the prevention of disability, relapse, and/or comorbidity.

Universal prevention: Preventive interventions that are targeted to the general public or a whole population group that has not been identified on the basis of individual risk. The intervention is desirable for everyone in that group.

Wait-list designs: Research designs that provide the new intervention first to the experimental group and later to those who were initially assigned to the control group.

Young people: For purposes of this report, children, youth, and young adults (to age 25).



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Summary

Several decades of research have shown that the promise and potential lifetime benefits of preventing mental, emotional, and behavioral (MEB) disorders are greatest by focusing on young people and that early interventions can be effective in delaying or preventing the onset of such disorders. National priorities that build on this evidence base should include (1) assurance that individuals who are at risk receive the best available evidence-based interventions prior to the onset of a disorder and (2) the promotion of positive mental, emotional, and behavioral development for all children, youth, and young adults.

A number of promotion and prevention programs are now available that should be considered for broad implementation. Although individuals who are already affected by a MEB disorder should receive the best evidence-based treatment available, interventions before the disorder occurs offer the greatest opportunity to avoid the substantial costs to individuals, families, and society that these disorders entail.

Most MEB disorders have their roots in childhood and youth. Among adults reporting a MEB disorder during their lifetime, more than half report the onset as occurring in childhood or adolescence. In any given year, the percentage of young people with these disorders is estimated to be between 14 and 20 percent. Mental, emotional, and behavioral issues among young people—including both diagnosable disorders and other problem behaviors, such as early drug or alcohol use, antisocial or aggressive behavior, and violence—have enormous personal, family, and societal costs. The annual quantifiable cost of such disorders among young people was estimated in 2007 to be \$247 billion. In addition, MEB disorders among young people

interfere with their ability to accomplish normal developmental tasks, such as establishing healthy interpersonal relationships, succeeding in school, and transitioning to the workforce. These disorders also affect the lives of their family members.

A 1994 report by the Institute of Medicine (IOM), *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*, highlighted the promise of prevention. In response to a subsequently burgeoning research base and an increasing understanding of the developmental pathways that lead to MEB problems, the Substance Abuse and Mental Health Services Administration, the National Institute of Mental Health, the National Institute on Drug Abuse, and the National Institute on Alcohol Abuse and Alcoholism requested a study from the National Academies to review the research base and program experience since that time, focusing on young people. The Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Families was formed under the auspices of the Board on Children, Youth, and Families to conduct this review (see Box S-1 for the complete charge).

The 1994 IOM report reaffirmed a clear distinction between prevention and treatment. The current committee supports this distinction. The prevention of disability, relapse, or comorbidity among those with currently existing disorders are characteristics and expectations of good treatment. Although treatment has preventive aspects, it is still treatment, not prevention. The strength of prevention research using this concept of prevention, coupled with the need for focused research on risks prior to the onset of illness, warrants the field's continued use of a typology focused on interventions for those who do not have an existing disorder. Interventions classified as *universal* (population-based), *selective* (directed to at-risk groups or individuals), or *indicated* (targeting individuals with biological markers, early symptoms, or problematic behaviors predicting a high level of risk) are important complementary elements of prevention. Going beyond the 1994 IOM report, we strongly recommend the inclusion of mental health promotion in the spectrum of mental health interventions.

The volume and quality of research since 1994 have increased dramatically. Clear evidence is available to identify many factors that place certain young people or groups of young people at greater risk for developing MEB disorders, as well as other factors that serve a protective role. Box S-2 summarizes key advances since 1994.

A number of specific preventive interventions can modify risk and promote protective factors that are linked to important determinants of mental, emotional, and behavioral health, especially in such areas as family functioning, early childhood experiences, and social skills. Interventions are also available to reduce the incidence of common disorders or problem behaviors, such as depression, substance use, and conduct disorder. Some

BOX S-1
Committee Charge

- Review promising areas of research that contribute to the prevention of mental disorders, substance abuse, and problem behaviors among children, youth, and young adults (to age 25), focusing in particular on genetics, neurobiology, and psychosocial research as well as the field of prevention science;
- Highlight areas of key advances and persistent challenges since the publication of the 1994 IOM report *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*;
- Examine the research base within a developmental framework throughout the life span, with an emphasis on prevention and promotion opportunities that can improve the mental health and behavior of children, youth, and young adults;
- Review the current scope of federal efforts in the prevention of mental disorders and substance abuse and the promotion of mental health among at-risk populations, including children of parents with substance abuse or mental health disorders, abused and neglected children, children in foster care, children whose parents are absent or incarcerated, and children exposed to violence and other trauma, spanning the continuum from research to policy and services;
- Recommend areas of emphasis for future federal policies and programs of research support that would strengthen a developmental approach to a prevention research agenda as well as opportunities to foster public and private sector collaboration in prevention and promotion efforts for children, youth, and young adults, particularly in educational, child welfare, and primary care settings; and
- Prepare a final report that will provide a state-of-the-art review of prevention research.

interventions reduce multiple disorders and problem behaviors as well as increase healthy functioning. While the evidence on the costs and benefits of interventions is limited, it suggests that many are likely to have benefits that exceed costs.

In addition, a number of interventions have demonstrated efficacy to reduce risk for children exposed to serious adversities, such as maternal depression and family disruption. Like family adversities, poverty is a powerful risk factor, and its reduction would have far-reaching effects for multiple negative mental, emotional, and behavioral outcomes. Numerous policies and programs target poverty as a risk factor by giving priority to low-income children and their families and by promoting resources for healthy functioning of those living in poverty through, for example, early childhood education programs, programs to strengthen families and schools, and efforts to reduce neighborhood violence.

BOX S-2
Key Areas of Progress Since 1994

- Evidence that MEB disorders are common and begin early in life.
- Evidence that the greatest prevention opportunity is among young people.
- Evidence of multiyear effects of multiple preventive interventions on reducing substance abuse, conduct disorder, antisocial behavior, aggression, and child maltreatment.
- Evidence that the incidence of depression among pregnant women and adolescents can be reduced.
- Evidence that school-based violence prevention can reduce the base rate of aggressive problems in an average school by one-quarter to one-third.
- Promising evidence regarding potential indicated preventive interventions targeting schizophrenia.
- Evidence that improving family functioning and positive parenting serves as a mediator of positive outcomes and can moderate poverty-related risk.
- Emerging evidence that school-based preventive interventions aimed at improving social and emotional outcomes can also improve academic outcomes.
- Evidence that interventions that target families dealing with such adversities as parental depression and divorce demonstrate efficacy in reducing risk for depression among children and increasing effective parenting.
- Evidence from some preventive interventions that benefits exceed costs, with the available evidence strongest for early childhood interventions.
- Evidence of interactions between modifiable environmental factors and the expression of genes linked to behavior.
- Greater understanding of the biological processes that underlie both normal brain function and the pathophysiology of MEB disorders.
- Emerging opportunities for the integration of genetics and neuroscience research with prevention research.
- Advances in implementation science, including recognition of implementation complexity and the importance of relevance to the community.

The 1994 IOM report expressed hope that identification of the genetic determinants of mental illnesses was on the horizon. It is now recognized that most disorders are not caused by a small number of genes and that this area of research is highly complex. An emerging area of research involves the influence of the environment on the expression of a specific gene or set of genes, the importance of epigenetic modification of gene expression by experience, and direct injury to neural systems that give rise to illness. This exciting new knowledge has the potential to inform future preventive interventions.

The future of prevention requires combined efforts to (1) apply existing knowledge in ways that are meaningful to families and communities and

(2) pursue a rigorous research agenda that is aimed at improving both the quality and implementation of interventions across diverse communities.

PUTTING KNOWLEDGE INTO PRACTICE

No concerted federal presence or clear national leadership currently exists to advance the use of prevention and promotion approaches to benefit the mental health of the nation's young people. Infusing a prevention focus into the public consciousness requires development of a shared public vision and attention at a higher national level than currently exists.

Recommendation: The federal government should make the healthy mental, emotional, and behavioral development of young people a national priority, establish public goals for the prevention of specific MEB disorders and for the promotion of healthy development among young people, and provide needed research and service resources to achieve these aims. (13-1)

Mental, emotional, and behavioral disorders among young people burden not only traditional mental health and substance abuse programs, but also multiple other service systems that support young people and their families—most notably the education, child welfare, primary medical care, and juvenile justice systems. According to one estimate, more than a quarter of total service costs for children who have these disorders are incurred in the school and juvenile justice systems. Similarly, a quarter of pediatric primary care visits address behavioral issues. The cost savings of prevention programs likewise are experienced in a range of service systems. A national-level response therefore requires the creation of a designated entity with the authority to establish common prevention goals, to direct relevant federal resources, and to influence the investment of state, local, or private resources toward these goals as well as coordination and leadership across and within multiple federal agencies.

Recommendation: The White House should create an ongoing mechanism involving federal agencies, stakeholders (including professional associations), and key researchers to develop and implement a strategic approach to the promotion of mental, emotional, and behavioral health and the prevention of MEB disorders and related problem behaviors in young people. The Departments of Health and Human Services, Education, and Justice should be accountable for coordinating and aligning their resources, programs, and initiatives with this strategic approach and for encouraging their state and local counterparts to do the same. (13-2)

Federal resources should support the continued evaluation and refinement of programs to increase understanding of what works for whom and when. The braiding of programmatic funding from service agencies, such as the Substance Abuse and Mental Health Services Administration, with evaluation funding from research agencies, such as the National Institute of Mental Health, would advance these efforts. Establishment of an ongoing national monitoring system that is capable of regular reporting on the incidence and prevalence of specific disorders, as well as the rates of exposure to key risk and protective factors, is needed to assess performance compared with national goals.

Determining what is “evidence-based” is an important component of ensuring that these efforts have a positive impact on the lives of young people. Priority should be given to programs that have been tested and replicated in real-world environments, that have reasonable cost, and that are supported by tools that will help to implement key elements of the programs with fidelity. Federal and state agencies should not endorse programs that lack empirical evidence solely on the basis of general community endorsement. In turn, states and communities need to consider the relevance of available models to their own needs, priorities, and cultural contexts. They should evaluate programs and systems that they adopt, so as to continue to build the prevention knowledge base. Programs should also engage in and document the results of quality improvement efforts to continuously enhance program outcomes.

Recommendation: States and communities should develop networked systems to apply resources to the promotion of mental health and prevention of MEB disorders among their young people. These systems should involve individuals, families, schools, justice systems, health care systems, and relevant community-based programs. Such approaches should build on available evidence-based programs and involve local evaluators to assess the implementation process of individual programs or policies and to measure community-wide outcomes. (13-3)

Concurrently, concerted attention should be paid to developing a workforce that has the knowledge base and skill sets necessary to research, implement, and disseminate relevant interventions in diverse community contexts and cultures. Training and certification programs for the next generation of professionals working with young people should include the latest knowledge of the early trajectories of disorders and of prevention approaches in a life-course framework. Box S-3 provides a list of other specific recommendations relevant to putting knowledge into practice.

BOX S-3 **Recommendations: Putting Knowledge Into Practice**

Funding and Implementation

- Congress should establish a set-aside for prevention services and innovation in the Community Mental Health Services Block Grant, similar to the set-aside in the Substance Abuse Prevention and Treatment Block Grant. (12-1)
- The U.S. Departments of Health and Human Services, Education, and Justice should braid funding of research and practice so that the impact of programs and practices that are being funded by service agencies (e.g., the Substance Abuse and Mental Health Services Administration, the Office of Safe and Drug Free Schools, the Office of Juvenile Justice and Delinquency Prevention) are experimentally evaluated through research funded by other agencies (e.g., the National Institutes of Health, the Institute of Education Sciences, the National Institute of Justice). This should include developing appropriate infrastructure through which evidence-based programs and practices can be delivered and evaluated. (12-2)
- The U.S. Departments of Health and Human Services, Education, and Justice should fund states, counties, and local communities to implement and continuously improve evidence-based approaches to mental health promotion and prevention of MEB disorders in systems of care that work with young people and their families. (12-3)
- The U.S. Departments of Health and Human Services, Education, and Justice should develop strategies to identify communities with significant community-level risk factors and target resources to these communities. (8-2)
- Researchers and community organizations should form partnerships to develop evaluations of (1) adaptation of existing interventions in response to community-specific cultural characteristics; (2) preventive interventions designed based on research principles in response to community concerns; and (3) preventive interventions that have been developed in the community, have demonstrated feasibility of implementation and acceptability in that community, but lack experimental evidence of effectiveness. (11-4)
(Also in Box S-5, Recommendations for Researchers)
- Federal and state agencies should prioritize the use of evidence-based programs and promote the rigorous evaluation of prevention and promotion programs in a variety of settings in order to increase our knowledge base of what works, for whom, and under what conditions. The definition of evidence-based should be determined by applying established scientific criteria. (12-4)

Data Collection and Monitoring

- The U.S. Department of Health and Human Services should be required to provide (1) annual data on the prevalence of MEB disorders in young people, using an accepted current taxonomy (e.g., the *Diagnostic and Statistical Manual of Mental Disorders*, the *International Statistical Classification of Diseases*) and (2) data that can provide indicators and trends for key risk and protective factors that serve as significant predictors for MEB disorders. (2-1)

continued

BOX S-3 Continued

- The Substance Abuse and Mental Health Services Administration should expand its current data collection to include measures of service use across multiple agencies that work with vulnerable populations of young people. (2-2)

Workforce Development

- The U.S. Departments of Health and Human Services, Education, and Justice should convene a national conference on training in prevention and promotion to (1) set guidelines for model prevention research and practice training programs and (2) contribute to the development of training standards for certifying trainees and accrediting prevention training programs in specific disciplines, such as health (including mental health), education, and social work. (12-7)
- Once guidelines have been developed, the U.S. Departments of Health and Human Services, Education, and Justice should set aside funds for competitive prevention training grants to support development and dissemination of model interdisciplinary training programs. Training should span creation, implementation, and evaluation of effective preventive interventions. (12-8)
- Training programs for relevant health (including mental health), education, and social work professionals should include prevention of MEB disorders and promotion of mental, emotional, and behavioral health. National certifying and accrediting bodies for training should set relevant standards using available evidence on identifying and managing risks and preclinical symptoms of MEB disorders. (12-6)

NOTE: The first number refers to the chapter in which the recommendation appears; the second number references its order of appearance in the chapter.

CONTINUING A COURSE OF RIGOROUS RESEARCH

The National Institutes of Health (NIH) fund research related to the prevention of MEB disorders through multiple centers and institutes. A significant body of research now points to common trajectories across multiple disorders and highlights the potential for interventions to affect multiple disorders. However, no definition of prevention is shared across agencies, no NIH-wide planning or accounting of prevention spending exists, and there are no common research priorities. In addition, most NIH research centers address single disorders. The ability of prevention research to approach issues from a comprehensive developmental perspective would be aided by cross-institute dialogue and by coordinated funding for interventions that address co-occurring outcomes, common risk and protective factors, and shared developmental pathways.

Recommendation: The National Institutes of Health, with input from other funders of prevention research, should develop a comprehensive 10-year research plan targeting the promotion of mental health and prevention of both single and comorbid MEB disorders. This plan should consider current needs, opportunities for cross-disciplinary and multi-institute research, support for the necessary research infrastructure, and establishment of a mechanism for assessing and reporting progress against 10-year goals. (13-5)

Continued investment in research can lead to interventions that will mitigate risks and strengthen protective factors prior to the onset of disorders and that will help to set young people on an appropriate developmental course. Substantial evidence has shown that the incidence of many disorders and problem behaviors can be reduced significantly, thereby justifying the need for dedicated efforts to refine these approaches.

Recommendation: Research funders¹ should establish parity between research on preventive interventions and treatment interventions. (13-4)

The report makes a number of specific recommendations aimed at identifying areas of focus for future research in a 10-year plan that will inform future federal, state, and local initiatives (see Box S-4). The following focus areas should serve as the research priorities for both federal agencies and foundations, and they should stimulate prevention partnerships:

- **Approaches to screening in conjunction with intervention.** Screening can take place at multiple levels, including the level of the population to identify communities at risk (e.g., high-poverty neighborhoods), the level of groups to identify those at risk (e.g., children with depressed parents), and the level of individuals to identify those who have either behavioral symptoms or biological markers indicating the likelihood of developing a disorder (e.g., young children who exhibit highly aggressive behavior). However, screening without community acceptance and sufficient service capacity to respond to identified needs is of limited value. Models are needed that partner screening with implementation of evidence-based interventions.
- **Implementation.** Implementation has only recently been identified as an area of research in its own right. The effectiveness of state

¹The term “research funders” is used throughout the recommendations to refer to federal agencies and foundations that fund research on mental health promotion or prevention of MEB disorders.

BOX S-4
Recommendations: Continuing a
Course of Rigorous Research

Overall

- Research funders* should fund preventive intervention research on (1) risk and protective factors for specific disorders, (2) risk and protective factors that lead to multiple MEB problems and disorders, and (3) promotion of individual, family, school, and community competencies. (4-3)
- Research funders should invest in studies that (1) aim to replicate findings from earlier trials, (2) evaluate long-term outcomes of preventive interventions across multiple outcomes (e.g., disorders, academic outcomes), and (3) test the extent to which each prevention program is effective in different race, ethnic, gender, and developmental groups. (10-1)
- The National Institutes of Health and other federal agencies should increase funding for research on prevention and promotion strategies that reduce multiple MEB disorders and that strengthen accomplishment of age appropriate developmental tasks. High priority should be given to increasing collaboration and joint funding across institutes and across federal agencies that are responsible for separate but developmentally related outcomes (e.g., mental health, substance use, school success, contact with justice). (12-5)
- Research funders should strongly support research to improve the effectiveness of current interventions and the creation of new, more effective interventions with the goal of wide-scale implementation of these interventions. (7-2)

Screening Linked to Interventions

- Research funders should support a rigorous research agenda to develop and test community-based partnership models involving systems such as education (including preschool), primary care, and behavioral health to screen for risks and early MEB problems and assess implementation of evidence-based preventive responses to identified needs. (8-1)

Implementation

- The National Institutes of Health should be charged with developing methodologies to address major gaps in current prevention science approaches, including the study of dissemination and implementation of successful interventions. (10-2)
- Research funders should fund research and evaluation on (1) dissemination strategies designed to identify effective approaches to implementation of evidence-based programs, (2) the effectiveness of programs when implemented by communities, and (3) identification of core elements of evidence-based programs, dissemination, and institutionalization strategies that might facilitate implementation. (11-1)
- Research funders should fund research on state- or community-wide implementation of interventions to promote mental, emotional, or behavioral health or prevent MEB disorders that meet established scientific standards of effectiveness. (11-2)

Adaptation

- Research funders should prioritize the evaluation and implementation of programs to promote mental, emotional, or behavioral health or prevent MEB in ethnic minority communities. Priorities should include the testing and adoption of culturally appropriate adaptations of evidence-based interventions developed in one culture to determine if they work in other cultures and encouragement of adoption when they do. (11-3)

Neuroscience Linkages

- Research funders, led by the National Institutes of Health, should dedicate more resources to formulating and testing hypotheses of the effects of genetic, environmental, and epigenetic influences on brain development across the developmental span of childhood, with a special focus on pregnancy, infancy, and early childhood. (5-1)
- The National Institutes of Health should lead efforts to study the feasibility and ethics of using individually identified genetic and other neurobiological risk factors to target preventive interventions for MEB disorders. (5-4)
- Research funders, led by the National Institutes of Health, should dedicate resources to support collaborations between prevention scientists and basic and clinical developmental neuroscientists. Such collaborations should include both basic science approaches and evaluations of the effects of prevention trials on neurobiological outcomes, as well as the use of animal models to identify and test causal mechanisms and theories of pathogenesis. (5-2)
- Research funders, led by the National Institutes of Health, should fund research consortia to develop multidisciplinary teams with the expertise in developmental neuroscience, developmental psychopathology, and preventive intervention science to foster translational research studies leading to more effective prevention efforts. (5-3)

Economic Analyses

- The National Institutes of Health, in consultation with government agencies, private-sector organizations, and key researchers, should develop outcome measures and guidelines for economic analyses of prevention and promotion interventions. The guidelines should be widely disseminated to relevant government agencies and foundations and to prevention researchers. (9-1)
- Funders of intervention research should incorporate guidelines and measures related to economic analysis in their program announcements and provide supplemental funding for projects that include economic analyses. Once available, supplemental funding should also be provided for projects with protocols that incorporate recommended outcome measures. (9-2)

continued

BOX S-4 Continued

Competencies

- Research funders, led by the National Institutes of Health, should increase funding for research on the etiology and development of competencies and healthy functioning of young people, as well as how healthy functioning protects against the development of MEB disorders. (4-1)
- The National Institutes of Health should develop measures of developmental competencies and positive mental health across developmental stages that are comparable to measures used for MEB disorders. These measures should be developed in consultation with leading research and other key stakeholders and routinely used in mental health promotion intervention studies. (4-2)

Technology

- Research funders should support research on the effectiveness of mass media and Internet interventions, including approaches to reducing stigma. (7-3)

Other Research Gaps

- Research funders should address significant research gaps, such as preventive interventions with adolescents and young adults, in certain high-risk groups (e.g., children with chronic diseases, children in foster care), and in primary care settings; interventions to address poverty; approaches that combine interventions at multiple developmental phases; and approaches that integrate individual, family, school, and community-level interventions. (7-4)

*NOTE: The term “research funders” is used to refer to federal agencies and foundations who fund research on mental health promotion or prevention of MEB disorders.

and community-level implementation processes and approaches is one of the frontiers of future prevention research.

- **Analysis of adaptation.** Little research has addressed factors that either facilitate or impede the transfer or adaptation of evidence-based interventions that have been developed for a single setting to a range of other ethnic, linguistic, and cultural groups. Additional research is needed to ensure the availability of interventions that are culturally relevant and that have been informed by the nation’s many ethnic, linguistic and cultural environments.
- **Linkages with neuroscience.** Environment and experience have powerful effects on modifying brain structure and function, including influences on the expression of genes and their protein products that can dictate or alter the course of development. Cross-disciplinary collaborations that formulate and test hypotheses concerning the

roles and interactions among multiple genetic and epigenetic influences on brain development may lead to strategies to tailor preventive interventions to specific individuals or groups of individuals at greatest risk.

- **Economic analyses.** The challenges of conducting economic analyses and the relative novelty of this type of analysis in the prevention field suggest the need for guidelines for conducting economic analyses (cost-effectiveness and cost-benefit analyses) as well as provision of incentives to encourage their inclusion in study designs. Evidence of the economic benefits of preventive interventions will make them more valuable to communities as they decide about the distribution of limited resources.
- **Competencies.** Competencies related to age-appropriate developmental tasks in the family, school, peer group, and community play an important role in mental health. The etiology and development of competencies need to be better understood. Methods to assess the relative value and effects of different types of competencies on development of and protection from disorders require attention.
- **Use of technology.** The Internet, mass media, and other current technologies (e.g., CD-ROMS) represent potential mechanisms to reach large segments of the population. Research in this area should be conducted to determine whether such media can be used effectively to promote mental health or to prevent disorders.
- **Other research gaps.** Despite dramatic increases in prevention research, significant gaps remain regarding populations and settings to be targeted.

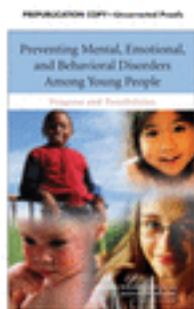
Given the modest effect sizes of some interventions, research funders are encouraged to support research to improve the breadth of the application and effectiveness of current evidence-based interventions and to develop new, more effective interventions. They should also direct researchers to measure outcomes over time, ideally across developmental periods, analyze multiple outcomes (including the effects on multiple disorders), and assess iatrogenic effects. Researchers in turn are encouraged to design interventions and evaluations that respond to these concerns (see Box S-5).

Finally, the gap is substantial between what is known and what is actually being done. The nation is now well positioned to equip young people with the skills, interests, assets, and health habits needed to live healthy, happy, and productive lives in caring relationships that strengthen the social fabric. This can be achieved by refining the science and by developing the infrastructure and large-scale collaborative systems that allow the equitable delivery of population-based preventive approaches. We call on the nation to build on the extensive research now available by implement-

BOX S-5
Recommendations for Researchers

- Research and interventions on the prevention of MEB disorders should focus on interventions that occur before the onset of disorder but should be broadened to include promotion of mental, emotional, and behavioral health. (3-1)
- Prevention researchers should broaden the range of outcomes included in evaluations of prevention programs and policies to include relevant MEB disorders and related problems, as well as common positive outcomes, such as accomplishment of age-appropriate developmental tasks (e.g., school, social, and work outcomes). They should also adequately explore and report on potential iatrogenic effects. (7-1)
- Researchers should include analysis of the costs and cost-effectiveness (and whenever possible cost-benefit) of interventions in evaluations of effectiveness studies (in contrast with efficacy trials). (9-3)
- Researchers and community organizations should form partnerships to develop evaluations of (1) adaptation of existing interventions in response to community-specific cultural characteristics; (2) preventive interventions designed based on research principles in response to community concerns; and (3) preventive interventions that have been developed in the community, have demonstrated feasibility of implementation and acceptability in that community, but lack experimental evidence of effectiveness. (11-4)

ing evidence-based preventive interventions, testing their effectiveness in specific communities, disseminating principles in support of prevention, addressing gaps in the available research, and monitoring progress at the national, state, and local levels.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

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ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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2

The Nature and Extent of the Problem

Epidemiology, the basic science of public health (Rothman and Greenland, 1998), provides vital information about diseases that threaten the health and well-being of the population. Epidemiology provides basic information that can be used to identify where and what kind of prevention is needed and to monitor the success (or failure) of preventive interventions. In order to be of use in the prevention of mental, emotional, and behavioral (MEB) disorders, epidemiology must provide information about which individuals are suffering from or at risk for emotional or behavioral problems, at what ages or developmental stages, and must be able to assess whether interventions have reduced the prevalence of a disorder.

National surveys of adults have shown the extent of the problem. In the early 1990s, the National Comorbidity Survey (NCS) of mental illness in the United States showed that more than one in four (26.2 percent) adults had a mental disorder in the 12 months up to the time of the survey (Kessler, Anthony et al., 1997). The NCS-Replication (NCS-R) a decade later reported this figure as close to one-third (Kessler, Chiu et al., 2005). In these and other surveys, roughly half of all affected adults recalled that their mental disorders started by their mid-teens, and three-quarters by their mid-20s (Kessler, Berglund et al., 2005). However, studies of young people themselves are needed to establish accurately when MEB disorders first occur and what their consequences are in terms of chronicity, impaired functioning, and impact on their ability to reach developmental milestones, such as graduating from school, finding work, and forming adult relationships. The NCS replication includes a sample of over 10,000 adolescents age 13 and older, but the findings are not yet available.

MEB disorders in young people are a public health concern for several reasons: (1) they cause suffering to individuals and their families; (2) they limit the ability to reach normal goals for social and educational achievement; (3) they increase the risk of further psychopathology, functional impairment, and suboptimal functioning throughout life; and (4) they impose heavy costs to society because of the resultant need for extra care, the social disruption that they can cause, and the risk that affected young people will underperform as adults. The significant economic costs of treating disorders warrant an increased focus on preventing them (Smit, Cuijpers et al., 2006). However, support for prevention programs depends on knowing the size of the problem and its societal burden and on being able to monitor reductions in that burden when prevention programs are put in place. The United States is significantly behind other countries in supporting the necessary information-gathering programs.

In this chapter, we review the evidence available from epidemiological studies to answer the following questions:

- What kind of research methods and data are needed to answer questions about areas of high priority for prevention?
- How prevalent are mental, emotional, and behavioral disorders of major public health concern?
- Is prevalence increasing or decreasing?
- How many new cases are there (incidence)?
- Is incidence increasing or decreasing?
- At what age do diagnosable disorders first occur (onset)?
- What is known about factors affecting prevalence, incidence, and age of onset?
- Are rates of these factors increasing or decreasing?
- Are some groups at particularly high risk for specific disorders?

Chapters 4 and 5 provide additional information related to the factors that affect the prevalence of disorders and define high-risk groups. A closely related set of questions deals with the cost to society of the harm caused by MEB disorders and the cost-effectiveness of prevention. These are addressed in Chapter 9.

RESEARCH METHODS AND DATA

The prevention of disease is a challenge for the whole community, not just for clinicians and their patients. Prevention is, by definition, an intervention that occurs before it is known who will develop a disorder and who will not. It follows that epidemiological information about whole communities (or representative samples of whole communities) is usually

needed to answer questions about prevalence (the total number of cases in a given period of time) and incidence (the number of new cases in a population). In addition, many young people have more than one emotional or behavioral disorder (Angold, Costello et al., 1999). This comorbidity can increase the severity of a disorder (Kessler, 2005). Rates of comorbidity cannot be determined using clinic-based data, because cases seen in treatment settings are different in many ways from untreated cases (Berkson, 1946). Population-level information is needed to determine which diseases are of public health concern. It needs to encompass a wide range of disorders, including their rates of occurrence and co-occurrence and the burden they cause to individuals, their families, and the social organizations and agencies in which individuals live their lives.

The standard method of finding out how many cases of a disease exist in the community is to carry out a randomized survey of the general population. The size of a sample needed to provide precise answers to questions about the prevalence of an emotional or behavioral disorder depends on how common or rare it is. The less common the disorder, the larger the sample needed to provide a reliable prevalence estimate. For example, if a disorder occurs in 1 child in 10,000, researchers would need a population sample of at least 1 million children to find approximately 100 cases.

If a disorder produces such a high level of disability that every case comes to the attention of doctors, schools, or other agencies, then agency records can sometimes be used to estimate prevalence and even incidence. This method has been used by the Centers for Disease Control and Prevention (CDC) to estimate the prevalence of autism. In some countries, databases of inpatient and outpatient treatment are maintained and can be used to estimate treated prevalence. But many MEB disorders rarely come to the attention of doctors or teachers. Studies in the United States show that fewer than one in eight children with a MEB disorder is currently receiving treatment in the mental health or substance abuse systems, and only about one in four has ever received treatment (Burns, Costello et al., 1995; Farmer, Burns et al., 2003; Kataoka, Zhang et al., 2002). To estimate the full burden of MEB disorders among children and adolescents, it is usually necessary to interview large community-based samples of parents and their children.

As mentioned earlier, there have been two recent surveys of mental illness in representative samples of the U.S. adult population: the National Comorbidity Survey (Kessler, 1994), a follow-up of the same participants (NCS-2) (Kessler, Gruber et al., 2007), and a second sample (NCS-R) a decade later (Kessler, Chiu et al., 2005). The NCS included no one younger than 15. The NCS-R includes a sample of 10,000 adolescents (ages 13-17), but the data on this sample are not yet published. Although the United States supports several national surveys of health and drug abuse, these

include very little on child and adolescent mental illness, and so there are almost no national prevalence and incidence estimates.

Table 2-1 is a summary of various nationally representative studies, sponsored by federal agencies, that have made some effort to produce estimates of the prevalence of MEB disorders of youth and, in some cases, the need for or use of mental health services. There is a dramatic contrast between the richness of the data on drug use and abuse from the National Health and Nutrition Examination Survey (NHANES), the National Survey on Drug Use and Health (NSDUH), and Monitoring the Future (MTF), and the paucity and lack of continuity of measures of MEB disorders. MTF has been collecting information on drug use and abuse since 1975, and NSDUH since 1988. However, the latter added some mental health questions only in 1994, and the results have not yet been published. NHANES used selected modules of a diagnostic interview for about five years, but since 2004 has limited its relevant data collection to a screener for depression for two years (2005, 2006) and some questions about conduct disorder since 1999. For three years, NHIS included the Strengths and Difficulties Questionnaire (Goodman and Gotlib, 1999), a 25-item parent report that produces symptom scales but not diagnoses. The current NHIS includes only three to five mental health questions. The new National Children's Study, which will begin recruiting participants in 2009, offers a wonderful opportunity for nationally representative, longitudinal data collection on the development of MEB disorders, the need for services, and the role of prevention and treatment in their course. No plans have been published for the data to be collected beyond the first few months, so it is unknown whether this opportunity will be realized.

Given the limitations of national surveys, conclusions about prevalence and incidence of MEB disorders among young people have to be drawn from (1) national surveys from other countries and (2) local population surveys in the United States. Despite being the best available data, both of these also have limitations. In the first case, rates can be very different in different countries, so that extrapolation to the United States is difficult. For example, using the same diagnostic interview (Development and Well-Being Assessment) with 8- to 10-year-olds in three different countries produced rates of conduct disorder in Norway that were much lower than those found in the United Kingdom (Heiervang, Stormark et al., 2007) or the United States (see below). Within the United States, local surveys also show variation in rates. For example, in a set of studies using identical methods, the prevalence of disruptive behavior disorders was lowest in Puerto Rican youth living in Puerto Rico, higher in mainland Hispanic and white youth, and highest in mainland African Americans, even after controlling for a range of risk factors (Bird, Canino et al., 2001).

Precise estimates of the size of the problem of MEB disorders of youth in the United States, or changes in the problem over time, require nationally

TABLE 2-1 Review of National Surveys Providing Information About Emotional and Behavioral Disorders in Youth

Survey and Agency	Relevant Information Collected	Design and Comments
National Health Interview Survey (NHIS) Agency: National Center for Health Statistics (CDC)	Adult respondent is asked whether a doctor has ever told the respondents that the child has mental retardation, developmental delay, ADHD, or autism, or if a school or health profession has said that the child had a learning disability. In 2001, 2002, and 2003, ~ 10,000 adults completed 2.5-item Strengths and Difficulties Questionnaire (SDQ) for children ages 4-17. From 2007 on, 3-5 mental health questions asked (depending on child's age and sex). No diagnostic information. Found 5% of youth had high SDQ scores (Simpson, 2005 #...)	Cross-sectional household interview survey. Sampling and interviewing continuous throughout each year. Multistage area probability design. Oversampling of both blacks and Hispanics. Sample size ~ 43,000 households (~ 106,000 persons) annually. For children, information provided by a responsible adult family member.
National Health and Nutrition Examination Survey (NHANES) Agency: National Center for Health Statistics (CDC)	Age/topic/method/dates 12+/Depression screener/(CAPI)/2005, 2006 12-19/Alcohol use /(ACASI)/1999 on 12-19/Conduct disorders/(ACASI)/1999 on 12-19 Drug use/(ACASI)/1999 on 12-19 Tobacco use/(ACASI)/2000-2004 8-19 Eating disorders/(CDISC)/2000-2004 8-19 Depression/(CDISC)/2000-2004 8-19 Panic and anxiety/(CDISC)/1999-2004 8-15 ADHD/(parent CDISC)/2000-2004 8-15 Conduct disorders/(parent CDISC)/2000-2004 8-15 Depression/(parent CDISC)/2000-2004 8-15 Eating disorders/(parent CDISC)/2000-2004 8-11 Elimination disorders/(parent CDISC)/2000-2004 No data yet published.	Examines a nationally representative sample of about 5,000 persons each year. 15 counties are visited each year. CAPI = computer-assisted personal interview ACASI = audio computer-assisted self-interview CDISC = computerized diagnostic interview schedule for children

continued

TABLE 2-1 Continued

Survey and Agency	Relevant Information Collected	Design and Comments
<p>Youth Risk Behavior Surveillance System (YRBSS) Agency: National Center for Chronic Disease Prevention and Health Promotion (CDC)</p>	<p>Covers tobacco use, unhealthy dietary behaviors, inadequate physical activity, alcohol and other drug use, sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, including HIV infection, behaviors that contribute to unintentional injuries and violence. No mental, emotional, or behavioral disorders included.</p>	<p>Since 1990, monitors health risk behaviors using self-report questionnaires administered in school.</p>
<p>National Survey on Drug Use and Health (NSDUH) Agency: Office of Applied Studies, Substance Abuse and Mental Health Services Administration</p>	<p>Designed to produce drug and alcohol use incidence and prevalence estimates and report the consequences and patterns of use and abuse in the general U.S. civilian population age 12 and older. Since 1994, questions added on mental health and access to care. Treatment for youths ages 12-17 is defined as receiving treatment or counseling for problems with behaviors or emotions from specific mental health or other health professionals in school, home, or from other outpatient or inpatient settings in the past year. A module on lifetime and past year prevalence of major depressive episode (MDE), severity of the MDE as measured by role impairments, and treatment for depression was administered to adults age 18 or older and youths ages 12-17, from 2004 to 2006; 8.5% of youth had an episode of MDE in the past 12 months.</p>	<p>Running since 1988 (formerly National Household Survey on Drug Abuse). Extensive data on drug use, including age at first use, lifetime, annual, and past-month usage for alcohol, marijuana, cocaine (including crack), hallucinogens, heroin, inhalants, tobacco, pain relievers, tranquilizers, stimulants, and sedatives; substance abuse treatment history and DSM-IV diagnoses.</p>
<p>(http://oas.samhsa.gov/2k8/youth Depress/youthDepress.pdf)</p>		

Monitoring the Future (MTF) Agency: National Institute on Drug Abuse	Has been collecting self-report anonymous data on drug use since 1975. Is able to show rise and fall of use of different drugs.	Ongoing study of the behaviors, attitudes, and values of U.S. secondary school students, college students, and young adults. Each year, ~ 50,000 8th, 10th and 12th grade students are surveyed (12th graders since 1975 and 8th and 10th graders since 1991). Annual follow-up questionnaires mailed to a sample of each graduating class for several years.
National Survey of Children's Health Agency: Maternal and Child Health Bureau of the Health Resources and Services Administration	Questions asked for ADHD, depression, anxiety, oppositional defiant disorder, behavioral or conduct problems, autism, developmental delay, Tourette syndrome: Has a doctor or other health care provider ever told you that selected child (SC) had...? Does S.C. currently have...? Would you describe his/her ... as mild, moderate, or severe? In case of ADHD, a fourth question is asked: Is S.C. currently taking medication for ADD or ADHD? Results not yet published.	One-time survey (2007-2008) of ~ 86,000 children ages 0-17. Data collected from responsible adult by telephone.
National Children's Study Agency: National Institute for Child Health and Human Development	No information yet collected. So far, there is no planned collection of information on emotional or behavioral disorders.	Will examine the effects of environmental influences on the health and development of ~ 100,000 children across the United States from before birth until age 21. Congress authorized the National Children's Study with the Children's Health Act of 2000. Will take place in 105 representative counties around the United States. 1,000 mothers and their children will be recruited from each site and followed for 20 years.

representative population surveys that make valid and reliable diagnoses. However, as discussed below, the consensus from a large number of recent studies with smaller samples or from other countries provides a ballpark estimate.

PREVALENCE OF MENTAL, EMOTIONAL, AND BEHAVIORAL DISORDERS

Clinical psychiatry has mapped out a range of MEB disorders and related problems seen in children and adolescents. These are listed in the two main taxonomies of disease, the section on mental and behavioral disorders in the *International Statistical Classification of Diseases and Related Health Problems* (ICD) (WHO, 1993) and the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (American Psychiatric Association, 1994). Some other major public health problems, like crime and violence, are subsumed within the diagnostic criteria for conduct disorder. The disorders examined in this chapter are those in the American Psychiatric Association's *Diagnostic and Statistical Manual, 4th Edition* (DSM-IV). The DSM-IV includes abuse of and dependence on alcohol and illicit drugs, as well as dependence on tobacco.

This section reviews current epidemiological information about the more common MEB disorders up to age 25: conduct disorder (CD) and oppositional defiant disorders (ODD), often combined as disruptive behavior disorders (DBD); attention deficit hyperactivity disorder (ADHD); anxiety disorders, including posttraumatic stress disorder (PTSD); depression; and drug abuse and dependence. Disorders of low population frequency, with little reliable epidemiological data but considerable societal burden—such as autism spectrum disorders and pervasive developmental disorders, schizophrenia, bipolar disorder, eating disorders, and obsessive compulsive disorder—are discussed when information is available. More specific information may be available when the adolescent version of the National Comorbidity Survey is published.

Table 2-2 presents the results of a meta-analysis of data on the prevalence of MEB disorders in young people from more than 50 community surveys from around the world, published in the past 15 years (updated from Costello, Mustillo et al., 2004). The analysis controlled for sample size, number of prior months that subjects were asked about in reporting their symptoms, and age of participants. Not all studies report on all diagnoses. The table includes the 16 diagnoses or diagnostic groupings that were reported by at least 8 studies (number of studies shown in parentheses).

Figure 2-1 illustrates with a box-and-whisker plot the range of estimates from these surveys for each diagnosis. The ends of the “whiskers” for each diagnosis show the highest and lowest estimates, and the upper and lower

TABLE 2-2 Prevalence Estimates of Mental, Emotional, and Behavioral Disorders in Young People

Diagnosis or Diagnostic Group (N of studies contributing to estimate)	Prevalence (%)	Standard		
		Error (%)	Lower 95%	Upper 95%
One or more disorders (44)	17.0	1.3	14.4	19.6
Unipolar depression (31)	5.2	0.7	4.0	7.0
Any anxiety disorder (29)	8.0	1.0	6.2	10.3
Generalized anxiety disorder (17)	1.3	0.3	0.9	2.0
Separation anxiety disorder (17)	4.1	0.9	2.6	9.4
Social phobia (15)	4.2	1.1	2.4	7.3
Specific phobia (13)	3.7	1.3	1.7	7.7
Panic (12)	0.7	0.2	0.3	1.5
Posttraumatic stress disorder (7)	0.6	0.2	0.3	1.1
Attention deficit hyperactivity disorder (34)	4.5	0.7	3.3	6.2
Any disruptive behavior disorder (23)	6.1	0.5	5.4	7.3
Conduct disorder (28)	3.5	0.5	2.7	4.7
Oppositional defiant disorder (21)	2.8	0.4	2.1	3.7
Substance use disorder (12)	10.3	2.2	6.3	16.2
Alcohol use disorder (9)	4.3	1.4	2.1	8.9

NOTE: The prevalence estimates from each study were transformed to logit scale and their standard errors computed using the available information about the sample size and prevalences. Using weights inversely proportional to estimated variances, weighted linear regression models were fit in SAS, using PROC GENMOD with study as a fixed effect (class variable). The overall estimate (on the logit scale) and its standard error were then used to recompute the overall prevalence and its standard error using the delta method.

SOURCE: Based on a meta-analysis for the committee by Alaattin Erkanli, Department of Biostatistics, Duke University. A list of the data sets used in the meta-analysis is available in Appendix B, which is available online.

bounds of the box show the interquartile range of the estimates—that is, the 75th and 25th percentiles of the range of estimates. It shows estimates only for diagnoses reported by at least eight studies (number of studies shown in parentheses). The mean estimate for any diagnosis was 17.0 percent (standard error, SE, 1.3 percent) and the median 17.5 percent. The most common diagnostic group was substance abuse or dependence, including nicotine dependence (10.3 percent, SE 2.2 percent). Anxiety disorders were common (8.0 percent, SE 0.1 percent), followed by depressive disorders (5.2 percent, SE 0.07 percent) and ADHD (4.5 percent, SE 0.07 percent).

Some disorders, notably anxiety disorders, have a much wider range of estimates than others. The range of estimates for specific phobias was particularly broad. It is also noticeable that the top 25 percent of the range of estimates is generally much wider than the lowest 25 percent range,

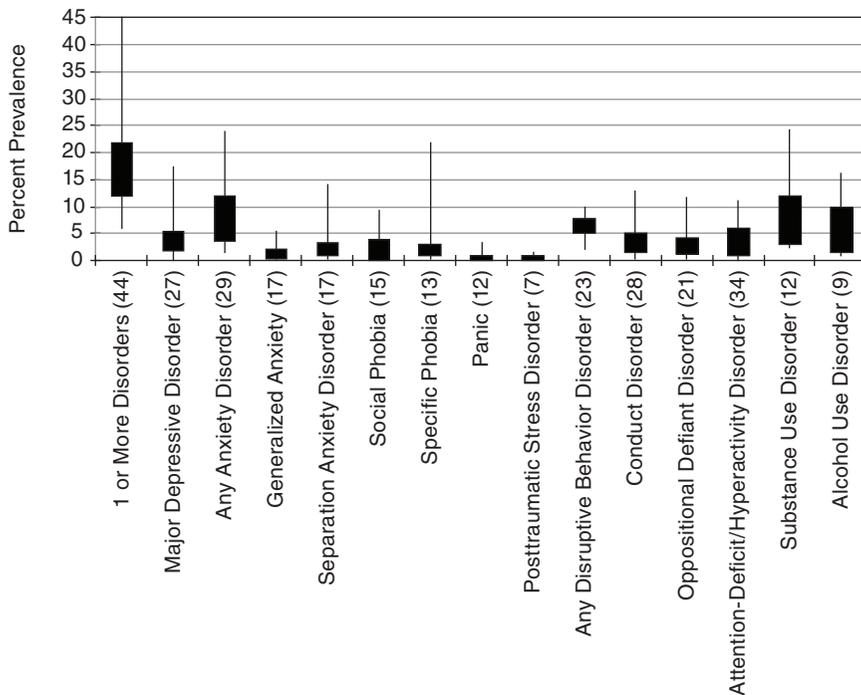


FIGURE 2-1 Ranges in data on the prevalence of mental, emotional, and behavioral disorders among young people.

NOTE: Lines represent the range of estimates from different studies. Boxes represent the interquartile range.

SOURCE: Based on a meta-analysis for the committee by Alaattin Erkanli, Department of Biostatistics, Duke University. A list of the data sets used in the meta-analysis is available in Appendix B, which is available online.

indicating that a few studies tend to generate much higher estimates than do the majority. Several factors contribute to the variability in prevalence estimates: (1) changes in the taxonomy or definitions and criteria used for disorders in different versions of the DSM and the ICD, (2) the evolution of assessment tools over the past few decades, and (3) differences in the populations sampled and the inclusion and exclusion criteria used. For example, since different disorders have different onset ages (see the section on incidence below), samples with different age ranges will show different prevalence rates for many disorders. A fourth factor is that, in surveys of young people (but rarely in surveys of adults), it is normal to collect information from several informants: mothers, fathers, teachers, and children

themselves. Each informant brings a unique view of the child, so the number and nature of informants affect the prevalence estimate.

Missing from both Table 2-2 and Figure 2-1 are some rare but often severe disorders; for example, schizophrenia, bipolar disorder, and pervasive developmental disorders. The reason is that studies to date have not been large or numerous enough to capture these rare disorders with any hope of accuracy. For example, the two studies that included schizophrenia had rates of 6 per 1,000 and 7 per 1,000, respectively (Wittchen, Essau et al., 1992; Costello, unpublished data). The three available estimates for adolescent bipolar disorder (two from the same study) fell between 1 and 3 per 1,000 (Lewinsohn, Rohde et al., 1998; Costello, unpublished data), although prevalence increases in young adulthood (Wittchen, Nelson, and Lachner, 1998). No population-based estimates are available for prepubertal bipolar disorder.

Despite the variability across studies, it is possible to draw some general observations about prevalence. The mean (17 percent) and median (17.5 percent) estimates for one or more MEB disorders were very close, with 50 percent of studies producing estimates between 12 and 22 percent, suggesting that this estimate is fairly reliable. The rank ordering of prevalence estimates for the different disorders was remarkably consistent across the individual studies. Of the diagnoses included in Figure 2-1, the lowest prevalence rates came from studies of younger children, especially those from Scandinavia, while the highest rates were reported from studies of young adults (ages 19-24). However, from the point of view of prevention, it should be noted that a review of studies of preschool children concluded that almost 20 percent of 2- to 5-year-olds had at least one DSM-IV disorder in the past three months (Egger and Angold, 2006), the same rate as seen in older children, adolescents, and young adults.

Within studies, after controlling for risk exposures that are often confounded with race/ethnicity, such as poverty (Costello, Compton et al., 2003), parental incarceration (Phillips, Erkanli et al., 2006), or migrant status (Bengi-Arslan, Verhulst et al., 1997), similarities across different racial/ethnic groups are much more noticeable than are differences (Costello, Keeler, and Angold, 2001; Loeber, Farrington et al., 2003). Disruptive behavior disorders (conduct disorder, oppositional defiant disorder), ADHD (Rutter, Caspi, and Moffitt, 2003), and substance use disorders (Wittchen, Nelson, and Lachner, 1998) tend to be more common in boys than girls, while the opposite is true of emotional disorders (depression, anxiety disorders). About half of the children with a diagnosis have a disorder that causes significant functional impairment—that is, a disorder that impedes their ability to function and develop appropriately in human relationships or in cognitive, social, or emotional development (Angold, Erkanli et al., 2002; Costello, Angold et al., 1996).

As noted earlier, no representative population surveys of rates of the full range of MEB disorders in children in the United States have been published, although results from a survey of 13- to 17-year-olds in the National Comorbidity Study will be published in 2009. The National Survey of Drug Use and Health, a household survey from the Substance Abuse and Mental Health Administration, includes adolescents age 12 and over. In 2005 and 2006 it included a module on major depressive episodes and found that 8.8 percent (2005) and 7.9 percent (2006) of youth reported such an episode in the past 12 months.¹ The National Health and Nutrition Examination Survey has also begun to include selected modules addressing MEB disorders in young people, but no data have yet been published. In addition, more work is needed to expand epidemiological studies to include representative samples of all racial/ethnic groups in the United States, to control for socioeconomic confounds in such studies, and to develop international collaborations that provide comparisons among nations using comparable measures (see Heiervang, Goodman, and Goodman, 2008).

Cumulative Prevalence

Several longitudinal studies have calculated the proportion of the population that has received at least one diagnosis of a MEB disorder across repeated assessments, from childhood through adolescence and into early adulthood (Costello, Mustillo et al., 2003). Jaffee and colleagues compared three such studies and found that between 37 and 39 percent of youth in the three studies had received one or more diagnoses between ages 9 and 16 (Jaffee, Harrington et al., 2005). In later follow-ups of these studies, the cumulative prevalence rose to between 40 and 50 percent by age 21 (Arseneault, Moffitt et al., 2000; Costello, unpublished data). This is similar to a 46.4 percent lifetime prevalence rate based on retrospective data from the National Comorbidity Survey of adults (Kessler, Berglund et al., 2005). In the one study for which cumulative data are available by diagnosis (Costello, unpublished data), rates of reporting one or more episodes of a disorder by age 21 were 16.4 percent for disruptive behavior disorders, 14.5 percent for anxiety disorders, and 10.4 percent for depressive disorders.

Comorbidity

Many children have more than one MEB disorder. Figure 2-2 summarizes the data from a meta-analysis of comorbidity among the major classes of disorder, after controlling for comorbidity between the comorbid condi-

¹See <http://oas.samhsa.gov/NSDUH/2k6nsduh/tabs/Sect6peTabs1to41.htm#Tab6.27B>.

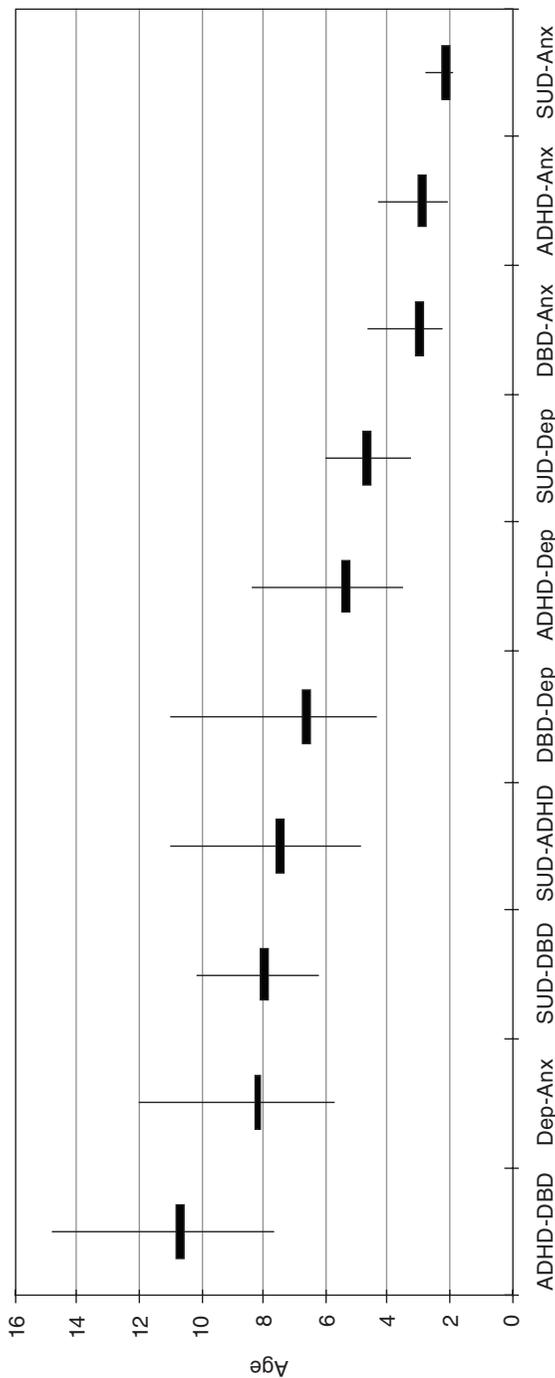


FIGURE 2-2 Comorbidity between major disorders (controlling for other comorbidities).
SOURCE: Adapted from Angold, Costello, and Erkanli (1999) and Armstrong and Costello (2002)

Legend:

- ADHD = attention deficit hyperactivity disorder
- DBD = conduct disorder/oppositional defiant disorder
- Dep = depression
- Anx = anxiety
- SUD = substance use disorder

Bars represent odds ratios; lines represent 95 percent confidence intervals.

tion and other disorders. For example, it adjusts the comorbidity between anxiety and depression for comorbidity between anxiety and ADHD and depression and ADHD. As the figure demonstrates, comorbidity is widespread, and there are clear patterns; there is greater comorbidity among disruptive behavior disorders, ADHD, and substance abuse disorders, on one hand, and among the emotional disorders (anxiety and depression), than between emotional and disruptive behavioral disorders, on the other. Comorbidity remains high from early childhood (Egger, Erkanli et al., 2006) through adolescence (Roberts, Roberts, and Xing, 2007) and into adulthood (Kessler and Chiu, 2005).

In summary, there is consistent evidence from multiple recent studies that early MEB disorders should be considered as commonplace as a fractured limb: not inevitable but not at all unusual. The prevalence of these disorders is the same in young people as it is in adults. An implication for prevention is that universal programs will not be wasted on large numbers of risk-free children.

IS PREVALENCE INCREASING OR DECREASING?

Repeated surveys are needed to tell whether rates of any disorder are going up or down. For adults, a second National Comorbidity Study has recently been completed, and should provide some information for the population age 18 and older. The one area of problem behavior in which data on trends in young people are available is alcohol and other drug use and abuse. Three national surveys—the National Survey on Drug Use and Health, the Youth Risk Behavior Surveillance System (YRBSS), and Monitoring the Future—regularly measure alcohol and drug use and abuse in young people. All restrict their data collection to adolescents (12 and over for NSDUH, eighth, tenth, and twelfth grade students for MTF). MTF tends to produce slightly higher estimates than NSDUH; however, they are remarkably consistent in their reports of trends, which show a clear reduction in use across nearly all categories between 2002 and 2007 (<http://oas.samhsa.gov/NSDUH/2k6NSDUH/2k6results.cfm#Tab9-1>).

Reviews or meta-analyses have used cross-sectional studies conducted at different periods, together with the small longitudinal data sets available, to put together a picture over time (Collishaw, Maughan et al., 2004; Costello, Foley, and Angold, 2006). Evidence of this sort has produced two fairly clear conclusions: there has been an increase in disruptive behavior symptoms over the past few decades (Collishaw, Maughan et al., 2004), whereas there is no evidence for a similar increase in child or adolescent depression (Costello, Erkanli, and Angold, 2006). The question of whether the prevalence of autism has increased (Fombonne, 2005) is fraught with problems of broadening of the diagnostic category, heightened public awareness, and more

attention from clinicians (Schechter and Grether, 2008). The same is true of ADHD and juvenile onset bipolar disorder (Moreno, Laje et al., 2007). It is certainly the case that more young people are being given these diagnoses.

INCIDENCE OF MENTAL, EMOTIONAL, AND BEHAVIORAL DISORDERS

To estimate the incidence, or number of new cases, in a given period of time, it is necessary to make repeated estimates in the *same* representative population sample, excluding those who had the disorder at the previous assessment. The same lack of basic data from repeated, representative sampling hampers the ability to answer questions about incidence. However, in this case, some of the small community-based longitudinal studies can provide data about incidence of the more common disorders. For example, data on 1,420 youth ages 9-21, over a 14-year period, from the Great Smoky Mountains Study (GSMS), a community study from the southeastern United States, shows a mean annual incidence rate of any disorder of around 3.5 percent in this age group. Of the 55 percent of youth in this community sample who had MEB disorders in one or more years of assessment, more than half (57.2 percent) had a diagnosis at two or more assessments, indicating that, in the majority of cases, the disorder was not confined to a single episode (Costello, unpublished data).

A related issue relevant to prevention is the age at onset of child and adolescent emotional or behavioral disorders. In the NCS and NCS-R studies of adults, which ask people with a lifetime history of mental illness to remember their age at the first episode, half of all adults report onset in childhood or adolescence; the NCS-R found that in a population sample age 18 and older, “half of all lifetime cases start by age 14 years and three fourths by age 24 years” (p. 593). Similarly, as noted earlier, in the GSMS, 55 percent of participants had been diagnosed with at least one MEB disorder by age 21 (see also Kim-Cohen, Caspi et al., 2003).

Age at Onset

Figure 2-3 shows the age at onset of the first symptom in youth from the GSMS sample who would eventually receive a diagnosis by age 21, as well as the age at onset of the full-blown disorder. Disruptive behavioral disorders and ADHD had the earliest onset, followed by emotional disorders (anxiety and depressive disorders). Although many adolescents began using alcohol and other illicit drugs in their early teens, they tended not to meet criteria for abuse or dependence until their late teens.

Epidemiological findings like these raise questions of the utmost importance for prevention. If at least half of those who will have an MEB disorder

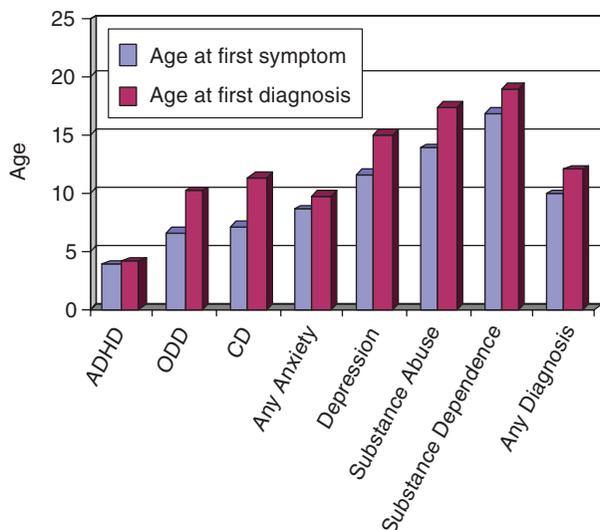


FIGURE 2-3 Age at onset of first symptom and of full psychiatric disorder, by age 21: data from Great Smoky Mountains Study.

NOTE: First symptom = age at first symptom in youth who at some point received this diagnosis. First diagnosis = age when subject reported the minimum number of symptoms for this diagnosis.

SOURCE: Unpublished data from the Great Smoky Mountains Study, provided by E. Jane Costello, Department of Psychiatry and Behavioral Sciences, Duke University Medical School.

during their lives have onset in childhood, then prevention resources need to be focused on this period of life. In addition to universal prevention programs, Figure 2-3 suggests that there may be a window of opportunity lasting two to four years between the first symptom and the full-blown disorder, when preventive programs might be able to reduce the rate of onset of specific disorders. Recently developed measures (Egger and Angold, 2006) now make it possible to identify children with symptoms of several disorders at an early stage. In addition, developmentally informed interventions that aim at known antecedent risk factors during childhood and early adolescence can provide important opportunities for prevention.

Is Incidence Increasing or Decreasing?

To determine whether the number of new cases is rising or falling over time, it is important to distinguish between incident (new) cases and

newly referred or treated cases. For example, according to one survey of clinical referrals, the number of children and adolescents in the United States treated for bipolar disorder increased 40-fold from 1994 to 2003, to about 1 percent of the population under age 20 (Moreno, Laje et al., 2007). In contrast, the three studies that have assessed rates of mental illness across time in the general population found a prevalence of bipolar disorder of between 1 and 3 per 1,000 children, with no increase over the past two decades (Lewinsohn, Rohde et al., 1998; Costello, unpublished data). The reason for this discrepancy between epidemiological and clinical data may arise from the increased use of psychopharmacological treatments for children. The availability of a treatment may encourage clinicians to make a diagnosis and parents to seek professional help. Thus, the advent of a new drug or greater willingness of parents to bring their children for treatment can greatly increase the number of children seen by professionals, while the baseline prevalence of the disease in the population may remain unchanged.

In order to find out whether population incidence and prevalence are changing we need several longitudinal studies are needed covering different time periods, so that new case rates can be calculated for different historical periods. National surveys like Monitoring the Future make it possible to chart, for example, the rise and fall of alcohol and cocaine use by adolescents (Banken, 2004). Data like these are not available for other MEB disorders. Although a variety of federal agencies are making efforts to monitor mental, emotional, or behavioral problems, with the exception of substance use disorders, these efforts have not yet produced the repeated estimates over time necessary to plot the rise and fall of disease prevalence and the effects of interventions.

FACTORS AFFECTING PREVALENCE AND INCIDENCE

In the language of infectious disease epidemiology, it is possible to talk about various pathogens as “causes” of disease. Epidemiology invented the term “risk factors” in the 1950s when the Framingham Heart Study showed that cardiovascular disease did not have a single cause but many different factors contributing to increased risk, no single factor being either necessary or sufficient. MEB disorders seem to have more in common with chronic diseases like cardiovascular disease than with infectious diseases, in having multiple risk factors.

A mountain of research on environmental risk and protective factors for MEB disorders in young people has identified a large number of predictors, from internal (e.g., intellectual ability, brain development) to familial, educational, communal, and national (see also Chapter 4). Several theorists have developed multilevel risk models that predict complex interactions

among the various levels of risk and protection. As with the prevalence and incidence of disorders, the prevalence and incidence of risk factors vary across the nation and at different developmental stages. To take a single example, data from the 2000 decennial census show that the proportion of families living in poverty in 2004 varied from 5.3 percent in Minnesota to 17.6 percent in Mississippi.

In order to focus prevention efforts most effectively, it is essential to know when vulnerability to an emotional or behavioral disorder increases simply with an increasing number of risk factors, irrespective of their nature, and when increased risk follows specific risk exposures. (Of course, both may occur at the same time.) We illustrate how both aspects of risk come into play with data from over 6,000 assessments of 1,420 youth from the GSMS. On one hand, there was a clear relationship between total risk exposure, using a list of over 80 risk factors, and MEB disorders. Rates of nearly all these disorders were three or more times higher in the highest risk group than in the lowest risk group, irrespective of the type of risk.

On the other hand, when the question of specific risk factors for specific disorders was examined in the same data set, both general and disease-specific risk factors emerged (Shanahan and Hofer, in press). Parental unemployment and maternal depression were associated with increased risk for most MEB disorders, but the analyses revealed “signature sets” of factors associated only with certain diagnoses. For example, while sexual abuse, poor parental supervision, and deviant peers were risk factors for both conduct disorder and oppositional defiant disorder, parental depression and loss of close relations and friends were specific to conduct disorder in these analyses. In the emotional disorders, parental depression was a specific risk for depression but was not associated with any anxiety disorders, whereas parental drug use and unemployment were associated with anxiety disorders but not with depression (see also Chapter 4).

The role of individual differences in genetic makeup has been the focus of intensive study in recent decades (see Chapter 5). Twin and adoption studies have identified a genetic component of risk for most child and adolescent psychiatric² disorders (Rutter, Silberg et al., 1999a, 1999b), and genetic research in psychiatry began with the hypothesis that genes “cause” mental illness (Kendler, 2005). However, with the exception of a number of rare disorders, such as Williams syndrome, Turner syndrome, fragile X syndrome, and velocardiofacial syndrome (Davies, Isles, and Wilkinson, 2001; Inoue and Lupski, 2003; Thapar and Stergiakouli, 2008) so far no unequivocal candidate genes for specific mental, emotional, or behavioral disorders in children or adults have survived the test of replication in mul-

²The term “psychiatric” rather than “mental, emotional, or behavioral” is used here as that is the term used by the authors.

tiple studies (Joober, Sengupta, and Boksa, 2005; Thapar and Stergiakouli, 2008). There are some indications that variations in specific genes may contribute to such disorders as depression (Levinson, 2006; Lopez-Leon, Janssens et al., 2008).

Current efforts focus on the search for genes that influence underlying processes, such as threat appraisal or risk aversion, that may be common to more than one mental, emotional, or behavioral disorder. More recently, genetic approaches are also being used to map out the role of environmental factors in the etiology of MEB disorders in people with different genetic profiles; that is, the extent to which (1) a disorder occurs in the presence of a given risk factor only in those with a specific genetic trait or (2) genetic effects on environmental exposure increase risk of a disorder.

As discussed in Chapter 5, continued research may make it possible to identify and target the most genetically vulnerable children for prevention interventions. Also, identifying gene variants that are associated with MEB disorders may eventually lead to prevention approaches based on modifying components of the pathways from genes to behaviors. However, the focus of prevention for the foreseeable future will still be on psychosocial interventions that change environmental risk factors. Research on signature sets of risk factors suggests that it may also be possible to target prevention efforts for some disorders to youth with high levels of signature risk for that disorder, potentially including both environmental and genetic factors. There is also an argument to be made for paying attention to risk factors, like maternal depression or family disruption, that affect multiple types of MEB disorders (see Chapter 4).

Are Rates of Causal Factors Increasing or Decreasing?

There is, of course, no simple answer to this question. National surveys and databases can be helpful in monitoring some of the epidemiological factors thought to be associated with emotional or behavioral disorders. For example:

- Low birth weight and other perinatal hazards may be increasing in the United States because of the increasing number of births from in vitro fertilization, the increasing age of women at first birth, and other factors. The proportion of newborns under 2,500 grams rose by more than 20 percent between 1980 and 2005.³
- Family poverty fell in the 1990s but has been level since then (according to the 2000 U.S. census).

³See http://www.cdc.gov/media/pressrel/r061121.htm?s_cid=mediarel_r061121_x.

- Divorce rates have fallen since their peak in the 1980s (U.S. census).
- Single-parent households have risen steadily, especially since the 1970s (U.S. census).

However, unless these changes can be linked with outcomes in specific data sets, the causal links remain very weak. Countries that maintain national databases on illness, crime, and household structure are beginning to use record linkage to monitor changes in risk exposure, but this is not possible in the United States.

High Risk of Some Sociodemographic Groups for Specific Disorders

It appears that boys are more vulnerable to disorders with early onset, such as developmental disabilities, autism, disruptive behavior disorders, and ADHD (Rutter, Caspi, and Moffitt, 2003). After puberty, several divergences appear. Depression and anxiety increase markedly in girls but not in boys (Rutter, Caspi, and Moffitt, 2003). Substance abuse develops faster in boys than girls, and behavioral disorders remain higher in boys (Rutter, Caspi, and Moffitt, 2003). However, sex differences can vary depending on how a disorder or its consequences are defined. For example, the DSM-IV diagnosis “conduct disorder” is not much more common in boys than girls, but boys are increasingly more likely than girls to be arrested, charged with an offense, convicted, and incarcerated (Copeland, Miller-Johnson et al., 2007). Similarly, conduct disorder is equally common in African American and Hispanic youth, controlling for socioeconomic status and rural/urban residence (Angold, Erkanli et al., 2002), but arrests, criminal charges, and convictions are more common in African American youth (HHS, 2001). Even in urban settings, after controlling for socioeconomic status, delinquency rates were similar in three urban and African American samples (Loeber et al., in press), perhaps due to the tendency for poor African American youth to be concentrated in urban ghettos (Sampson, Raudenbush, and Earls, 1997).

CONCLUSIONS AND RECOMMENDATIONS

Epidemiology provides the basic information needed to establish the size and community burden of MEB disorders and to track the effectiveness (and cost-effectiveness) of large-scale preventive interventions. To carry out this task, a nation needs to be able to monitor the changing rates of risk exposure and illness in the population as a whole, at different developmental stages, and also in minority groups that may have different patterns of risk. Based on an amalgam of small surveys, about one in five or six

young people has one or more recent emotional or behavioral disorders. Retrospective studies of adults show that half or more had their first episode as a child, adolescent, or young adult. The first symptoms of most disorders precede onset of the full-blown condition by several years, so the opportunity exists for preventive intervention.

Conclusion: Mental, emotional, and behavioral disorders are as common among young people as among adults. The majority of adults with a mental, emotional, or behavioral disorder first experienced a disorder while young, and first symptoms precede the full-blown disorder, providing an opportunity for prevention and early intervention.

As discussed in more detail in Chapter 9, emotional and behavioral disorders impose a heavy national burden of disability. Early emotional and behavioral problems predict school failure, unplanned pregnancy, and crime. MEB disorders are not well tracked by the mortality statistics that are among the few monitoring tools available in the United States. Other tools are needed, including regular household surveys and surveys of institutions, such as hospitals and prisons, where rates of mental illness are high. The United States supports several household and school-based surveys suitable for this purpose. Although these provide very detailed coverage of drug use and abuse, they have many limitations in the area of mental illness, particularly for younger populations, and they are sketchy in their measurement of risk. Data specific to the United States come from a patchwork of small, local studies.

Conclusion: Although the United States collects rich data related to drug use and abuse, systematic data related to the prevalence and incidence of MEB disorders in young people are sparse.

It is notable that the Foundation for Child Development's annual Child Well-Being Index,⁴ which has been charting trends in child well-being since 1975, because data are not available, includes only one measure related to MEB disorders: the teenage suicide rate. Similarly, given the limitations of available data, the only national indicators related to MEB disorders reported by the federal Forum on Child and Family Statistics⁵ are alcohol and drug use and the percentage of children ages 4-17 reported by their parent as having serious emotional or behavioral difficulties.⁶ The forum

⁴See <http://www.soc.duke.edu/~cwi/>.

⁵See <http://www.childstats.gov/americaschildren/index.asp>.

⁶The indicator is based on a parental response to one question from the Strengths and Difficulties Questionnaire and does not provide information about any diagnosis.

is planning to add an indicator related to adolescent depression using data collected in the NSDUH.

Recommendation 2-1: The U.S. Department of Health and Human Services should be required to provide (1) annual data on the prevalence of MEB disorders in young people, using an accepted current taxonomy (e.g., the *Diagnostic and Statistical Manual of Mental Disorders*, the *International Statistical Classification of Diseases*) and (2) data that can provide indicators and trends for key risk and protective factors that serve as significant predictors for such disorders.

Methods for collecting such data should:

- be capable of providing reliable prevalence estimates for minority populations and high-risk groups (e.g., incarcerated youth, foster children, immigrant children, youth with chronic diseases, children with developmental delays);
- be capable of providing accurate estimates at the level of individual states, ideally with unique identifiers that would facilitate the use of data by local communities and potential linkage with other state databases, such as those created as part of the No Child Left Behind Act of 2001; and
- include measurement of identified risk and protective factors, either directly or by building links to appropriate databases (e.g., parental death, foster care placement, divorce, incarceration).

As illustrated in Table 2-1, multiple agencies of the Department of Health and Human Services administer surveys that collect data related to MEB disorders. The Centers for Disease Control and Prevention, which has public health surveillance and prevention within its mandate and administers several major surveys potentially relevant to this task, is one possible lead agency for the collection of prevalence and incidence data. Similarly, the Substance Abuse and Mental Health Services Administration is the lead federal agency charged with “building resilience and facilitating recovery” in relation to substance abuse and mental disorders. It has recently expanded its population survey, the National Survey of Drug Use and Health, beyond substance abuse, making it another potential option. However, while a specific agency may need to be identified to provide data on the prevalence and incidence of disorders, inclusion of data related to risk and protective factors is likely to require the involvement and input of multiple HHS agencies, making this a departmental responsibility. The Office of Disease Prevention and Health Promotion and the Office of the Assistant Secretary

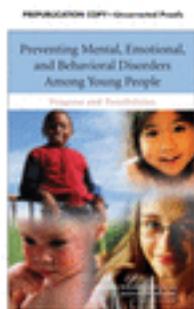
for Planning and Evaluation, both in the Office of the Secretary, would potentially be able to serve a coordinating function.

Young people with MEB disorders tend to receive care from a wide range of service providers and agencies, including the child welfare, education, and juvenile justice systems, as well as primary medical and specialty mental health care providers. Very little is known about the adequacy of this patchwork of care. Under its statutory mandate, the Substance Abuse and Mental Health Services Administration (SAMHSA) must provide national data on mental health and substance abuse treatment services and on persons with mental and substance use disorders. This mandate includes the determination of the national incidence and prevalence of the various forms of mental disorder and substance abuse, as well as characteristics of treatment programs.

SAMHSA has focused much of its efforts on specialty providers and services supported through state substance abuse and mental health agencies. However, nontraditional settings, such as jails, prisons, schools, and general hospitals, are becoming increasingly important as sites of care for youth with MEB disorders. Exclusion of other settings in which young people often receive care provides a misleading and incomplete picture of service use.

Recommendation 2-2: The Substance Abuse and Mental Health Services Administration should expand its current data collection to include measures of service use across multiple agencies that work with vulnerable populations of young people.

The Centers for Medicare and Medicaid Services (CMS) and programs funded by CMS collect information on use of Medicaid-funded services for prevention and treatment. These data could provide a rich set of information on trends in utilization of services across various health care providers. Analysis of these data in conjunction with the above prevalence and service use data, with appropriate privacy protections, could provide additional insights.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

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ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Prevention of Specific Disorders and Promotion of Mental Health

The preceding chapter focused on preventive interventions that target change in the systems that most influence the cognitive, emotional and behavioral development of young people: the family, schools, and the community. This chapter explores available preventive interventions that are targeted at specific mental, emotional, and behavioral (MEB) disorders. Many of these are designed to address the specific risk and protective factors associated with those disorders, although some also target risk factors that are common to multiple disorders.

The disorders targeted by preventive interventions tend to emerge at different development stages; for example, anxiety begins to emerge at a relatively young age, whereas schizophrenia tends to emerge closer to adolescence and young adulthood. Depression, eating disorders, and substance use and abuse tend to become a significant problem in the middle and high school years. The chapter organizes discussion of disorder-specific interventions in terms of the order in which they tend to appear in the developmental course of young people's lives. Many of the interventions discussed in the previous chapter include among their outcomes improvements in one or more disorders, particularly externalizing disorders (e.g., substance abuse, conduct disorder, attention deficit hyperactivity disorder [ADHD]) (see Box II-1). Those results are not repeated here. Similarly, other low-frequency disorders for which little preventive literature is available, such as bipolar disorder, autism spectrum disorder, and pervasive developmental disorders, are not discussed.

The chapter also includes interventions targeted at mental health promotion, including strategies related to fostering positive development among

children and adolescents and to modifying lifestyle factors that have been associated with a range of MEB disorders. The programs described here are delivered across mental health, physical health, and school settings and have involved intervention directly with children, with parents, and with the whole family. The chapter closes with conclusions and recommendations based on the evidence presented in both Chapter 6 and Chapter 7.

PREVENTION OF SPECIFIC DISORDERS

Prevention of Anxiety

Anxiety symptoms and disorders typically emerge in childhood (see Chapter 2); lifetime rates of anxiety disorders by adolescence may be as high as 27 percent (Costello, Egger, and Angold, 2005). Anxiety disorders typically precede depression and may contribute to its development (Wittchen, Beesdo, Bittner, and Goodwin, 2003). Although a number of studies have shown the effectiveness of cognitive-behavioral therapy (CBT) in treating anxiety disorders in children and adolescents (Barrett, 1998; Kendall, 1994; Kendall, Safford et al., 2004; Manassis et al., 2002; Mendlowitz et al., 1999), and there is some evidence of the benefits of anxiety prevention for college-age individuals with anxiety symptoms (Schmidt et al., 2007; Seligman, Schulman et al., 1999), relatively little research has been done on the prevention of these disorders. However, Bienvenu and Ginsburg (2007) recently reviewed evaluations of anxiety preventive interventions, most of which were conducted in Australia. All of the interventions are variants of CBT applied to prevention, and most involve parents in some way.

Rapee (2002) and Rapee, Abbott, and Lyneham (2006) report a selective intervention for 3- to 5-year-olds whose behavior was inhibited according to parent and child reports and a behavioral assessment. Parents were randomly assigned to a no-intervention control condition or to an intervention involving six 9-minute group sessions that taught them how to practice gradual exposure and techniques for dealing with different situations, such as entering school. At 12-month follow-up, the intervention group children had a significantly lower prevalence of anxiety disorders, although there was no effect on parental or maternal ratings of inhibition or inhibition as assessed through behavioral testing.

Barrett and colleagues conducted several studies of universal interventions to prevent anxiety problems among children and adolescents (Barrett, Lock and Farrell, 2005; Barrett and Turner, 2001). The interventions consist of 10-12 classroom sessions and 4 parent sessions guided by a framework called FRIENDS: Feeling worried; Relax and feel good; Innner helpful thoughts; Explore plans; Nice work, reward yourself; Don't forget to practice; and Stay calm for life (Barrett, Lowry-Webster, and Turner,

2000). Barrett and Turner (2001) randomized 489 children ages 10-12 to one of three conditions: usual care, the program led by a teacher, or the program led by a psychologist. Those assigned to the active interventions had significantly fewer anxiety symptoms at the end of the intervention. In other studies, the program reduced the proportion of 10- to 13-year-olds who were at risk for anxiety problems (Lowry-Webster, Barrett, and Dadds, 2001) and at 12-month follow-up had significantly lowered anxiety among sixth- and ninth-grade students (Barrett, Lock, and Farrell, 2005). There was some evidence that the intervention produced greater reductions than the control condition for the high- and moderate-risk groups (Barrett, Lock, and Farrell, 2005).

Dadds, Spence et al. (1997) evaluated an indicated intervention for 7- to 14-year-olds who had anxiety symptoms or who met criteria for an anxiety disorder but did not have severe problems. The intervention followed Kendall's FEAR strategy: Feeling good by learning to relax, Expecting good things to happen, Actions to take in facing up to fear stimuli, and Rewarding oneself for efforts to overcome fear or worry (Kendall, 1994; Bienvenu and Ginsburg, 2007). The intervention was provided to young people in 10 weekly group sessions; 3 sessions were provided to help parents learn to manage their own anxiety and to model and encourage their children's use of the strategies. Six months after the intervention, young people in the intervention group had significantly fewer anxiety disorders than controls (16 compared with 54 percent). The difference was not significant at one-year follow-up, but it was at two-year follow-up (20 compared with 39 percent).

Schmidt and colleagues (2007) report on a randomized trial of a selective intervention predicated on evidence that sensitivity to anxiety—the fear people have of having anxiety symptoms—is a predictor of the development of anxiety problems. Participants who were high in anxiety sensitivity were randomized to a brief intervention that taught about the symptoms of anxiety and the fact that they are not harmful. Participants were recruited from a university, the community, and local schools, with an average age of 19.3 years. Compared with the no-intervention group, participants had reduced concerns about the physical and social consequences of anxiety by the end of the program, although the effect was not maintained at follow-up. Intervention participants were also significantly more comfortable than control participants when exposed to a CO₂ challenge that elicits anxiety, and significantly fewer had developed anxiety disorders one to two years after the intervention.

Seligman, Schulman et al. (1999) used a randomized design to test an intervention consisting of ten 2-hour group sessions with 231 university students selected on the basis of their pessimistic views compared with controls. The sessions focused on changing cognitions, for example, replac-

ing automatic negative thoughts with more constructive ones. At three-year follow-up, participants had experienced significantly fewer episodes of generalized anxiety disorder and fewer moderate (but not severe) depressive episodes than controls.

Although the preventive interventions for anxiety disorders evaluated to date are all based on CBT approaches, recent research suggests that these approaches may not be optimal (Biglan, Hayes, and Pistorello, *in press*). Growing evidence suggests greater effectiveness for acceptance-based interventions (Hayes, 2004; Hayes, Luoma et al., 2006), which teach people to accept anxiety as a normal part of living a value-focused life. Support for this approach also comes from evidence that efforts to control unwanted thoughts and feelings may exacerbate them (e.g., Wegner, 1992, 1994). Additional research is needed to develop and evaluate preventive interventions based on acceptance-based approaches and to determine the effectiveness of these approaches relative to traditional CBT.

Prevention of Posttraumatic Stress Disorder (PTSD)

Although it appears plausible that providing some sort of counseling to all trauma victims could prevent PTSD, empirical research has not shown this to be the case. Critical incident stress debriefing (CISD) is a technique widely used to prevent adverse reactions to trauma. As soon as possible after the traumatic event, victims are encouraged to discuss the details of their experience, their emotional reactions, any actions they have taken, and any symptoms they have experienced. They are reassured that their reactions are normal, told of adverse reactions that are typical, and encouraged to resume usual activities. The intervener tries to assess whether any adverse reactions have occurred and if so, refers the person for further assistance. Typically there is a follow-up contact with the victim. Recent research found that CISD is ineffective and possibly harmful (American Psychiatric Association, 2004). A meta-analysis found no benefit from its use and suggested a detrimental effect compared with no intervention or minimal help (van Emmerik et al., 2002).

In contrast, randomized controlled trials of CBT for individuals who are symptomatic in the weeks after a trauma reveal significant efficacy (Boris, Ou, and Singh, 2005). Some evidence suggests that this includes children (Chemtob et al., 2002).

In a quasi-randomized controlled trial, Berger et al. (2007) evaluated a school-based intervention consisting of an eight-session structured program designed to prevent and reduce children's stress-related symptoms, including PTSD. Compared with the wait-list controls, the study group reported significant improvement on all measures. Finally, there is some evidence that adolescents who maintain their routines have less posttraumatic stress

(Pat-Horenczyk, Schiff and Doppelt, 2006), a finding consistent with other findings that catastrophizing puts individuals at risk for developing PTSD (Bryant and Guthrie, 2005).

Prevention of Depression

In 1994, when the Institute of Medicine (IOM) report *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research* was released, available trials of interventions targeting depression were able to demonstrate only a reduction in symptoms (Muñoz and Ying, 1993). Since that time, methods have been developed for consistently identifying individuals at significant risk of experiencing depression within the next year, and some trials have demonstrated a reduction in the incidence of major depressive episodes, particularly among those at high risk (Muñoz, Le et al., 2008). Of the trials that have shown a significant reduction in new episodes, all have focused either on high-risk adolescents (Clarke et al., 1995; Clarke et al., 2001; Young et al., 2006) or pregnant women (Elliott et al., 2000; Zlotnick et al., 2001, 2006), and at least one intervention prevented episodes among those who had prior episodes (Clarke et al., 2001). On the basis of these advances, Barrera, Torres, and Muñoz (2007) assert that prevention of depression is a feasible goal for the 21st century, with the promise of being able to reduce incidence by as much as half.

Preventive Interventions for Children and Adolescents

Recent meta-analyses have concluded that interventions to prevent depression can reduce both the number of new cases in adolescents (Cuijpers et al., in press) and depressive symptomatology among children and youth (Horowitz and Garber, 2006). In a review that included seven trials targeting adolescents, Cuijpers and colleagues (in press) report that preventive interventions for adolescents can reduce the incidence of depressive disorders by 23 percent. They caution, however, that since the follow-up period in most studies did not exceed two years, the projects may have delayed onset rather than incidence. Both meta-analyses showed slightly higher effect sizes for selective and indicated interventions, although the number of universal interventions was very small.

Significant benefit has been reported for preventive interventions for reducing depressive symptoms in children and adolescents, with small to modest effect sizes (Horowitz and Garber, 2006; Jané-Llopis et al., 2003). In a systematic review of preventive interventions with children and adolescents, Merry and Spence (2007) highlight several promising approaches. However, they also describe failed attempts to repeat results in real-world school and primary care settings, limited follow-up periods, and method-

ological flaws, and they conclude that there is not yet sufficient evidence of effectiveness for preventive interventions for depression. In an analysis of the high-quality studies reviewed by Horowitz and Garber (2006), Gladstone and Beardslee (in press) demonstrate that although symptom reduction, a powerful goal in itself, is possible, very few studies of adolescents have examined actual reduction in new episodes of major depression, the work of Clarke and colleagues cited above being the notable exception. They emphasize that future studies should examine prevention of episodes as well as reductions in symptomatology.

In the committee's judgment, the balance of evidence suggests that some interventions can significantly reduce the symptomatology and incidence of depression. The potential to increase the sample sizes and reach of interventions has been highlighted by work done to adapt behavioral interventions to a range of settings and cultural groups, including conducting worldwide randomized controlled trials via the Internet (Muñoz et al., 2006).

The Clarke Cognitive-Behavioral Prevention Intervention (Box 7-1), an indicated program targeting adolescents at risk for future depression, has successfully prevented episodes of major depression in several randomized trials. A recent replication indicated that it is not as effective for adolescents

BOX 7-1

Clarke Cognitive-Behavioral Prevention Intervention Program: A Promising Indicated Intervention to Prevent Depression

The Clarke Cognitive-Behavioral Prevention Intervention, a 15-session group cognitive-behavioral intervention focused on coping with stress, is modeled after an effective cognitive-behavioral treatment for depression. The first randomized trial targeted adolescents with elevated depressive symptoms and was delivered in schools. At one-year follow-up, intervention participants had a much lower incidence of major depressive disorder or dysthymia (14.5 percent) than participants in the usual care control group (25.7 percent) (Clarke et al., 1995). A second trial broadened the definition of high-risk adolescents to include parental depression and subsyndromal symptoms and recruited 95 adolescents from a health maintenance organization rather than from classrooms (Clarke et al., 2001). At 15-month follow-up, participants in the experimental condition showed a much lower rate of major depressive episodes (9.3 percent) than those in the usual care condition (28.8 percent) ($p = .003$). These results were recently replicated in a four-site randomized trial involving 316 at-risk youths (Garber, Clarke et al., 2007). Parental depression at the beginning of the intervention significantly moderated the effect, however; thus adolescents who had a parent with current depression did not experience a significant reduction in rates of incident depression versus those receiving usual care. Further follow-up of this sample is under way.

with a depressed parent (Garber, Clarke et al., 2007). The Penn Resiliency Program (PRP) (Box 7-2), a school-based group intervention that teaches cognitive-behavioral and social problem-solving skills to prevent the onset of clinical depression, has also had promising results.

Preventive Interventions for Families with Depressed Parents

Children of parents with depression and related difficulties have a substantially higher rate of depression than their counterparts in homes with no mental illness (Beardslee and Podorefsky, 1988; Hammen and Brennan, 2003; Lewinsohn and Esau, 2002; Beardslee, Versage, and Gladstone, 1998; Weissman, Wickramaratne et al., 2006). They are also at risk for a

BOX 7-2
Penn Resiliency Program:
A Promising Universal Intervention to Prevent Depression

The Penn Resiliency Program (PRP) strives to prevent depression by teaching middle-school students to think flexibly and accurately about the challenges and problems they confront. Students learn, for example, about the links among beliefs, feelings, and behaviors and how to challenge negative thinking by evaluating the accuracy of beliefs and generating alternative interpretations. The original evaluation of the program (Gillham, Reivich et al., 1995) found that it halved the rate of moderate to severe symptoms among youths in a predominantly middle-income white sample. Another study (Jaycox, Reivich et al., 1994) found that depressive symptoms were significantly reduced and classroom behavior was significantly improved in the treatment group compared with controls at posttest and 6-month follow-up. The reduction in symptoms was most pronounced in the students who were most at risk. Positive results of PRP in preventing depressive symptoms have likewise been reported by Cutuli and colleagues (2006) and Gillham and colleagues (2006). The program has also been found to reduce anxiety (Roberts, Thomson et al., 2004). Similarly, students in a program patterned after PRP—the Penn Optimism Program—experienced decreased depressive symptoms relative to controls (Yu and Seligman, 2002).

On the other hand, a study of a culturally tailored version of PRP with low-income minority middle-school students had mixed results. The program had beneficial immediate and long-term effects on depressive symptoms for Latino children, but no clear effects for African American children (Cardemil, Reivich, and Seligman, 2002). Pattison and Lynd-Stevenson (2001) and Roberts and colleagues (2004) failed to replicate the findings reported by Gillham and colleagues (1995). These authors also found that a similar intervention—the Penn Prevention Program—showed no evidence of reducing depressive symptoms in youths, although Roberts and colleagues (2004) noted that the intervention group reported less anxiety.

variety of other difficulties in such areas as school performance and interpersonal relationships (Goodman and Gotlib, 1999). Beardslee and colleagues developed two public health preventive interventions (see Box 7-3) specifically aimed at providing information and assistance in parenting to

BOX 7-3
Preventive Interventions Designed for Families with Parental Depression

Two preventive interventions are aimed at providing education and support to families facing depression, helping them understand the illness and the value of obtaining treatment, and improving their capacity to reflect and solve problems together. One intervention involves two lectures followed by a group discussion with parents only. The other—the Family Talk Intervention—is clinician-facilitated; it consists of five to seven sessions (clinician-centered) that include discussion of the history of the illness and psychoeducation for the parents, meeting with the children (ages 8-14 at the time of enrollment), a family meeting planned and conducted by parents with the clinician's help, and follow-up over several years. In a randomized efficacy trial of these two interventions, significantly more children in the Family Talk group reported gaining a better understanding of parental affective illness as a result of their participation in the intervention. These results were sustained during the year following the intervention (Beardslee et al., 1997). For long-term follow-up, the researchers followed 105 families. Analysis of the entire sample 2.5 years after enrollment showed sustained gains for both sets of intervention groups, with an increase in the main target of intervention—understanding in the children—as well as sustained changes in attitudes and behaviors in the parents; however, the improvement was significantly greater in the Family Talk group. There was an overall effect in both groups of a reduction in depressive symptomatology (Beardslee et al., 2003). In the most recent follow-up, 4.5 years after enrollment, the same effects were found (Beardslee et al., 2008). Also, both intervention groups showed an overall decline in depressive symptomatology, an increase in family functioning, and better recognition of when youngsters became depressed (Beardslee et al., 2008).

In another trial, these interventions were adapted for use with inner-city single-parent minority families (Podorefsky, McDonald-Dowdell, and Beardslee, 2001). The intervention proved safe and feasible, and there was more change in the families receiving the clinician approach than the lecture approach, although both interventions showed gains. The interventions have also been adapted for use with Hispanic families, and an open trial has demonstrated that they are safe and feasible and lead to significant gains for both parents and children, with stronger effects in the parents (D'Angelo, Llerena-quinn et al., in press). Additionally, the principles of the Family Talk intervention have been applied in a program to help teachers develop skills to deal with depressed parents in Head Start and Early Head Start (Beardslee, Hosman et al., in press). Family Talk is now being used in a number of nationwide efforts to develop programs for children of the mentally ill (see Box 13-1 in Chapter 13).

children of depressed parents, both of which have shown positive results in multiple randomized trials.

PREVENTION OF SUBSTANCE USE AND ABUSE

School-Based Approaches

Many of the interventions discussed in Chapter 6 have had effects on outcomes related to substance abuse. Additional intervention strategies specifically targeting prevention of substance abuse are discussed here. School-based programs with this focus emerge primarily in the middle school years, when initial risk for use is greatest.

Cuijpers (2002) reviewed three meta-analyses of classroom-based substance abuse prevention programs (Rooney and Murray, 1996; Tobler et al., 2000; White and Pitts, 1998) and a set of studies that analyzed mediators of the effects of these programs. Their synthesis led to six conclusions about effective programs. First, programs that involve interactions among participants and encourage them to learn drug refusal skills are more effective than noninteractive programs. Second, interventions that focus on direct and indirect (e.g., media) influences on use of drugs appear to be more effective than those that do not focus on social influences. Third, programs that emphasize norms for and a social commitment to not using are superior to those without this emphasis. Fourth, adding community components to school-based programs appears to add to their effectiveness (see also Biglan, Ary et al., 2000). Fifth, use of peer leaders may enhance short-term effectiveness (see also Gottfredson and Wilson, 2003). Sixth, adding training in life skills to that in social resistance skills may increase program effectiveness (see also Faggiano et al., 2005).

A meta-analysis to assess potential moderators of program effectiveness by Gottfredson and Wilson (2003) determined that programs that can be delivered primarily by peer leaders have increased effectiveness. An analysis by Faggiano et al. (2005) found that the most effective programs are those focused on life and social skills. Skills-based programs increased drug knowledge, decision-making skills, self-esteem, and peer pressure resistance and were effective in deterring early-stage drug use.

Derzon et al. (2005) report on an analysis of a 46-site, 5-year evaluation of school- and community-based substance abuse prevention programs that included behavioral skills programs, information-focused programs, recreation-focused programs, and affective programs. Using a meta-analytic technique to project potential impact by accounting for methodological and procedural differences, they calculated a mean adjusted effect size of 0.24 for decreasing 30-day substance use (tobacco, alcohol, and marijuana).

Life Skills Training (Box 7-4) is one of the most prevalent substance use prevention curricula in the nation's public schools and has been endorsed as a model program by both the Blueprints for Violence Prevention and the Surgeon's General's Youth Violence Report. Another successful alcohol, tobacco, and marijuana preventive intervention for middle-school students is Project ALERT (Box 7-5). The Drug Abuse Resistance Education (DARE) program, based primarily on scare tactics, has been found in multiple trials to be ineffective in its original form; a modified version is currently being tested.

College Interventions Targeting Prevention of Alcohol and Drug Use and Abuse

The evidence on alcohol and drug abuse prevention in colleges is limited and inconclusive because, although many colleges have such programs, very few studies have evaluated them (Larimer, Kilmer, and Lee, 2005). More robust evaluation has been done of interventions focused on reducing drinking among college students. Carey, Scott-Sheldon, Carey,

BOX 7-4
Life Skills Training:
A Universal Substance Use Prevention Program

The current goal of the Life Skills Training Program (LST) (Botvin, 1996, 2000) is providing adolescents with the knowledge and skills needed to resist social influences to use cigarettes, alcohol, and other drugs, as well as reducing potential motivations to use these substances by increasing general personal and social competence (Botvin, 1986). Middle- (or junior high) school students attend fifteen 45-minute class periods during or after school, with 10 booster class periods in the second year, 5 booster class periods in the third year, and optional violence prevention units. Botvin and colleagues evaluated LST in a 3-year randomized controlled trial of predominantly white seventh-grade students from 56 schools. Significant prevention effects were found for cigarette smoking, marijuana use, and immoderate alcohol use. Prevention effects were also found for normative expectations and knowledge concerning substance use, interpersonal skills, and communication skills. Three years later, approximately 60 percent of the initial seventh-grade sample was surveyed again during a long-term follow-up study (Botvin, Baker et al., 1996; Botvin, Griffin et al., 2000). Significant reductions were found in both drug and polydrug use. Positive effects have also been found for a version of LST modified for minority studies (Botvin, Griffin et al., 2001) and for an intervention combining LST and the Strengthening Families Program, which is described in Chapter 6 (Spoth, Redmond et al., 2002; Spoth, Clair et al., 2006). The benefits of LST have been reported to exceed its costs (Aos et al., 2004).

BOX 7-5
Project ALERT:
A Middle School Substance Abuse Prevention Curriculum

Project ALERT seeks to motivate middle-school students not to use alcohol, tobacco, or marijuana and to impart skills needed to translate that motivation into effective resistance behavior. The curriculum includes lesson plans, handouts, interactive videos, posters, unlimited access to online training and resources, toll-free phone support, an ongoing *ALERT Educator* newsletter, and unlimited ability to download additional copies of lesson plans.

The first evaluation of Project ALERT, conducted in the late 1980s, showed positive results in terms of drug use and associated cognitive risk factors (Ellickson and Bell, 1990). A second large-scale randomized controlled trial found similar results (Ellickson, McCaffrey et al., 2003; Ghosh-Dastidar, Longshore et al., 2004). On the other hand, a randomized, two-cohort longitudinal evaluation of the program found no positive effects, although this may have been due to implementation differences (St. Pierre, Osgood et al., 2005). The program is among the substance abuse prevention programs for which Aos and colleagues report that benefits exceed costs (2004).

Project ALERT has evolved over time into a combined middle school and high school curriculum called ALERT Plus, which extends the basic curriculum to ninth grade with five booster lessons to help sustain the program's positive effects. Longshore, Ellickson et al., (2007) found weak results for Project ALERT in a randomized controlled field trial of the intervention with ninth-grade at-risk adolescents.

and DeMartini (2007) report on a meta-analysis of 62 interventions. They found that, although on average the interventions reduced alcohol consumption both immediately and at follow-up, the majority of studies failed to produce a significant effect. Variables associated with positive outcomes include motivational interviewing (MI, a nonconfrontational approach to asking students to describe their drinking behavior and its consequences), feedback about expectancies and motives for drinking, and decision-making procedures that prompt the individual to weigh the benefits and negative aspects of drinking. Skills training approaches were less effective, as were interventions for men and for those who were already drinking heavily.

An intervention reported by Carey, Carey, Maisto, and Henson (2006) did produce significant benefit. They evaluated MI as a means of reducing problematic drinking among 509 heavy-drinking undergraduates who were randomly assigned to one of six conditions. The students received one of two versions of MI or no interviews. The standard version of MI stressed the students' autonomy in deciding what they wanted to do, discussed

norms about drinking, provided tips for reducing drinking, and reinforced talk about change. The second, “enhanced” version included a worksheet containing a decisional grid to help students clarify the pros and cons of changing their behavior. Students were also assigned to receive or not receive a Timeline Follow Back (TLFB) interview that took the students back through the previous 90 days, starting with the most recent period, and helped them reconstruct their drinking behavior during this time. Assessment of the students’ drinking behavior and alcohol-related problems occurred at baseline and 1, 6, and 12 months postintervention. Carey et al. (2006) found that the TLFB by itself reduced alcohol consumption compared with the no-intervention control. The standard MI produced significantly greater reductions in alcohol use and alcohol problems than did the TLFB; those who received the enhanced MI did not improve as much. On the basis of this evidence, motivational interviewing coupled with the TLFB appears to have the greatest potential to reduce drinking significantly among undergraduates.

Other Approaches

In addition to school-based and college interventions, efforts to prevent substance use and abuse among young people often include other community, media, regulatory, or policy approaches. These more broadly based strategies tend to target norms and policies rather than trying to reach individuals with behavior change strategies, although in many cases they are combined with components that target individuals more directly through schools and families. Many of these interventions, particularly those targeting alcohol, also focus on reducing the consequences of substance use as much as use itself.

The Centers for Disease Control and Prevention’s Guide to Community Preventive Services (undated) recommends restrictions on outlet density and zoning to reduce excessive alcohol consumption and enhanced enforcement of laws prohibiting the sale of alcohol to minors. Nationally oriented recommendations related to reducing and preventing underage drinking call for these and other approaches, such as limiting the marketing of alcohol and specifically youth-oriented alcohol products, use of media campaigns targeted at parents, and creation of community coalitions; two policy reports also call for continued research on developmental considerations and early alcohol use (NRC and IOM, 2002; Surgeon General, 2007). The Task Force on College Drinking concluded that evidence was strongest for indicated interventions that included cognitive skills training, norms or values clarification, motivational enhancements, or challenging of expectancies, but it recommended comprehensive integrated community coalitions targeting individuals, the student population as a whole, and the college and surrounding community (NIAAA, 2001).

A review of interventions in nonschool settings designed to prevent substance abuse among those under age 25 found insufficient evidence to draw conclusions about the effectiveness of these programs (Gates et al., 2006). The authors were able to identify only 17 randomized controlled trials, which varied greatly in their program components and included four types of interventions: MI or brief interventions, education or skills training, family interventions, and multicomponent community interventions. Some interventions, including three family interventions, MI, and two interventions with both community and school components, showed potential benefit in reducing marijuana use. Compared with the more robust data on school-based substance abuse prevention programs, existing research is insufficient to determine the effectiveness of efforts to prevent substance abuse through interventions in other settings.

A review of the impact of universal prevention programs on alcohol use (Foxcroft et al., 2002) found a lack of clear evidence for effectiveness in the short or medium term. This analysis, which included school-based, family, and community interventions, found the most promising effects for long-term outcomes of a culturally focused school and community skills-based intervention with American Indians, which reduced the likelihood of weekly drinking over 3.5 years, and the Strengthening Families Program (described in Chapter 6), which reduced alcohol initiation behaviors over 4 years.

Almost none of the community interventions aimed at preventing adolescent tobacco, alcohol, or other drug use have been in the subject of more than one experimental evaluation. However, the emphasis on these more broad-based approaches in national recommendations and the progress that has been made since 1994 in this area warrant some discussion of a few example programs that include a significant community and policy component.

The Midwestern Prevention Program (MPP), a multimodal community-wide drug prevention program, evaluated effects on high-risk and general youth populations (Chou et al., 1988; Johnson et al., 1990; Pentz et al., 1989, 1990). The intervention included (1) classroom curriculum targeting students in sixth and seventh grades, (2) parent training addressing prevention policy and parent-child communication skills, (3) training of community leaders in development of a drug abuse prevention task force, and (4) media promotion of prevention policies and norms (Pentz, MacKinnon, Flay et al., 1989). The intervention was evaluated in a quasi-experimental trial and a subsequent experimental trial. In the formal trial, the intervention was equally effective for both high- and low-risk youth (Johnson et al., 1990). In the latter trial, there was significantly less tobacco and marijuana (but not alcohol) use in the MPP schools than in control schools, with effects found primarily in private and parochial schools (Pentz, Trebow, Hansen, and MacKinnon, 1990); through 3.5 years postbaseline, the per-

centage of students with reports of substance abuse during the past month declined from one assessment to the next (Chou et al., 1998). MPP produced significant declines in cigarette, alcohol, and marijuana use across all follow-ups. There were limited effects for baseline marijuana users and diminishing effects for early alcohol and cigarette users over time.

Project Northland was a multimodal intervention aimed at delaying the onset of and reducing underage drinking (Perry et al., 1996, 2000, 2002). It was initially evaluated in a randomized trial of 24 small Minnesota communities and subsequently in a randomized trial in Chicago inner-city schools. The intervention included social-environmental approaches and individual behavior change strategies along with community organizing, youth action teams, print media regarding healthy norms about underage drinking, parent education and involvement, and classroom-based social-behavioral curricula. In the Minnesota trial, alcohol use was prevented among eighth-grade students, and those who were not using alcohol at the beginning of the project reported significantly less alcohol, marijuana, and cigarette use at the end of eighth grade. The effects were not maintained by the time students were in tenth grade. The results were not replicated in the Chicago trial (Komro et al., 2008).

Other programs have focused primarily on changing community policies and norms. Communities Mobilizing for Change on Alcohol developed a social-environmental intervention to reduce underage alcohol access through changes in policies and practices of major community institutions (Wagenaar et al., 2000). Strategy teams comprised community groups and organizations focused on decreasing the number of alcohol outlets selling to youth, reducing access to alcohol from noncommercial sources (e.g., parents, siblings, peers), and changing cultural norms that tolerate underage access to and consumption of alcoholic beverages. Fifteen communities in Minnesota and Wisconsin were randomized into intervention or control groups. The intervention reduced youths' commercial access to alcohol and arrests for driving under the influence of alcohol among 18- to 20-year-olds (Wagenaar et al., 2000).

Two quasi-experimental studies have also shown benefits in reducing alcohol-related problems. The Community Trials Project reduced alcohol-related injuries and deaths among all age groups through community-wide environmental prevention activities and policy change (Holder et al., 1997). The study matched but did not randomize communities in California and South Carolina. In the intervention communities, the following were targeted: (1) community mobilization, (2) responsible beverage service, (3) increased enforcement of drunk driving laws and perceived risk of drunk driving detection, (4) reduced underage access, and (5) reduced availability of alcohol through the use of local zoning and other municipal controls on outlet quantity and density. The intervention produced significant reduc-

tions in nighttime injury crashes, alcohol-related crashes, assault injuries, and hospitalizations. Adults reported lower rates of drinking and driving, and sales of alcohol to minors were reduced. Adolescent alcohol use was not assessed.

Saving Lives (Hingson et al., 1996) aimed to reduce alcohol-impaired driving and related risks. The study compared six Massachusetts intervention communities and five control communities using a quasi-experimental design. The intervention involved a task force that designed specific activities for its community, including business information programs, media campaigns, speeding and drunk driving awareness days, high school peer-led education, speed-watch telephone hotlines, and police training. During the five years of program activity there was a 25 percent decline in fatal crashes and a 25 percent decrease in fatal crashes involving alcohol compared with the prior five years.

In contrast with the positive results of media messages related to smoking, however, evaluations of the National Anti-Drug Media Campaign have yielded mixed results. While there is some evidence consistent with a favorable effect of the Campaign on parent outcomes, there is no evidence that the effect on parents translates into improved outcomes for their children (Orwin, Cadell et al., 2006)

Derzon and Lipsey (2002) reviewed 72 studies evaluating the effects of a broad range of media interventions on substance use behavior, attitudes, or knowledge. Using pre–post gain effect size statistics, they found positive effects for those receiving media interventions compared with controls, including smaller increases in substance use, greater improvement in substance use attitudes, and larger gains in substance use knowledge. Intervention characteristics consistently associated with greater gains include communications directed at parents and other adults with influence over young people; messages communicated by video (compared with television, radio, or print); and the use of supplementary components, such as group discussion, role play, or supportive services. The authors acknowledge significant methodological challenges for both the research evaluating media interventions and the meta-analysis, and the effect sizes they found were small. However, they conclude that media interventions can be effective, and that the wide reach of such interventions can potentially translate a small effect into significant cumulative changes for large numbers of young people.

Prevention of Eating Disorders

The lifetime prevalence of eating disorders, including anorexia nervosa, bulimia nervosa, and binge eating disorder, is relatively small, more common among females, and most likely to occur during the teen years (Stice

and Peterson, 2007). In a meta-analysis of 53 randomized and quasi-experimental trials focused on prevention of eating disorders, Stice and Shaw (2004) found, on average, significant effects (generally small to modest) for each of the included dependent variables: body mass, thin-ideal internalization, body dissatisfaction, dieting, negative affect, and eating pathology. Some effects were detectable as much as two years after the intervention. The effect sizes were smaller for universal interventions, which included many participants not at risk for eating disorders. Didactic programs were less effective than those that engaged participants in interactions. Single-session programs were less effective than longer ones, and programs were more effective if they targeted those over age 15. Interventions that simply provided education about eating disorders were significantly less effective than other interventions for most outcomes. The effective interventions varied in content and included ones that focused on resistance to cultural pressure for thinness, addressed body dissatisfaction, and taught healthy weight management. A meta-analysis of five studies of Internet-based interventions to prevent eating disorders found no statistical significance for pooled outcome data but recommended additional research given the small number of studies (Newton and Ciliska, 2006). Stice and Shaw (2004) similarly point to the need for improved methodological rigor and theoretical rationale in order to progress from promising to conclusive interventions.

PREVENTION OF SCHIZOPHRENIA DURING A PRODROMAL STAGE

There has been limited work on early prevention of psychotic disorders. Given the severity of such disorders as schizophrenia and bipolar disorder (McFarlane, 2007) and their extraordinarily high associated lifetime risk for suicide (Palmer et al., 2005) and early mortality (Fenton, 2000), it is essential to investigate opportunities for prevention before onset or when symptoms are in the prodromal stage (a period of nonpsychotic symptoms that precedes onset). Findings from a number of treatment studies of early detection and intervention indicate that both atypical antipsychotic drugs and psychosocial interventions are good candidates for testing in youth who are at high risk for a psychotic episode (Haas et al., 1998; Leucht et al., 1999; Lieberman et al., 2001; Loebel et al., 1992; Marshall et al., 2005; McFarlane, 2007; Pilling et al., 2002a, 2002b; Wyatt, 1995).

To be effective, however, these preventive and early intervention strategies need to overcome some important challenges. First, epidemiological and developmental factors make it challenging to conduct universal, selective, or indicated preventive intervention trials aimed at those who have not yet had an episode (Faraone et al., 2002; Brown and Faraone, 2004). Second, preventive intervention strategies are limited by incomplete understanding

of the genetic, neurological, and environmental factors leading to these disorders. Third, ethical challenges are posed by the testing of interventions that may do harm and the stigma regarding labeling someone as being at high risk for psychosis. None of these challenges appears insurmountable, however. Moreover, the very high costs of these illnesses when they occur and the fact that experiencing the illness itself predisposes to more episodes make effort in this area warranted.

A number of prodromal clinics worldwide identify subjects from the community at high risk for a psychotic episode. These clinics provide training to mental health professionals, school and community professionals, and the public regarding early warning signs and opportunities for referral. Several are testing an active intervention, including early pharmacological intervention, against a control condition. The prodromal phase is characterized by schizoid characteristics or familial risk, brief or attenuated psychotic symptoms, and social deterioration or negative symptoms (McFarlane, 2007). The criteria used by these clinics to distinguish those in the prodromal phase from those who are not at elevated risk or have already had a psychotic episode are not identical across clinics. However, there is compelling evidence that those identified in such prodromal stages have a very elevated risk for experiencing a psychotic episode in the near future (Yung and McGorry, 1996; Yung, McGorry, McFarlane et al., 1996; McGlashan et al., 2007).

The published studies of these preventive interventions indicate a substantial reduction in rates of development of frank psychosis and in prodromal and psychotic symptoms, although one study did not show statistical significance. Using a simple meta-analysis, McFarlane (2007) estimated that the mean conversion rate across studies is about 11 percent of treated cases and 36 percent of untreated or treatment-as-usual control cases.

Given the limitations of many of these studies and the risk of serious adverse events, the positive results found are not sufficient to recommend such interventions as a standard for practice. However, the interventions show considerable promise, and several studies are under way. Continued research in this area should be a high priority. The existence of standard criteria across multiple sites, such as in the North American Prodrome Longitudinal Study (a collaborative, multisite investigation into the earliest phase of psychotic illness), would be invaluable in conducting such research.

MENTAL HEALTH PROMOTION

Mental health promotion programs aim to improve positive outcomes among young people. Some programs share elements with universal prevention programs when they attempt to reduce negative emotional and

behavioral outcomes as well as to improve positive mental health outcomes. As a natural consequence of shared risk and protective factors, mental health promotion and prevention strategies also have shared outcomes. As mentioned in Chapter 3, meta-analytic and qualitative reviews demonstrate significant overlap between the strategies, although promotion programs are distinguished by their primary emphasis on positive aspects of development, including developmentally appropriate competencies. This section first reviews interventions aimed at fostering positive development. It then examines lifestyle factors that promote mental health.

Interventions Aimed at Fostering Positive Development

A common feature of most validated programs aimed at fostering positive development and preventing the development of problems is the emphasis on supportive environments or “nurturance.” From the prenatal period through emerging adulthood, such interventions are supportive of individuals and their caretakers and provide positive reinforcement for prosocial behavior. Home visitors encourage young mothers to develop new skills, including how to comfort and interact warmly with their infant. Preschool teachers attend to, praise, and reward the developing skills of their children. The Good Behavior Game reinforces cooperative behavior among teams of children. Trainers praise parents for trying new skills in nurturing their children.

The creation of supportive environments also involves acceptance. Parents who are aggressive toward their children are not confronted; they are simply prompted to try more positive methods of being with their children (Webster-Stratton, 1990). College students who are drinking too much are gently questioned about their drinking and its consequences and are given tips for changing their behavior if they choose to do so. People who have been exposed to traumatic events are helped to accept that these events have happened and to move forward in their lives. Families struggling with parental depression are helped to understand and accept and to develop a shared approach to coping with it. Adolescents and young adults experiencing psychotic symptoms for the first time receive assistance in dealing with them.

In contrast to many punitive societal reactions to young people’s problem behavior, none of these interventions emphasizes punishment. The Good Behavior Game helps teachers reinforce desirable behavior and thereby reduce the behaviors that commonly draw punitive responses. Parenting programs help families replace harsh and inconsistent discipline practices with time-outs and brief removal of privileges, while parents are prompted to greatly increase positive reinforcement for desirable behavior. Several studies with families that have experienced major disruptions, such

as marital separation and bereavement, have provided consistent evidence that the ability of such parenting programs to increase nurturance (warmth) and improve effective discipline accounts for their effectiveness in reducing internalizing and externalizing of problems in the short term and up to six years following the intervention (DeGarmo et al., 2004; Forgatch, 2008; Tein et al., 2004, 2006; Zhou et al., in press; Martinez, 2001). The principles of richly reinforcing desirable behavior and minimizing punishment are practices that may go a long way toward reducing problem behaviors among young people (see also Chapter 11).

Durlak and Wells (1997) reviewed 177 interventions targeted at reducing behavioral and social problems in children and adolescents, including both prevention and mental health promotion interventions. They found significant mean effects for programs that modified the school environment, helped children negotiate stressful transitions, and provided individually focused mental health promotion. Most of these programs both significantly increased competencies and significantly reduced problems.

Catalano et al. (2002) identified 25 youth development programs that focused on building positive constructs, such as social, emotional, and cognitive competence; self-determination; and self-efficacy. They concluded that the programs showed evidence of improving measures of positive development and reducing a range of problem behaviors, such as risky sexual behavior, alcohol and drug use, violence, and aggression. For example, Raising Healthy Children (Catalano et al., 2003), an extension of the successful Seattle Social Development Program, focuses on promoting positive youth development by improving classroom and family support for prosocial behavior. A trial matched 10 schools and randomized first- or second-grade students to the Raising Healthy Children intervention or a no-intervention group. At 18-month follow-up, program participants had higher teacher-rated academic performance and commitment to school, lower antisocial behavior, and higher social competency. Participants also showed less increase in the use of alcohol and marijuana in their middle school years (Brown, Catalano et al., 2005).

Similarly, in a meta-analytic review of 237 school-based mental health promotion programs, Weissberg et al. (2007) reported improvements in aspects of positive development (e.g., social-emotional skills, prosocial norms, school bonding, positive social behavior), as well as reductions in problem outcomes (e.g., aggressive behavior, internalizing symptoms, substance use). Kraag et al. (2006) reviewed 19 trials of school-based programs that teach coping skills or stress management through relaxation training, social problem solving, or social adjustment and emotional self-control. Although there was significant heterogeneity in methodological quality, they found large pooled effect sizes for both enhanced coping skills and reduced stress symptoms.

A recent evaluation by the RAND Corporation of a widely implemented after-school program, Spirituality for Kids, demonstrated a causal link between spiritual development and resilience. In a randomized trial involving 19 program sites, the program showed medium to large effects on positive behaviors, such as adaptability and communication, and small to medium effects on behavioral problems, such as attention problems, hyperactivity, and withdrawal (RAND, 2008).

Embry (2004) has suggested that the dissemination of a set of simple behavior-influence procedures, or “kernels,” would be helpful for parents, teachers, health care providers, and youth workers in fostering positive development among children and adolescents. Examples include praise notes (Gupta et al., 1990; Hutton, 1983; Kelley et al., 1988; McCain and Kelley, 1993), peer-to-peer tutoring (Greenwood, 1991a, 1991b), the Beat the Timer game (Adams and Drabman, 1995), and some of the skills that are used in parent-child interaction therapy (Eyberg, Funderburk et al., 2001) and other caregiver training approaches. Others have similarly called for the study of core components of programs to facilitate their implementation in schools and other community settings (e.g., Greenberg, 2007). Discerning generic principles that are common to diverse interventions could foster their broader use.

Illustratively, because they achieve their preventive effects through promotion of family and child competencies, several programs discussed earlier in this report, including the Promoting Alternative Thinking Strategies (PATHS) curriculum (Box 6-7), Fast Track (Box 6-9), and Life Skills Training (Box 7-4), as well as the Big Brothers Big Sisters Program (Box 7-6) are frequently cited as successful promotion and prevention programs; they have also been recommended by Blueprints for Violence Prevention.

Lifestyle Factors That Promote Mental Health and Prevent MEB Disorders

Evidence from a small but growing set of observational and interventional studies indicates that modifications in a number of lifestyle factors, including sleep, diet, activity and physical fitness, sunshine and light, and television viewing, can promote mental health. Of these factors, the opportunity is perhaps strongest for the salutary effects of adequate sleep and certain nutritional elements, such as adequate iron content in the diet. In many cases, intervention studies related to lifestyle factors have documented physical health benefits. Given the strong connections between physical and mental health, improvements in both may be achievable using common approaches.

Attempts to modify lifestyle factors can appropriately be centered on families and the activities of the medical care community, promoted in the

BOX 7-6
Big Brothers Big Sisters

Big Brothers Big Sisters is a community-based mentoring program that matches an adult volunteer (Big Brother or Sister) to a child aged 6-18 from a single-parent household (Little Brother or Sister), with the expectation that a supportive relationship will solidify. The match is well supported by mentor training and ongoing supervision and monitoring by professional staff. An experimental design using random assignment was used to evaluate the Big Brother Big Sisters program at eight sites across the country (Grossman and Tierney, 1998; Tierney, Grossman, and Resch, 1995). This study, although limited by the lack of long-term follow-up data after the 18-month intervention period and little information about site-level variability, had several positive findings. Youth in the treatment group (including both those who received a mentor and those who did not) had higher grade point averages, attended school more often, and reported better parental relationships and more parental trust despite lack of improvement in other related areas. They were less likely to initiate drug and alcohol use than those in the control group and also reported hitting others less often. Aos and colleagues (2004) cite Big Brothers Big Sisters as a mentoring program whose benefits exceed its costs.

context of schools and community organizations, or accomplished through policy decisions. It should be noted that in many families, there are substantial barriers to promotion and prevention related to lack of knowledge, as well as factors that interfere with healthy decisions, such as poverty, neighborhood stresses, family tensions, and a general lack of child supervision.

While there is a commonsense element to interventions aimed at improving modifiable lifestyle factors, future efforts must rigorously document the promotion and prevention outcomes of their adoption. Promotion of mental health early in young people's lives using such universal strategies that are feasible, inexpensive, and scientifically compelling holds great promise.

Sleep

Sleep deprivation and sleep-related breathing disorder (SDB) are linked to emotional and behavioral problems that include hyperactivity, inattention, impulsivity, mood lability, and aggression (IOM, 2006; Rosen, Redline et al., 2004; Wolraich, Drotar et al., 2008). Hyperactivity and attention disorders are associated with two other sleep disorders—restless leg syndrome and periodic limb movement disorders (Chervin, 2002).

Given that 20 percent or more of children have sleep problems, the contribution of SDB and other sleep problems to behavioral disorders is

potentially enormous, though largely underrecognized. Interventions to improve sleep duration and quality must be rigorously assessed to determine their potential for improving emotional and behavioral outcomes. For example, a program to screen all children in primary care based on a history of snoring, interrupted sleep, and insufficient hours of sleep could be followed by a behavioral assessment using validated instruments and behavioral interventions as indicated. Studies are needed to demonstrate that the treatment of obstructive sleep apnea with tonsillectomy and adenoidectomy or other measures reduces the occurrence of behavioral consequences. A more general proposed approach to healthy sleep is the establishment of a multimedia public education campaign targeting specific populations, such as children, their parents, teachers in preschool and elementary school, college students, and young adults (IOM, 2006). The intent of such a campaign would be awareness concerning the consequences of insufficient or disrupted sleep, leading to identification of these problems and reestablishment of healthy sleeping patterns.

Diet and Nutrition

Adverse emotional and behavioral outcomes for children have long been linked to dietary factors. However, many suggested nutritional interventions have little or no evidence base. Prenatal nutrition was addressed in Chapter 6. Postnatal nutrition factors include hunger, undernutrition, and failure to thrive, which have been linked to cognitive and behavioral consequences (Dykman and Casey, 2003). Other factors that may be more modifiable include knowledge about optimal food intake and content, which can be addressed with education.

Breastfeeding has been studied extensively concerning its relevance to emotional and behavioral health. On the one hand, mounting evidence suggests that breastfeeding can contribute to enhanced cognitive capabilities independently of confounding factors (Kramer, Aboud et al., 2008). While the IQ effect is modest in most studies, intelligence is a protective factor for MEB disorders and related problems. On the other hand, the weight of evidence at this time does not support superior behavioral outcomes for children who have been breastfed (Kramer et al., 2008). Based on current information, breastfeeding should be promoted for many reasons, but prevention of MEB disorders in childhood or in later life is not one of them.

Avoidance of nutritional deficiencies is important for promotion of mental health. High on the list of critical nutritional elements is iron. Children shown to have severe chronic iron deficiency in infancy score lower on measures of mental and motor functioning and are rated by both parents and teachers after 10 years of follow-up as more problematic in the areas of anxiety, depression, social problems, and attention problems

(Lozoff, Jimenez et al., 2000). This study is one of several that suggests an important relationship between iron deficiency and subsequent behavior. A concern, of course, is that iron repletion does not reverse long-term adverse outcomes and that iron deficiency remains very common in the United States (e.g., Schneider, Fuji et al., 2005). U.S. Hispanic children and overweight children are particularly vulnerable (Brotanek, Halterman et al., 2005). Strategies for avoiding iron deficiency include iron supplementation of exclusively breastfed babies (Dallman, Siimes, and Steckel, 1980), avoidance of prolonged bottle feeding (Brotanek, Halterman et al., 2005), and routine testing of certain populations of infants for iron deficiency in the course of medical care. Given the magnitude of potential adverse outcomes, systematic efforts to inform parents of childbearing age about the importance of adequate iron intake for both mother and child should be adopted and sustained at the national level.

Attention has been focused for the past decade or two on the omega-3 fatty acid content of prenatal maternal diets and diets for children postnatally. Low levels of DHA and EPA—omega-3 fatty acid products—and corresponding high levels of arachadonic acid have been shown in animal studies to be detrimental to brain development (Innis, 2008) and are related to indices of brain inflammation (Orr and Bazinet, 2008). Cognitive and some behavioral consequences of this imbalance have been described in animals and correlated with effects on cell membranes in the central nervous system (Mahieu, Denis et al., 2008). In human studies, alterations in omega-3 fatty acid levels have been associated with cardiovascular disease; stroke; cancer; cognition problems; and a number of behavioral problems, including attention deficit disorders, depression, autism, and suicide.

A number of randomized trials of omega-3 supplementation for mothers during gestation or for infants indicate benefits for cognitive and motor skills, including language development. These improvements could serve as protective factors for MEB disorders. Trials of the effects of omega-3 supplementation on aggression have also been conducted. Studies involving children have had mixed results, with three studies demonstrating a reduction in some symptoms of ADHD and related problem behaviors (Richardson and Montgomery, 2005; Richardson and Puri, 2002; Sinn and Bryan, 2007); one showing a reduction in hostility and aggression, primarily among girls (Itomura et al., 2005); two showing no effect on aggressive or disruptive behavior (Hirayama, Hamazaki, and Terasawa, 2004; Voigt et al., 2001), and one finding only limited effectiveness (Stevens et al., 2003). While not yet conclusive, however, the available evidence warrants well-designed experimental trials of the impact of omega-3 in preventing depression and behavioral disorders involving aggression.

The majority of randomized controlled trials of omega-3 supplementation have focused on its use to treat adults with mental disorders. Although

two recent meta-analyses report evidence for the potential value of omega-3 supplementation, particularly for depression (Freeman et al., 2006; Lin and Su, 2007), another suggests that the effects are negligible (Appleton et al., 2006). All concur, however, regarding the troublesome variability of results; the heterogeneity and poor quality of many studies; and the need for large-scale, well-designed and -executed studies to permit conclusive statements.

Other associations between dietary content and behavioral and emotional disorders are focused on the potential effects of allergenic foods and large boluses of sugar on the occurrence of ADHD (Wolraich, 1998). More study in this area is warranted.

Neurotoxins

Exposure to neurotoxins, such as lead and mercury, is a significant risk during gestation (see Chapter 5). Postnatal exposures are also of concern. Blood levels of neurotoxins in childhood are correlated with cognitive deficits and MEB disorders, including ADHD and conduct disorder (Braun, Kahn et al., 2006; Braun, Froehlich et al., 2008). Evidence has accumulated that blood lead levels once thought to be safe (>10 mg/ml) can be detrimental to infants (Canfield, Henderson et al., 2003). Protection against exposure to lead, as well as other potential neurotoxins whose effects are not as well documented, is deserving of greater national attention, and demands the concerted efforts of medical caregivers, environment health specialists, community organizations, and lawmakers, as well as regulatory officials at all levels of government.

Physical Fitness and Exercise

Physical fitness and exercise are widely recognized as important modulators of stress, and there is some evidence of their effectiveness for the treatment of depression (Craft, Freund et al., 2008). A meta-analysis of exercise interventions targeting depression and anxiety, primarily in college students, showed significant positive effects related to depression and positive but not significant effects related to anxiety (Larun et al., 2006). However, the 16 available trials were of low methodological quality. A clear relationship between physical fitness and exercise and the prevention of MEB disorders in children is even less well documented. Given the clear relationship between exercise and stress, however, both general and medical education for children and their families should include discussion of appropriate exercise and advocacy for overall family fitness.

Television Viewing

Extended television viewing has been linked to the occurrence of ADHD (Christakos, 2004) and limiting television time for children as a preventive measure has received increasing attention. The American Academy of Pediatrics recommends no television viewing for children under 2 years of age and no more than two hours a day thereafter. Exposure of children to violence through television and other media has been linked to conduct problems in children and adolescents (Bushman and Huesmann, 2006; Huesmann, Moise-Titus et al., 2003). Attempts to reduce exposure of children to violence have had very little effect on the content of entertainment programming, and management of this risk falls largely to in-home restriction.

Sunlight

Exposure to adequate sunlight and light in general may affect mental health. Vitamin D deficiency can occur because children today are outside for shorter periods of time and are often protected by sunscreen. Vitamin D may have effects not only on bone mineralization, but also on immunity to infectious agents. Vitamin D plays an important role as well in brain development and function. Subtle effects of vitamin D deficiency on behavior have been suggested, but a causal relationship has not been firmly established (McCann and Ames, 2008). Whether prevention of vitamin D deficiency truly contributes to mental health in childhood deserves further study. Furthermore, limited exposure to light is related, in some individuals, to the occurrence of seasonal affective disorder. More brightly lit classrooms are associated with fewer classroom problems for children with ADHD (Pediatric Clinics of North America, 2007).

CONCLUSIONS AND RECOMMENDATIONS: CHAPTERS 6 AND 7

This and the preceding chapter have documented substantial progress since the 1994 IOM report in approaches to prevention in multiple developmental stages. The strength of evidence related to prevention of symptoms and incidence of externalizing disorders and problem behaviors has significantly increased, particularly through school-based interventions. There is emerging evidence that preventive interventions not only can reduce symptomatology, but also can reduce the number of new cases of depression. And there is promising evidence of the potential to intervene in the lives of young people in the early stage of schizophrenia, prior to full-blown disorder.

Many programs that have been tested in multiple randomized controlled trials demonstrate efficacy, and an increasing number have dem-

onstrated effectiveness in real-world environments. Increasing numbers of programs are culturally adapted and, while still relatively limited, some have been tested with multiple racial, ethnic, or cultural groups. It is no longer accurate to argue that emotional and behavioral problems cannot be prevented or that there is no evidence for the prevention of MEB disorders experienced during childhood, adolescence, and early adulthood.

Conclusion: Substantial progress has been realized since 1994 in demonstrating that evidence-based interventions that target risk and protective factors at various stages of development can prevent many problem behaviors and cases of MEB disorders.

Interventions variously target strengthening families by modifying discipline practices or parenting style, strengthening individuals by increasing resilience and modifying cognitive processes and behaviors of young people themselves; or strengthening institutions, such as schools, that work with young people by modifying their structure or management processes. Parenting and family-based interventions have demonstrated positive effects on reducing risk for specific externalizing disorders, for multiple problem outcomes in adolescence, for reducing prevalence of diagnosed mental disorders, and for reducing parenting and family risk factors.

Conclusion: Interventions that strengthen families, individuals, schools, and other community organizations and structures have been shown to reduce MEB disorders and related problems. Family and early childhood interventions appear to be associated with the strongest evidence at this time.

Interventions based in schools have demonstrated positive effects on violence, aggressive behavior, and substance use and abuse. Emerging evidence has indicated the potential for a positive impact of some of these interventions on academic outcomes. Communities have a role in supporting preventive interventions and in developing responses that address community needs and build on community needs.

Conclusion: Community-based organizations, particularly schools and health care providers, can help prevent the development of MEB disorders and related problems.

Although an increasing number of interventions have shown positive results related to reductions in the incidence or prevalence of disorders, most measure highly relevant risk and protective factors but do not measure disorders per se.

Conclusion: Preventive interventions can affect risk and protective factors strongly associated with MEB disorders. Future research must determine the full impact of these interventions on MEB disorders.

Preventive interventions have increasingly demonstrated positive effects on multiple outcomes, but the range of outcomes assessed is also limited. The same type of intervention may demonstrate positive effects on different outcomes, given the limited nature of the outcomes assessed. Similarly, although academic outcomes are likely to be important to schools considering adoption of preventive interventions, because there is some indication of positive effects on academic achievement, this has been assessed in only a few studies. Inclusion of a broader range of outcomes could help in the identification of potential iatrogenic effects that can meaningfully inform the development of future interventions.

Recommendation 7-1: Prevention researchers should broaden the range of outcomes included in evaluations of prevention programs and policies to include relevant MEB disorders and related problems, as well as common positive outcomes, such as accomplishment of age-appropriate developmental tasks (e.g., school, social, and work outcomes). They should also adequately explore and report on potential iatrogenic effects.

Although there are now multiple, well-tested interventions, the effect sizes for most interventions are small to modest. Similarly, though several studies have now demonstrated results with strong empirical designs and statistical techniques, meta-analyses consistently highlight the methodological weaknesses of many studies. As discussed in Chapter 10, this is not because of a lack of appropriate methodological techniques. There is a convergence among both meta-analyses and individual studies suggesting that interventions are more effective for participants with elevated risk, including for participants in many universal interventions. However, most interventions have been tested with a single cultural group, and few have been tested in community-wide interventions that reach large numbers of at-risk youth. Continued rigorous research is needed to improve the reach of current interventions and to expand interventions that are culturally relevant and responsive to community priorities (see Chapter 11).

Conclusion: Although evidence-based interventions are now available for broad implementation in some communities, there is a need to increase the effectiveness of prevention programs and to develop interventions that reach a larger portion of at-risk populations.

Recommendation 7-2: Research funders should strongly support research to improve the effectiveness of current interventions and the creation of new, more effective interventions with the goal of wide-scale implementation of these interventions.

Mass media and the Internet present a potential opportunity to reach large numbers of young people with readily disseminable interventions. Although the currently available evidence does not support particular interventions, this is an area that warrants additional research. Mass media also offers the potential to address concerns related to stigma that serve as a barrier to prevention.

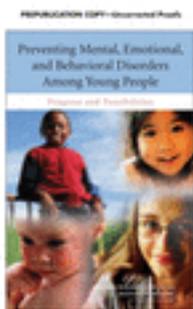
Recommendation 7-3: Research funders should support research on the effectiveness of mass media and Internet interventions, including approaches to reduce stigma.

Although the research base of preventive interventions has expanded significantly, there are several groups or settings that have not been represented in this expansion. With the exception of college populations, very little research has been done related to young adulthood. Adolescence is also less well represented than earlier developmental periods. In addition, there has been limited research following young people across developmental stages. Although there is converging evidence that approaches that combine multiple interventions, such as family and school interventions, have greater effects, this is a relatively new area of inquiry.

Recommendation 7-4: Research funders should fund efforts to address significant gaps, such as preventive interventions with adolescents and young adults, with certain high-risk groups (e.g., children with chronic diseases, children in foster care) and in primary care settings; interventions to address poverty; approaches that combine interventions at multiple developmental phases; and approaches that integrate individual, family, school, and community-level interventions.

In addition, as discussed in the chapters that follow, achieving the widespread benefits of evidence-based preventive interventions will also require further research on how to train those who implement interventions, how to influence organizations to adopt evidence-based interventions and to implement them with fidelity, and establishing an infrastructure with the capacity to implement and evaluate proven approaches. These problems might seem to be political and beyond the purview of public health and the behavioral sciences. However, policy decisions and the public support needed to influence those decisions are matters of human behavior. Just as a

behavior like cigarette smoking is seen as something to change because it is a risk factor for cancer and heart disease, the lack of public understanding and support for prevention can be seen as a risk factor for societal failure to prevent problem development in childhood and adolescence. Research on how to generate public support for the implementation of evidence-based practices is a next logical step in the centuries-long struggle of the public health community to improve human well-being.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

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ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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8

Screening for Prevention

Broadly defined, prevention screening is a two-part process that first identifies risk factors or early phenotypic features (behaviors, biomarkers) whose presence in individuals makes the development of psychological or behavioral problems more likely, and then segments the relevant subset of the population to receive a unique preventive intervention. As outlined in Figure 8-1, screening can be carried out at the community level, focused on population-based risks (for universal prevention efforts, e.g., training of clerks to check for underage alcohol sales); at group or individual levels (for selective prevention efforts, e.g., screening for the risk factor, maternal depression, when children receive care in the emergency room); or at individuals based on their unique behaviors or biomarkers that may be prodromal features of mental, emotional, and behavioral (MEB) disorders (for indicated prevention efforts, e.g., screening for risk factors when a child's grades in school fall unexpectedly). Screening for community-level and group- or individual-level risks is based on identification of risk exposures. Indicated prevention requires screening for individual characteristics.

There is a long list of possible community-level exposures that represent risks. Examples include poverty, violence and other neighborhood stressors, lack of safe schools, and lack of access to health care. High-risk exposures for subsets of the population include maternal depression, separation of parents as a result of divorce or a death of one of the parents, physical or sexual maltreatment, any events that lead to placement of a child in foster care, and catastrophic events, such as suicide of a classmate. Individual characteristics are also numerous and can include behaviors or

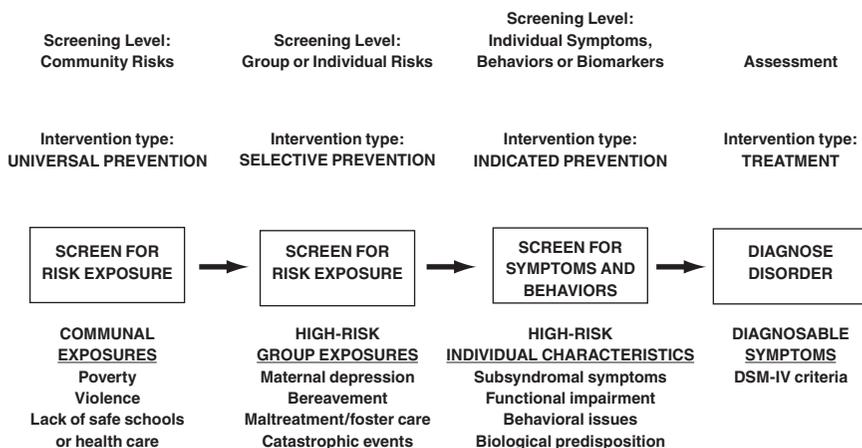


FIGURE 8-1 Schema of opportunities for screening and prevention.

symptoms that do not yet qualify for a *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* (DSM-IV) diagnosis; chronic disease and other functional impairments, such as neurodevelopmental disabilities; and genetic, environmental exposure, or other biological predisposing factors (see also Chapter 4). Screening at any of these levels will identify youth, individually or collectively, who should be candidates for preventive interventions, assessment, and (if indicated) specific treatment.

Screening should be easily and quickly performed, affordable, and reasonably accurate as a detection tool. There are a number of screening measures and approaches related to MEB disorders that meet these criteria (Stancin, 1997). However, for a number of reasons discussed in this chapter, screening for risks and behaviors or biomarkers associated with a higher likelihood of future MEB disorders has not been widely adopted. The idea of screening for risk factors is considerably different than screening for specific disorders, as is carried out in newborn screening for metabolic disorders that need immediate treatment, such as phenylketonuria. Nevertheless, identification of elevated risks can guide public investments and mobilize communities to pursue needed resources to reduce these risks. While individual risks and behaviors or biomarkers can be identified and receive attention through such settings as primary health care and the school system, there are few specifically identified systems for screening and follow-up at the community or group risk levels. One exception is the Communities That Care approach (see Chapter 11), which has a protocol for helping communities profile their community-level risk and protective factors to aid in selecting an intervention or interventions for implementation.

This chapter outlines criteria for assessing the applicability of screening for selective and indicated preventive interventions, building on criteria published by the World Health Organization (WHO). It also addresses issues related to each of the three levels of screening—community, group, and individual. The chapter closes with conclusions and recommendations on where the field should move to further consider screening in the context of prevention. Although screening approaches have been used in a research context to identify potential participants in indicated preventive interventions, the focus here is on prevention in real-world environments.

CRITERIA FOR SELECTIVE AND INDICATED PREVENTION SCREENING

Fifty years ago, the World Health Organization established guidelines to use in determining the public health applicability of screening (Wilson and Jungner, 1968). The 10 basic principles, in various forms, are used today to assess applicability of biomarkers or other diagnostic information for presymptomatic detection of serious disorders. However, the WHO criteria were developed from the perspective of early detection of disease, with the goal of providing treatment before the disorder becomes symptomatic.

For prevention, one of the goals of screening should be to identify communities, groups, or individuals exposed to risks or experiencing early symptoms that increase the potential that they will have negative emotional or behavioral outcomes and take action prior to there being a diagnosable disorder. Successful screening and preventive interventions can reduce diagnosable disorders that require treatment. Thus, considering screening in the context of prevention requires a shift in thinking and adaptation of some of the WHO criteria. For example, mental health screening targets both risk factors and early behaviors or biomarkers that predict MEB disorders. Table 8-1 presents a revised set of criteria that are likely to lead to successful prevention through screening at the individual level. We discuss below the extent to which the amended criteria are met.

1. The MEB disorders to be prevented through identification of this risk factor should be a serious threat to mental health or increase the likelihood of substance abuse or delinquent or violent behavior. MEB disorders among young people result in significant personal and family suffering and substantial societal costs associated with service use and lost productivity (see Chapter 9). Available data on the prevalence of MEB disorders suggest that one in five or six young people is currently experiencing a significant disorder (see Chapter 2), and there are strong links between childhood and adolescent risk factors and specific MEB disorders. For example, parental depression greatly increases the likelihood of a child's being depressed;

TABLE 8-1 Adaptation of World Health Organization Criteria to Prevention

World Health Organization Criteria	Adaptation for Selective and Indicated Prevention
The condition should be an important health problem.	The MEB disorders to be prevented through identification of this risk factor should be a serious threat to mental health, or increase the likelihood of substance abuse or delinquent or violent behavior.
The natural history of the disease should be adequately understood.	The antecedent history of the disorder and its developmental link to target risk factors should be adequately described.
There should be a treatment for the condition.	There should be an effective intervention to address the identified risks or early symptoms and signs of the MEB disorder. Early preventive intervention should lead to better outcomes than a treatment after onset.
Facilities for diagnosis and treatment should be available.	Facilities or settings for screening and intervention should be available.
There should be a latent stage of the disease.	There should be identifiable risk or protective factors or a latent stage of the disorder to be addressed by prevention.
There should be a test or examination for the condition.	There should be validated screening tools or interview techniques to identify risks or early symptoms. Tools should have acceptable accuracy when compared with formal assessments.
The test should be acceptable to the population.	Screening approaches and guidelines should be acceptable to the population and not cause labeling.
There should be an agreed policy on whom to treat.	There should be agreed-on guidelines for whom to refer for assessment, prevention services, or treatment.
The total cost of finding a case should be economically balanced in relation to medical expenditure as a whole.	The cost of finding a case should be affordable, cost-effective, and reimbursable.
Case-finding should be a continuous process, not just a “once and for all” project.	Screening can be population-based or targeted to at-risk groups or individuals. It should be longitudinally implemented, as risks and early signs or markers of MEB disorders may develop over time.

similarly, the risk of schizophrenia or other major mental disorders is much higher among those with parents or siblings who have the disorder (see Chapter 4).

2. The antecedent history of the disorder and its developmental link to target risk factors should be adequately described. Although the origins of most MEB disorders and problems are still incompletely understood, the temporal relationship between early behavioral phenotypes and DSM-IV diagnosable conditions has been documented extensively. There are valuable models of how antecedent risk factors relate to the onset of these disorders. The taxonomy of these disorders, although less precise than physical disorders, has also been standardized using DSM criteria. Perhaps most importantly for this discussion, many risk factors for MEB disorders are measurable with scientifically verified assessment tools, facilitating the linkage of their recognition to the onset of later MEB disorder outcomes. While protective factors are less thoroughly documented than are risk factors, they can be recognized in some cases and associated with mental health outcomes.

3. There should be an effective intervention to address the identified risks or early symptoms and signs of the MEB disorder. Early preventive intervention should lead to better outcomes than treatment after onset. We note first that there are treatments available for most mental, emotional, and behavioral disorders. However, the effectiveness of these treatments is highly variable. However, if these disorders can be prevented or delayed, a much larger benefit can be obtained than through early treatment. Parental concern about young children's behavior is a strong risk factor for later emergence of MEB disorders meeting DSM-IV criteria (Perrin and Stancin, 2002). There is some evidence that reduction of risk or presymptomatic intervention prevents, delays, or modifies disorder symptoms. As discussed in Chapter 7, recognition of the risk for depression has led to interventions that reduce the incidence of the full-blown disorder. Interventions for families struggling with divorce have been protective for downstream MEB disorders in the children (see Box 6-9). School or community-wide interventions following a catastrophic event appear to reduce the occurrence of posttraumatic stress disorder (PTSD) in young people (Layne, Saltzman et al., 2008). Many more such examples could be cited and undoubtedly will surface in the future. The ability to screen for adverse events or conditions has led to effective early interventions in several but not all situations.

Prodromal identification of behaviors or biomarkers for schizophrenia could provide an intervention advantage; studies are suggestive but not yet conclusive that this screening improves clinical outcomes (see Chapter 7). Abused and neglected children are more likely to be abusive and neglectful

when they become parents (an intergenerational risk factor) (Noll, Trickett et al., 2008). It is potentially important to recognize, but there are limited studies that document effectiveness of a specific intervention for children or adolescents known to be abused that reduces their abusive behaviors as they mature. The rationale for screening is strong; however, a robust evidence base must be assembled to demonstrate where investment in broad screening efforts is effective and cost-efficient. In particular, studies should address identification of types of risks that can lead to mobilization of community resources to address risk.

For some disorders, effective prevention strategies are available. Before implementing an individual screening strategy, it would be important to compare its impact with that of a universal strategy. For the prevention of conduct disorder, youth can be identified through screening of teachers and parents for those exhibiting aggressive behavior (Perrin and Stancin, 2002). A number of individual-level interventions are available, ranging from behavioral reinforcement with a mental health professional to long-term intervention, as used in the Fast Track program (Box 6-14). Alternatively, universal preventive interventions have been shown to have lasting impact on those with the highest levels of aggressive behavior early on (Kellam, Brown et al., 2008), and they do not encounter the kinds of stigma or labeling that occurs from individual-level interventions. Where multiple levels of preventive intervention are available, universal interventions may serve as an informal screening mechanism, with those who do not respond to the intervention being identified for more targeted approaches based on elevated risk.

We note that screening should target not only young people, but also their extended family members and caretakers as well as peers and community environments, including norms and policies, for example, around substance use. Home visitation has been one useful strategy for screening of relevant figures and experiences in a child's life. For example, postpartum depression was detected in more than 40 percent of socioeconomically disadvantaged mothers by home visitation (Stevens, Ammerman et al., 2002). Situational stresses, such as death of a parent, affect all family members (Melhem et al., 2008). Screening for parental mental disorders, such as depression, PTSD, domestic violence, and substance use, is key to designing interventions to reduce children's risk and has been recommended for primary care (Whitaker, 2006) as well as emergency room (Grupp-Phelan, Wade et al., 2007) settings. Preventing behavior problems in young children requires family-oriented strategies that address the needs of both parents and their children.

4. Facilities or settings for screening and intervention should be available. Screening for risks or for precursors of MEB disorders is not limited

by the availability of screening settings. Three settings appear to have particular advantages: primary medical care, schools, and preschools or day care. However, neither has become a site for the routine screening of children.

Primary care: A number of screening tools have been proposed for use in the medical office (Perrin and Stancin, 2002). One of the best indicators of risk for emergence of MEB disorders in the future is the presence of parental or caretaker concern about a particular child's behavior. The office visit can screen for risk by routinely inquiring about parental concern. Computerized screening has demonstrated enhanced recognition of behavioral problems in the office setting (Stevens, Kelleher et al., 2008). There are several barriers to widespread adoption of medical office screening for risks or behavioral indicators of future MEB disorder (Perrin and Stanair, 2002). First, most physicians, including pediatricians and their office staff, have not been trained to include screening in their routine well child or sick child visits (see Chapter 12). Second, good systems frequently are not in place to further assess children who are identified as being at risk. Many pediatric or family medicine offices are neither prepared to take necessary steps, nor are they linked to behavioral care capabilities (psychiatry, psychology, social work expertise) for follow-up of the screening outcomes. Third, in most medical office settings, neither public nor private payers will reimburse for behavioral screening. Early and Periodic Screening, Diagnostic, and Treatment (EPSDT), a Medicaid program, has been used largely to promote developmental screening. For a number of reasons, the intent of the program to include behavioral screening has not been fully realized; the EPSDT screening tools in nearly half the states do not address behavioral health issues at all (Semansky, Koyanagi, and Vandivort-Warren, 2003). States use a variety of tools with variable coverage of mental health and substance abuse issues (Judge, undated). The state of Massachusetts, as the result of a court decision, has mandated behavioral screening for all children enrolled in Medicaid at each physician visit, starting in January 2008. Physicians' practices are reimbursed \$12 for each screening session, so compensation is not a barrier. The effectiveness of the screening and outcomes of children at risk in this program are as yet unmeasured.

Assuring Better Children's Health and Development (ABCD) is a program funded by the Commonwealth Fund and administered by the National Academy of State Health Policy (NASHP). It has created two state health consortia, the second of which (ABCD II) employs standardized, validated screening tools to assess the mental development of young children and to provide follow-up services for those at risk. The successes of this program provide encouragement that the primary medical care setting can effectively identify children who can benefit from early attention (see Box 8-1). Initial lessons from implementation of this program in Iowa have been made avail-

BOX 8-1
Assuring Better Child Health and Development Initiative

The Assuring Better Child Health and Development (ABCD) Initiative is a program funded by the Commonwealth Fund and administered by the National Academy for State Health Policy. It is designed to strengthen the capacity of states to deliver early child development services to low-income children and their families through their Medicaid programs. Two state consortia were formed under the ABCD program. The first, ABCD I, created in 2000, provided grants to four states (North Carolina, Utah, Vermont, and Washington) to develop or expand service delivery and financing strategies aimed at enhancing healthy child development, including efforts to strengthen developmental screening, surveillance, and assessment efforts. The second, ABCD II, formed in 2004, is aimed at strengthening primary health care services and systems that support the healthy mental development of young children from birth to age 3 in five states (California, Iowa, Illinois, Minnesota, and Utah). The initiative was carried out primarily through a small number of pilot programs in clinical practice settings. Many of the states also included an effort to identify and address systematic policy barriers, including clarifying or amending state Medicaid policies.

In an effort to improve the identification of children at risk for or with social or emotional development delays, the ABCD II consortium states each identified standardized, validated screening tools and encouraged pediatric primary care providers to use them as a routine part of their regular delivery of care. Each state sought tools that would accurately identify children who may need behavioral developmental care and follow-up services, be inexpensive and rapid to administer, and provide information that could lead to action. The final selections included the Ages and States Questionnaire[®] (ASQ), the Ages and Stages Questionnaire[®]: Social-Emotional (ASQ:SE), the Brief Infant-Toddler Social and Emotional Assessment (BITSEA), the Child Development Review, the Infant Development Inventory, the Parents' Evaluation of Developmental Status (PEDS), and the Temperament and Atypical Behavior Scale (TABS). Most are designed to elicit information from

able (Silow-Carroll, 2008), but evaluation of the program is still in progress. Other efforts to screen for MEB disorders in the primary care setting include (1) routinely questioning adolescents about symptoms suggesting depression (ACGME, Adolescent Medicine Training Program Requirements), (2) surveillance (ongoing observation) and screening young children for behaviors suggestive of autism (Johnson, Myers, and the American Academy of Pediatrics Council on Children with Disabilities, 2007), and (3) screening for suicidal ideation (Institute of Medicine, 2002). All of these efforts span the boundary between screening for risk or early indicators and diagnostic efforts. Nevertheless, they offer the potential to intervene early and, in some cases, to prevent fully developed MEB disorders.

parents rather than through clinician observation, requiring minimal staff time to administer. Clinicians felt these tools also helped parents learn about child development, identify concerns, and organize questions prior to an appointment.

ABCD II found that to ensure young children's healthy mental development and to successfully change provider practices, it was necessary not only to improve screening of young children for potential social and emotional development problems but also to help families and clinicians access resources for appropriate follow-up services. Thus, the states also undertook efforts to identify existing resources for assessment and treatment, remove policy barriers to accessing those services, and facilitate referrals. All five ABCD II states were able to increase screening in selected practices, and most states also increased the percentage of children referred for services, including assessment, secondary developmental surveillance, child psychologist evaluation, rehabilitation, early intervention, and school services. There was no consistent measurement of follow-up services received after referral, and child outcomes as a result of screening and referral were not assessed. The states also initiated policy changes that improved program coverage, reimbursement, and system performance; worked with physician practices to test and spread practice innovations; and relied on key partnerships with other state agencies and provider organizations.

Building on this work as well as other advances in the field, the ABCD Screening Academy was established in 2007. It provides technical assistance to help implement practices and policies designed to increase the use of developmental screening tools as part of the standard practice of well-child care delivered by primary care providers.

SOURCES: Pelletier and Abrams, 2003; Kaye, May, and Abrams, 2006; Kaye and Rosenthal, 2008.

Schools: Universal screening to identify students at risk for school failure or psychological or behavioral problems is increasingly recognized as an important professional practice (Burns and Hoagwood, 2002; Glover and Albers, 2007; Levitt et al., 2007). For example, both the President's Commission on Excellence in Special Education and the National No Child Left Behind Act of 2001 (see U.S. Office of Special Education Programs and NCLB, U.S. Department of Education) have strongly endorsed this approach. In its current 2004 reauthorization, up to 15 percent of the funds available through the Individuals with Disabilities Education Act (IDEA) can be used for early screening, intervention, and prevention to reduce referrals to special education and related services. In a 2002 report on minority and gifted

students in special education, the National Research Council recommended that states adopt a universal screening and multitiered intervention strategy in addressing the needs of these school populations, in part to provide services before special education services are needed (see NRC, 2002). Finally, the U.S. Public Health Service (2000) recommended that early indicators of mental health problems be identified in existing preschool, child care, education, health, welfare, juvenile justice, and substance abuse treatment systems.

School-based screening also has its opponents. Among the objections raised are (1) teachers' concern that their discretion will be reduced (Elliott, Huai and Roach, 2007); (2) the extra work involved (Levitt et al., 2007); (3) potential stigmatization of students who are identified (Levitt et al., 2007); (4) questions about the validity of discrepant rates of disorders related to gender, race/ethnicity, and economic status (Barbarin, 2007); and (5) related parental concerns about labeling and consent.

Thus, universal screening procedures, especially those involving multiple stages, must be brief, technically adequate, valid across racial, ethnic, and socioeconomic groups, and produce valued outcomes in order to be acceptable in educational environments. Moreover, they should be accompanied by appropriate safeguards to address and obviate concerns. For example, parents should be contacted in advance whenever such screening initiatives are being planned and provided with transparent and detailed information about their purpose and methods and how results will be used. The wishes of parents who object to their child's inclusion in such efforts should be respected. The goals and design of these initiatives should be targeted to relatively narrow and specific purposes, for example, (1) improving school success for struggling students, (2) preventing bullying and student harassment, (3) improving teacher and peer relationships, (4) increasing school safety and security, or (5) learning to regulate and control behavior.

The ultimate justification for school-based screening is that it can contribute to preventing the development of psychological and behavioral problems, which interfere with school performance. There is evidence that screening can identify young people who are at risk for the development of these problems.

For example the Systematic Screening for Behavior Disorders (SSBS) program is a validated, universal screening system to identify school-related externalizing or internalizing behavior problems for students of elementary school age (Walker and Severson, 1990). It consists of three integrated screening stages: teacher nominations of students with internalizing and externalizing problems, teacher ratings of the three highest children on each list, and direct observation of students whose scores on the teacher ratings exceed normative cutoffs.

SSBD has a national normative base of over 4,400 cases representing schools in 8 states distributed across the United States. The two behavioral

observation codes in Stage 3 were normed on 1,300 cases drawn from these same participating schools. Elliott and Busse (2004) reported that SSBD reliably differentiated students having and not having behavioral disorders.

Walker et al. (in press) reported a randomized control trial in which SSBD was used to identify the 2 percent of primary grade children who were most aggressive. They identified 200 students (70 percent of whom were Hispanic) in two cohorts and provided an evidence-based intervention involving both parenting skills training and a classroom intervention. The intervention resulted in significant improvements in symptoms, function, and academic domains.

Preschool and Day Care: A large proportion of children in the United States regularly attend day care, nursery school, or an alternative out-of-the-home setting prior to age 5. Identification of risk or early indicators of mental, emotional, or behavioral disorders in these settings provides for early detection and the opportunity for preventive interventions. A significant number of children arrive in kindergarten without the self-regulatory skills to function productively in the classroom (Rimm-Kaufman, Pianta, and Cox, 2000) or are expelled from preschool due to behavioral issues (Gilliam, 2005; Gilliam and Shahar, 2006). Although Head Start has adopted standards mandating mental health assessment and intervention for socioemotional problems of enrolled children (Head Start Quality Research Consortium, 2003), it is unclear if it has been fully implemented. Although numerous screening tools are available, there is no single, widely accepted easy-to-use instrument. Barbarin (2007) recently developed a simple tool aimed at identifying children at risk of early onset socioemotional difficulties designed to address barriers to screening in the preschool context. There are promising indications that mental health consultation in preschool settings can improve behavioral outcomes (Perry, Dunne et al., 2008). McDermott and colleagues (2008) found that screening children ages 2-4 with a standardized questionnaire for irregular eating patterns identified those more likely to have behavioral problems. Children with a chronic illness in the preschool setting are at risk for depressive symptoms and impairment in several social domains (Curtis and Luby, 2008). However, broad implementation of screening for mental, emotional, and behavioral issues linked with prevention programs has not occurred. Reimbursement, the availability of trained staff, and the ability to provide follow-up services impede screening in this setting as well. Federal agencies and knowledgeable professional organizations should address this opportunity singly but, more importantly, in a partnership mode.

Community: Communities and neighborhoods can respond to the emotional and behavioral needs of their youth, aided by information about community-level risks and the prevalence of specific problems and dis-

orders. Mechanisms are available for community self-assessment, for example, Healthy Cities/Healthy Communities, and Communities That Care programs. Survey and administrative data will be needed to allow communities to move forward on this front, in particular to identify individuals and groups within the community who are most in need of intervention and support. Successful strategies will include partnerships among schools, primary care settings, the mental health professions, community agencies, and local government.

Community-based programs, such as home visitation, have incorporated behavioral screening into their interventions (Olds, Memphis Study). The Ages and Stages Questionnaire-SE, which can be used for children ages 6 months to 5 years, has been adopted by several home visiting programs. The Child Behavior Check List and the Infant Toddler Social-Emotional Assessment have also been used for home-based screening by visitors.

5. There should be identifiable risk or protective factors or a latent stage of the disorder to be addressed by prevention. Chapter 4 summarized published work on identification and application of knowledge concerning risk and protective factors for MEB disorders. The literature is now replete with results of randomized controlled studies that support the contention that interventions directed to these factors, whether at the community, family, school, or individual level, result in some level of protection against the emergence of MEB disorders. Many disorders display prodromal symptoms well in advance of diagnosable conditions.

6. There should be validated screening tools or interview techniques to identify risks or early symptoms. Clinical judgment in medical care identifies fewer than 50 percent of children who have serious emotional and behavioral disturbances (Glascoe, 2008). This percentage is likely to be smaller for identification of risk factors or early behavioral problems.

Numerous tools and procedures are available that can be used to systematically screen for individual mental, emotional, and behavioral risks or early behavioral symptoms in such settings as primary medical care (Box 8-1; Perrin and Stancin, 2002; Kemper and Kelleher, 1996), emergency rooms (Grupp-Phelan et al., 2003), schools (Barbarin, 2007; Asetline and DeMartiono, 2004; Walker and Severson, 1990), and colleges (McCabe, 2008). Tools are available to screen for a variety of risks, including purging in young adolescent girls (Field et al., 2008), trauma (Cohen, Kelleher and Mannarino, 2008), maternal depression (Grupp-Phelan et al., 2003), suicide (Asetline and DeMartino, 2004), and drug abuse (McCabe, 2008), to name a few. The large number of tools available reflects the spectrum of problems and developmental stages to be screened, as well as perhaps the lack of standardization of approaches in this field.

The sensitivity (the ability to accurately identify individuals at risk) and specificity (the ability to accurately identify those not at risk) of available screening tools are important considerations (Meisels and Atkins-Burnett, 2005; Glascoe, 2008). On one hand, a high false-positive rate compounds the problem of stigmatization of potentially healthy children. On the other hand, an excessive false-negative rate will preclude many children in need from being identified and getting the early intervention services needed to keep them healthy. Most of the instruments reviewed have sensitivities and specificities in the 70-90 percent range, which is acceptable for screening. Positive and negative predictive values (the probability of disease among those with a positive test and the probability of no disease among those with a negative test, respectively) are usually not reported in these analyses. The committee did not systematically review the evidence related to all screening tools but was struck by the breadth of available tools.

Adaptation of screening tools for specific ethnic/cultural groups may be required. Psychometric properties are not always demonstrated for these groups (Pignone, 2002). Children from culturally or linguistically distinct backgrounds may respond differently than majority youth not only to the screening instrument, but also to the screening process itself (Snowden and Yamada, 2005). In addition, behaviors and emotions that tools identify as dysfunctional may be adaptive in the sociocultural and physical environments of some ethnic minority children and families (Canino and Spurlock, 1994; Dubrow and Garbarino, 1989). Although race and ethnicity are often confounded with socioeconomic status, and socioeconomic status is the stronger predictor of MEB disorders, efforts to increase the cultural relevance, including the linguistic acceptability, of screening tools warrant attention.

7. Screening guidelines should be acceptable to the population and not result in labeling. Historically, the U.S. public has favored the opportunity to gain knowledge of potentially adverse medical situations or outcomes so that action can be taken to avoid the consequences. For example, all states have newborn screening programs in place, many of which test for 20, 30, or even more serious disorders. However, circumstances related to prevention of MEB disorders may frame this point of view differently. Some people do not want to acknowledge or think about mental illness. When screening results have the potential to adversely label or stigmatize young people, whether healthy or dysfunctional, even if there is a small chance that this may occur, some families are reluctant to allow their children to participate in screening efforts.

Males with a genotype resulting in low MAOA activity who are maltreated in childhood have a strong chance (85 percent) of developing anti-social behavior (Caspi et al. 2002). Screening early in life with genetic

testing would appear to be advantageous in that preventive interventions are available that focus on cultivating strong family systems. However, screening could be stigmatizing for black males, who are frequently stereotyped and more likely to be harshly punished compared with their counterparts (Surgeon General, 2001). There has been public and organized opposition to screening programs, such as Teen Screen,¹ a national mental health and suicide risk screening program (Lenzer, 2004). This dilemma represents a barrier for screening programs for MEB disorders.

Stigma has been recognized as a barrier to screening and mental health services in many settings, including schools. The President's New Freedom Commission called for a national campaign to reduce the stigma of seeking mental health care and the delivery of universal preventive interventions, especially in schools (Mills, Stephan et al., 2006). Stigma has been characterized as public, self, and label avoidance. General approaches to changing stigma include protest, education, and exposure (public) as well as fostering group identity, cognitive rehabilitation, and disclosure for self-stigma and label avoidance (Carrigan and Wassel, 2008). Positive Attitudes Toward Learning in Schools (PALS) is one organized effort to reduce stigma that emphasizes families as partners with schools and the use of community consultants (Atkins, Graczyk et al., 2003; Atkins, 2006). Other approaches have embraced the term "mental health" as a positive concept in their communication with the public in an attempt to avoid stigma.

Several states have adopted antistigma programs, including advertisements (New Mexico) and a Youth Speakers Bureau (Ohio). The magnitude of the impact of stigma and antistigma efforts on prevention programs for MEB disorders remains to be determined. A survey of adult attitudes of children's mental health problems found that among adults able to differentiate depression and ADHD from "daily troubles," a significant percentage rejected the label of mental illness (13 and 19 percent for depression and ADHD, respectively) (Pescolido, Jensen et al. 2008). Existing stigma reduction efforts have not been widely supported, probably contributing to the persistence of this barrier. Routine screening for mental, emotional, and behavioral problems may help alleviate concerns about stigma and labeling.

Other ethical issues enter into screening considerations. Screening in the absence of available preventive or early treatment services is a formula for frustration and serves to heighten the potential for emotionally isolating the identified child. Accordingly, in the committee's view, screening is warranted if follow-up intervention is available and accessible that could protect against risk factors becoming predictive factors. If follow-up intervention is not available, the community will have to weigh other potential benefits, such as community awareness and the potential leveraging of

¹See <http://www.teenscreen.org>.

resources against the potential issues raised. The committee also concludes that in cases of individual or group-level screening, all families should be able to make an informed choice about the participation of their child in screening activities, including being provided information on the goals, methods, and intended use of collected information. Ensuring that families are fully informed, however, is an enormous task.

Screening as a pathway to better mental health will succeed only if all the attendant ethical issues are managed transparently. The most important element of screening programs going forward may be education of the public concerning the benefits of screening, including avoidance of risks and the importance of early interventions.

Public acceptance of screening for risks or early emotional and behavioral problems also becomes a factor in arranging for reimbursement of screening efforts. Costs of newborn screening are borne by the state as the result of legislation. This is not the case for screening related to mental, emotional, and behavioral health. A recent expert forum convened by the Substance Abuse and Mental Health Services Administration (SAMHSA) identified lack of reimbursement incentives for screening and preventive mental health services as one of seven primary mental health barriers (SAMHSA Expert Forum Meeting, 2007). Economic issues also play a role in decisions about school-based screening because of reimbursement constraints, tight budgets, and reduced staffing in many districts. The future of prevention screening rests in part on public policy decisions.

8. There should be agreed-on guidelines for whom to refer for assessment, prevention services, or treatment. Validated screening tools have cut points or thresholds for concern that would make a child eligible for preventive services or treatment. The first step, following a positive screen, should be the performance of a more detailed psychological assessment to verify the screening results and to determine the nature and the severity of the risk or emotional or behavioral problem. This may take the form of more extensive psychological testing or a psychiatric interview (Perrin, 2002). Too often, delay or lack of availability of psychological or psychiatric consultation becomes a barrier for timely assessment and creation of an action plan for the child or adolescent. Lack of training and failure of the health care reimbursement system to compensate primary care providers for behavioral care has been an impediment to expansion of an engaged workforce. Greater capacity for behavioral evaluation and care is an unaddressed need in the United States. Training and support for individuals and programs that provide behavioral care, whether in the health care, social service, or education system, is a high-priority need.

Another barrier is the nature of many of the risk factors, such as poverty, violence, and other neighborhood-related stressors. Modifying these

risk factors requires community action, which does not respond in a timely fashion to the needs of individual children. Interventions for population-wide risk factors often fall back on individually focused efforts that identify or build on protective factors, such as parental or other caregiver support in the home. Partnerships with schools can also address risk and protective factors from the individual or group perspective, for example, interventions for exposure to aggressive behaviors (Wilson and Lipsey, 2007).

9. The cost of finding a case should be affordable, cost-effective, and reimbursable. As suggested from the discussion above, screening in the primary health care system can be carried out and reimbursed, as demonstrated by the program for Medicaid children mandated by the courts in the state of Massachusetts. A study of the costs of both developmental and behavioral screening for preschool-age children in a general pediatric practice estimated a per member, per month cost of \$4 to \$7, depending on the screening objectives and methods (Dobrez et al., 2001). If effectiveness of screening for detecting and preventing cases of MEB disorders can be demonstrated, it is likely that screening in the primary health care setting will be cost-effective. Walker and colleagues (in press) report positive outcomes associated with use of a behavioral screening tool paired with family and classroom interventions. No data were found for the cost of screening in school systems. It appears that the biggest economic barrier is not cost, but arriving at societal decisions about who will pay for screening and what the mechanisms for reimbursement of the cost will be.

10. Screening can be population-based or targeted to at-risk groups or individuals. It should be longitudinally implemented, as risks and early signs or markers of evidence-based disorders may develop over time. Contrary to the experience with newborn screening for specific diseases, for which markers are not time-sensitive, risks and early signs or symptoms of MEB disorders may appear or be introduced over time. Therefore, screening for risk factors or the antecedents of these disorders is an ongoing process. The age at which screening should be initiated and the frequency with which it should be repeated have not been subjected to systematic study. These determinations will require judgments based on, among multiple factors, the environment in which youth are raised, the family structure, and direct observation or reports of the child or adolescent behavior. Furthermore, once an intervention to reduce risk is initiated, screening must continue to assess benefits, and the need for repeated screening imposes a burden, both in terms of workforce and economic demands, on present systems of surveillance. This dimension of screening for MEB disorders deserves additional consideration and analysis.

Screening Versus Assessment

Research has demonstrated that some groups of young people are at great risk for emotional or behavioral disorders because they have entered a service system, such as criminal justice or child welfare, or because of their particular life circumstances. Children in foster care, children of depressed or alcohol- or drug-dependent parents, incarcerated children, children with chronic health conditions, children exposed to trauma or violence, or run-away youth all are at heightened risk of emotional or behavioral disorders. In the foster care system, given the known elevated risk, all young people are typically screened or assessed for MEB disorders (Child Welfare League of America, 2007; Stahmer, Leslie et al., 2005).

CONCLUSIONS AND RECOMMENDATIONS

One of the criteria for assessing the applicability of screening is the availability of facilities to conduct the screening and provide an intervention. The vast majority of young people attend school, see a primary care physician, or both. These settings are likely to be viewed as less stigmatizing than other service environments.

Conclusion: Schools and primary care settings offer an important opportunity for screening to detect risks and early symptoms of mental, emotional, and behavioral problems among young people.

Multiple screening instruments are available for a variety of ages, settings, and behavioral risks. For many reasons, these instruments are not uniformly used. Schools and primary care settings may also be able to readily identify high-risk groups, such as children in divorced families or children in foster care.

Conclusion: A variety of screening instruments and approaches are available, but there is no consensus on the use of these instruments.

Although potential screening settings and tools are available, an overarching principle in determining the applicability of screening should be the availability of an intervention when a risk has been identified. Multiple approaches are available, but few have been tested in conjunction with screening in real-world environments.

Recommendation 8-1: Research funders should support a rigorous research agenda to develop and test community-based partnership models involving systems such as education (including preschool), pri-

mary care, and behavioral health to screen for risks and early MEB problems and assess implementation of evidence-based preventive responses to identified needs.

The effectiveness of screening in primary care and emergency departments could be improved if mental health and substance abuse professional organizations were to work with the various professional organizations, such as the American Academy of Pediatrics, the National Association of Pediatric Nurse Practitioners, and the emergency physicians groups, to develop a consensus on the best instruments for screening for specific behavioral health issues. Policy makers, providers, advocates, and researchers could then provide technical assistance to ensure the use of these tools and evaluate their impact on screening children for behavioral health issues (Semansky et al., 2003). Many of these screening tools are designed to elicit information from parents rather than through clinician observation, requiring minimal staff time to administer. Literacy and language competence must be addressed when using this approach.

Similarly, screening and preventive interventions are more likely to be acceptable and used in a community if members of the community, including parents, are involved in the design of these approaches (see also Chapter 11). Parental involvement in identification of risk, selection of screening tools, and development of follow-up protocols may help address concerns about stigma and labeling. Similarly, involvement by a range of community providers can help ensure that resources are targeted to identified community needs.

There is clear evidence that certain groups of young people face an increased likelihood of negative mental, emotional, and behavioral developmental outcomes. As a result, interventions aimed at assessing and treating these young people have been put in place. Opportunities also exist to provide preventive interventions for groups at known risk.

Conclusion: Some groups of young people, such as children in foster care, children in juvenile detention facilities, and children of depressed parents, are known to have a greatly elevated risk for MEB disorders. Targeted screening or in some cases full assessment of individuals in these groups to identify potential preventive services or treatment needs are warranted.

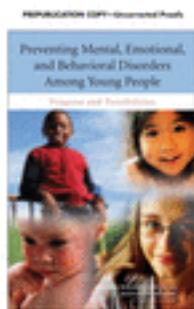
Identifying and addressing groups or communities with elevated risk can serve a preventive function complementary to identification of individuals at risk. This screening level uses public health principles and may be particularly cost effective.

Conclusion: Screening for community- and group-level risk factors as well as individual-level screening for symptoms is an important public health function.

Community-level screening in the United States has largely been limited to communities assessing their own strengths and needs (e.g. Communities That Care; see Box 11-1) rather than using known risk factors to identify specific communities with elevated needs. For example, although there is substantial documentation that factors such as poverty place young people in communities with these characteristics at greater risk for negative emotional and behavioral outcomes, few programs have targeted resources to these communities to address community-level risks.

Recommendation 8-2: The U.S. Departments of Health and Human Services, Education, and Justice should develop strategies to identify communities with significant community-level risk factors and target resources to these communities for universal interventions.

Although this would be a novel approach in the United States, there are models available from the United Kingdom that could guide these efforts. Since 2000, the United Kingdom has a system for identifying areas with high need for intervention using the Indices of Multiple Deprivation. The index is based on the idea that certain areas can be characterized as deprived on the basis of the proportion of people in the area experiencing various manifestations of deprivation. The indices include seven domains: income deprivation; employment deprivation; health deprivation and disability; education, skills, and training deprivation; barriers to housing and services; living environment deprivation; and crime. These are measured using 38 indicators based on census and other publicly available data (Noble, McLennan et al., 2008). Areas identified with high levels of deprivation are targeted for additional local and national-level resources. In addition to permitting precise focus on areas with high multiple deprivations, this approach provides the ability to track change using the same criteria. The committee was not aware of any outcomes data on this approach, however.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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9

Benefits and Costs of Prevention¹

On an intuitive level, preventing mental, emotional, and behavioral (MEB) disorders among young people is one of the soundest investments a society could make. The benefits include higher productivity, lower treatment costs, less suffering and premature mortality, and more cohesive families—and, of course, happier, better adjusted, more successful young people. Given the evidence that feasible actions can be taken to achieve these benefits, the case for action is compelling. Emerging evidence that some of these interventions are also cost-effective makes the case even stronger.

In an analysis conducted for the committee, Eisenberg and Neighbors estimate that the annual costs of MEB disorders among young people totaled roughly \$247 billion in 2007 (see Box 9-1). Demonstrating the effectiveness of interventions is necessary to establish a scientific basis for prevention approaches aimed at avoiding these costs. As outlined in this report, there is reason for optimism about the ability to successfully intervene in the lives of young people and prevent many negative outcomes. However, decisions about how to invest limited public resources must consider the cost of delivering the service and demonstrate that the benefits that can be expected from an intervention—both those that can be readily valued in dollars (e.g., increased productivity, decreased treatment costs) and those that cannot (e.g., alleviation of pain and suffering of both

¹This chapter is based in part on a paper written for the committee by Daniel Eisenberg and Kamilah Neighbors in the Department of Health Management and Policy, School of Public Health, University of Michigan.

BOX 9-1
Methodology for Cost Estimates

1. Mental Health Service Costs

- a. Multiply Ringel and Sturm's 1998 estimate of \$11.7 billion by $(73.7 + 29.45)/73.7$ to expand age group to include 18-24 (they only included 0-17).
- b. Multiply by 2 to account for fact that their estimates do not account for full range of settings, as suggested by Costello et al. (2007).
- c. Inflate to 2007 dollars (multiply by 1.28), based on the Bureau of Labor Statistics' consumer price index (see <http://www.bls.gov/cpi/>).
- d. Multiply by population growth between 1998 and 2007 for people under age 25 (1.07) = \$45 billion.

2. Health, Productivity, and Crime Costs

- a. **Mental disorders:** multiply share of mental health and substance abuse-related DALYs incurred by 0-24 age group (0.355), times National Institute of Mental Health (2000) estimate (\$102 billion for 1995—\$185 billion less the portion of total costs attributable to health care since counted in part 1), times inflation adjustment from 1995 to 2007 dollars (1.37), times population growth between 1995 and 2007 for people under 25 years old (1.07) = \$54 billion.
- b. **Drug abuse:** multiply share of mental health and substance abuse-related DALYs incurred by 0-24 age group (0.355), times Office of National Drug Control Policy (2004) estimate (\$165.1 billion for 2002—\$180.9 billion less the \$15.8 billion in health care costs since counted in part 1), times inflation adjustment from 2002 to 2007 dollars (1.15), times population growth between 2002 and 2007 for people under 25 years old (1.05) = \$71 billion.
- c. **Alcohol abuse:** multiply share of mental health and substance abuse-related DALYs incurred by 0-24 age group (0.355), times Harwood (2000) estimate (\$158 billion for 1998—\$185 billion less the portion of total costs attributable to health care since counted in part 1), times inflation adjustment from 1998 to 2007 dollars (1.27), times population growth between 1998 and 2007 for people under 25 years old (1.07) = \$77 billion.

Total = \$247 billion which, divided by 104 million people ages 0-24, equals about \$2,380 per young person.

individuals and their families)—outweigh the costs that would be incurred in a real-world environment. As one example of the complexity of measuring costs, a serious mental disorder in a parent or a child has obvious and measurable financial costs associated with treatment and lost productivity. However, the disorder also often profoundly affects the overall functioning of the family in psychosocial ways that are devastatingly costly to the

family but not readily susceptible to quantification, much less valuation in dollars and cents.

This chapter opens with a brief tutorial on cost-benefit and cost-effectiveness analysis, as well as an explanation of what the terms “cost-beneficial” and “cost-effective” mean. The chapter then synthesizes existing knowledge on the benefits that could be achieved (namely, avoided costs) if prevention were widely implemented on a national scale. Next the available research on the benefits and costs of individual prevention programs or types of intervention is summarized. The chapter then discusses limitations of the available research and concludes by offering recommendations for future research in these areas.

It is important at the outset to acknowledge the basic purpose and limitations of economic analysis in the context of prevention and prevention research. Economic analysis may be valuable at the beginning of prevention research by quantifying the costs associated with the disorder or problem being targeted for prevention, or at least those costs that lend themselves to quantification. This provides a sense of the potential value of prevention of the problem. Evaluating the cost-effectiveness of an intervention at the end of the prevention research cycle helps determine whether funding the intervention is a wise use of societal resources and hence desirable for dissemination. However, economic analysis has limitations as a decision-making aid. In particular, as mentioned above, even the best analyses are challenged to capture all of the psychological and emotional costs associated with MEB disorders in a manner that would be deemed universally acceptable. As a consequence, estimates of the cost of these disorders may misestimate the true social costs, possibly considerably. Equally importantly, economic analysis addresses efficiency but not equity. In some cases, a society or an organization may prefer investing in a less cost-effective program if it is more likely to reach disadvantaged populations. Also, particularly in the context of prevention, economic analysis may rely on a number of unproven assumptions (see *Current Knowledge Regarding Intervention Benefit and Costs*, below).

The cost-effectiveness of an intervention also often depends on the perspective of the decision maker. In many cases, an intervention is cost-effective from the perspective of society as a whole, but not from the narrower perspective of a single organization considering whether to fund the intervention. For example, consider the case of an investment in prevention of MEB disorders by a health care provider. That provider incurs the costs of the intervention and derives some of the benefits, in the form of reduced future costs of care. However, major social benefits of the intervention may be realized in other sectors of society, including the education sector (e.g., when students are less disruptive in class) and the criminal justice sector (e.g., when recipients of the intervention are less likely to get

into trouble with the law). It is quite plausible that the health care organization may not perceive the intervention as worthwhile from its narrow perspective, whereas from a social perspective the intervention is highly cost-effective (see Chapter 11 for a discussion of implementation issues). Addressing the disjunction between those who bear the costs of an intervention and those who experience its benefits may require coordinated planning of interventions and, if possible, aligning of incentives across service systems.

COST-BENEFIT AND COST-EFFECTIVENESS ANALYSIS

Cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA) are two methods of economic analysis used to assess whether an intervention is desirable from an economic perspective; put simply, they evaluate whether the benefits derived from the intervention are worth the cost invested in the intervention. The principal distinction between the two techniques lies in the measurement of desired outcomes. In CBA, all such outcomes are valued in monetary units (dollars), permitting a direct comparison of the benefits produced by the intervention with its costs. When benefits exceed costs, the intervention is said to be cost-beneficial. When benefits fall short of costs—and assuming that one is comfortable that all important positive outcomes have been captured in monetary terms—the conclusion is that the intervention is not worth undertaking. CBA is the ideal form of analysis given that it allows a comparison of desired outcomes (benefits) and undesired outcomes (costs) in the same metric. This permits a precise conclusion about the desirability of the intervention. Is the intervention “worth it”?

CEA, in contrast, is used when one or more major desired outcomes cannot be readily measured in monetary terms but a major outcome, measurable in another metric, is common to the interventions being compared. A notable example in the health care literature pertains to interventions that avoid preventable premature deaths (or preventable illness or disability). Historically, the principal outcome in published studies was measured in terms of life-years saved. Now, most commonly, outcomes are measured as quality-adjusted life years (QALYs). Analysts typically employ CEA when they think that the desired outcome does not lend itself readily to monetization. Thus, breast or prostate cancer screening and treatment avoid premature deaths, but as they do so primarily for people beyond their working years, many analysts are uncomfortable attributing a dollar value to the beneficiaries’ extra years. It is possible to do so, using a measure of willingness-to-pay (Gafni, 1997). Since the desired outcomes and the undesired outcomes (costs) are measured in different metrics in CEA (life-years and dollars, respectively), the bottom line of a CEA is a ratio,

in this case cost per QALY. An intervention is deemed cost-effective if it produces the desired outcome at a reasonable price, typically the lowest cost to realize a QALY among competing interventions. Thus, if an analyst is comparing three different interventions, all other things being equal, the cost-effective intervention is the one for which the cost per QALY is the least. (This simplification ignores additional concerns—the other things *not* being equal—such as *who* benefits from the extra life-years.) Often, analysts will label cost-effective an intervention not compared directly with alternative investments. In such instances, typically they are comparing their findings to a standard in the literature. As a rule of thumb, ratios in the range of \$50,000 to \$100,000 or lower per life-year lost are generally considered cost-effective (Ubel et al., 2003).²

In theory, a well-designed CBA and CEA of the same intervention should yield the identical conclusion about the desirability of the intervention (Bleichodt and Quiggin, 1999). An intervention will be cost-effective—that is, cost less per unit of benefit than alternative interventions—if its benefits exceed its costs and do so with a net benefit that is greater than that of the alternative interventions. In practice, however, because researchers often focus on somewhat different outcomes depending on the method being used,³ one cannot assume that CBA and CEA will yield identical conclusions about intervention desirability. Furthermore, all of these analyses rest on assumptions related to the quantification and valuation of important outcomes, assumptions that can drive the conclusions reached. Indeed, standard practice in CBA and CEA should include use of sensitivity analysis, a family of methods to evaluate whether bottom-line conclusions are sensitive to assumptions made in the analysis (Gold et al., 1996).

The health care literature is dominated by CEAs; that is, one finds relatively few CBAs (Hammitt, 2002). The principal reason is the inability, or reluctance, of analysts or policy makers to place dollar values on important health outcomes. As we describe below, however, the prevention field seems to be an exception: the majority of studies to date have employed CBA.

ECONOMIC NEED FOR PREVENTION

Prevention, by definition, is undertaken to avoid harmful outcomes; the potential benefits of prevention are therefore equivalent to the net harms, or costs, of those outcomes. MEB disorders among young people account

²Ubel et al. assert that the cost-effectiveness threshold should be raised to \$200,000 or more per QALY.

³For example, researchers using cost-benefit analysis may ignore improvements in health-related quality of life, because other benefits, such as reduced crime and increased employment, are easier to quantify in dollar terms.

for considerable costs to the health care, child welfare, education, juvenile justice, and criminal justice systems, as well as enormous additional costs in terms of the suffering of individuals, families, and others affected (see Figure 9-1). The most direct and probably most significant economic cost is increased morbidity and decreased health-related quality of life of the individual experiencing a mental, emotional, or behavioral disorder.

The individual's health problems, in turn, may lead to adverse consequences for other members of society, such as family members, victims of crime, and peers. Health problems typically also lead to additional costs, in the form of reduced productivity and earnings (Kessler, Heeringa et al., 2008) and increased use of a range of social services. And, of course, MEB disorders place enormous stress on young people themselves and interfere with healthy development.

Morbidity and Quality of Life

MEB disorders among young people are associated with substantially increased morbidity and reduced health-related quality of life. These health

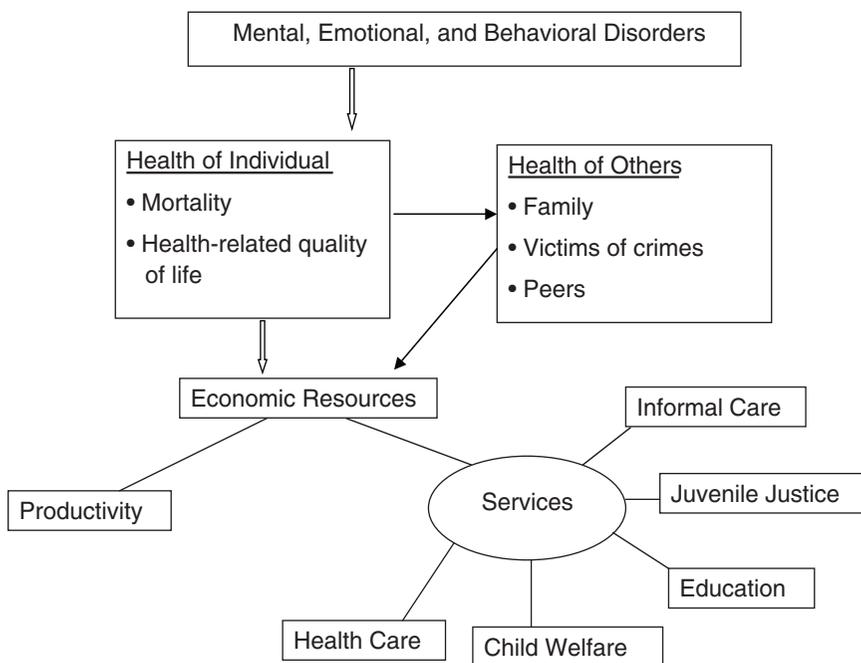


FIGURE 9-1 Costs of mental, emotional, and behavioral disorders among young people. SOURCE: Adapted from Eisenberg and Neighbors (2007).

problems are associated with psychological suffering (U.S. Department of Health and Human Services, 1999) as well as increased risks of physical illnesses (Vreeland, 2007). These health consequences represent an enormous burden during childhood (Glied and Cuellar, 2003) and are also correlated with significantly increased risks to health and reduced productivity in adulthood (Kessler et al., 2005; Kessler, Ormel, Demler, and Stang, 2003).

A young person's mental disorder or substance abuse may also lead to negative health consequences for other members of society. For example, mental disorders lead to lost productivity and functioning not only for the children, but also for the parents and caregivers of the children (Tolan and Dodge, 2005). Untreated mental illness may also have intergenerational effects. Having a depressed mother, or having two parents with poor mental health, is associated with mental, behavioral, and emotional problems in children (Kahn, Brandt, and Whitaker, 2004; see also Chapter 7).

Substance abuse, and to a lesser extent other MEB disorders, are also associated with more frequent risky behavior (such as driving under the influence) (Harwood, 2000), which often have substantial health repercussions for others. In addition, an individual's health condition may affect his or her peers; in particular, substance abuse (Gaviria and Raphael, 2001) and suicidal behavior (Gould, Jamieson, and Romer, 2003) are thought to spread among peers via a contagion effect.

To quantify the total health burdens posed by various illnesses and disorders, researchers with the Global Burden of Disease project of the World Health Organization (WHO) and the World Bank calculated disability-adjusted life years (DALYs) lost due to each health condition. This measure accounts for both morbidity (mainly measured by functional impairments) and mortality. For the United States, depression and alcohol use and abuse were among the top five sources of premature death and disability (Michaud et al., 2006). According to the most recent estimates by age group for the United States, in 1996 mental disorders and substance abuse accounted for 30 percent of DALYs lost by people under age 25 (calculation by Eisenberg and Neighbors based on Annex 4 to Michaud et al., 2006).⁴ This represents by far the highest burden of any disease category for this broad age range. By more specific age intervals, the proportions were 3 percent for ages 0-4, 18 percent for ages 5-14, and 48 percent for ages 15-24. Given evidence that people with mental disorders are at greater risk for both communicable and noncommunicable diseases and that their disorders contribute to both

⁴This percentage was calculated by including all conditions in the Global Burden of Disease project's neuropsychiatric category except epilepsy and multiple sclerosis, which are not typically considered mental disorders. Updated estimates for the United States, for the year 2005, will be available within the next few years, according to Catherine Michaud, the first author of the report used to generate the estimates here.

intentional and unintentional injuries, the percentage may be even higher (Prince et al., 2007).

Economic Resource Costs

Health problems associated with MEB disorders decrease productivity and significantly increase the utilization of services, thus reducing economic resources available to society for other purposes.

Productivity⁵

During childhood and adolescence, when most people do not participate in the labor market, the direct impacts of mental disorders and substance use on economic productivity are small but real. Young people with MEB disorders may diminish the productivity of others closely involved in their lives, particularly family members. For example, the stress and unpredictability of having a child with a serious MEB disorder can interfere with parents' work lives (Busch and Barry, 2007), or a disruptive child in a classroom can interfere with other students' learning. There may also be significant costs to the work or educational productivity of siblings (Fletcher and Wolfe, 2008).

The indirect and long-term consequences are also likely to be large. These conditions interfere with young people's ability to invest in their own human capital via education. Many studies show that poor mental health and substance use among young people are negatively related to participation and performance in school (Diego, Field, and Sanders, 2003; Glied and Pine, 2002), as well as high school completion (Vander Stoep, Weiss, Juo, Chancy, and Cohen, 2003), important determinants of productivity in adulthood. These factors can increase risk for such behavioral problems as delinquent and antisocial behavior (Yoshikawa, 1994). Also, to the extent that MEB disorders in childhood carry over into adulthood, there will be further reductions in economic productivity. A large number of studies, many of which focus on depression, document that adults with mental illness and substance abuse disorders are less likely to be employed, and those who are employed work fewer hours and receive lower wages (see Ettner, Frank, and Kessler, 1997; Kessler, Heeringa et al., 2008). Similarly, as adults, employees with mental health or substance abuse disorders can

⁵When aggregating the costs of mental disorders and substance abuse, it is important to keep in mind that productivity costs may already be reflected, at least to some extent, in measures of health burden, such as DALYs. Thus, one might be double-counting by claiming, for example, that a case of depression accounts for a certain number of DALYs in addition to productivity costs. This caveat, however, does not take away from the fact that in general productivity costs are large and important to consider in their own right.

reduce the productivity of other workers, particularly if the job affects the work of others (e.g., assembly line work).

Utilization of Services

As one would expect, mental disorders and substance abuse are strongly associated with increased utilization of mental health and substance abuse services. Ringel and Sturm (2001) estimated the annual national costs of mental health treatment for children under age 18, as of 1998, at \$11.68 billion, or \$172 per child. They found that expenditures were \$293 per child for ages 12-17, \$163 per child for ages 6-11, and \$35 per child for ages 0-5. Adjusted to current dollars using the consumer price index (CPI), the annual national costs in 2007 would be \$14.8 billion. We are not aware of analogous estimates for substance abuse treatment of young people, although estimates are available for adults for alcohol abuse (Harwood, 2000) and drug abuse treatment (ONDCP, 2004). In the past 15 to 20 years, the mix of mental health services for young people has shifted from inpatient to outpatient settings (Ringel and Sturm, 2001), as in the adult population (Wang et al., 2006). Also, as in the adult population, the relative treatment mix for children's mental health has shifted from specialty settings to primary care (Wang et al., 2006) and from therapy and counseling to medication (Glied and Cuellar, 2003) (although this latter shift was interrupted in 2003 by the Food and Drug Administration's warnings about the use of antidepressant medications for children (Libby et al., 2007)). These changes are also not fully reflected in the estimates cited.

Young people with MEB disorders have higher utilization of mental health services across a range of social service systems, not just health care. Costello et al. (2007) considered data from a range of settings and demonstrated that mental health service costs in health care settings represent only a modest fraction of the total costs incurred by children with mental disorders for these services. Using a sample of adolescents ages 13-16 in western North Carolina, they estimated that mental health service costs for adolescents with mental disorders equated to \$894 per adolescent in the local population, with more than one-quarter (27 percent) of the total costs incurred in the school and juvenile justice systems.⁶ The overall estimate is over three times that in the Ringel and Sturm (2001) study, which focused mainly on mental health service costs in health care settings. The findings of Costello, Copeland et al. (2007) are consistent with other empirical studies

⁶This number is based on converting the total costs per 100,000 population in Table 2 in Costello, Copeland et al. (2007) to total costs per person. The percentage attributable to the school and the juvenile justice systems is based on dividing the sum of these costs (\$10.9 million and \$13.2 million, respectively) by the total costs (\$89.4 million).

showing that MEB disorders are associated with increased use of services in nonmedical settings, such as foster care (Harman, Childs, and Kelleher, 2000), special education (Bussing, Zima et al., 1998), and juvenile justice (Teplin, Abram et al., 2002).

Youth with MEB disorders who become involved with the juvenile justice system also often incur costs related to law enforcement and court expenses, detention, placement and incarceration, and other forms of treatment that are publicly provided (National Center on Addiction and Substance Abuse, 2004). In addition, violent crimes can result in victim costs, such as medical care, treatment through public programs, and property damages to victims. The costs associated with all juvenile (under age 18) arrests in 2004 were estimated at about \$14.4 billion (National Center on Addiction and Substance Abuse, 2004), and the costs of medical care, treatment through public programs, and property damages to victims of juvenile violence were estimated at about \$95 million (Miller et al., 2001). Although not all of these crimes were committed by young people with MEB disorders, overall costs of these disorders would be higher if the cost of relevant juvenile crimes were included with service use estimates. In addition, these health problems lead to significantly increased use of informal (unpaid) care by family members and others. For example, family members with a child with mental health care needs are more likely than family members whose children do not have these needs to reduce their working hours or stop working to care for their child (Busch and Barry, 2007).

Using data from the Fast Track project, Foster and colleagues (2005) estimated that each youth with conduct disorder incurs public costs of more than \$70,000 over a 7-year period, with costs incurred by the juvenile justice, education, and general health care systems in addition to the mental health system. Similarly, a study in the United Kingdom (Scott et al., 2001) documented societal costs from childhood conduct disorder that extended into adulthood. Children who had diagnosed conduct disorder at age 10 incurred public service costs by age 28 that were 10 times higher than those considered to have no problems and 3.5 times higher than those with conduct problems but not diagnosed with conduct disorder. This suggests that preventive interventions aimed at addressing behavioral problems before they reach the threshold for a diagnosis could yield significant savings.

Estimates of Total Costs

Comprehensive “cost of illness” studies quantify and aggregate, in monetary terms, the various costs associated with particular illnesses or disorders. Although there are many recent studies of this type in European countries, the most recent estimates in the United States correspond to 1995 for mental disorders (National Institute of Mental Health, 2000), 2002 for

drug abuse (Office of National Drug Control Policy, 2004), and 1998 for alcohol abuse (Harwood, 2000). Aggregating service costs and health and productivity costs⁷ for individuals age 18 and older,⁸ the annual economic costs of mental disorders were estimated at \$185 billion in 1995 (NIMH, 2000), the annual economic costs of drug abuse in 2002 were estimated at \$180.9 billion (ONDCP, 2004), and the annual economic costs of alcohol abused in 1998 were estimated at \$185 billion (Harwood, 2000). These reports do not permit an estimate of costs specific to people from birth to age 24. However, in an analysis for the committee, Eisenberg and Neighbors used data in these reports to make a rough approximation, for the year 2007, by making the following two assumptions: (1) the full cost of services for this age group per person is twice as high as the mental health care costs per person estimated by Ringel and Sturm (2001)⁹ and (2) the population share of health, productivity, and crime-related costs for people ages 0-24 is 35.5 percent (a calculation based on Annex 4 to Michaud et al., 2006). Under these assumptions, Eisenberg and Neighbors estimated that the total annual economic costs are roughly \$247 billion as of 2007 (in 2007 dollars),¹⁰ or about \$2,380 per person under age 25. This per-person total includes about \$500 in health service costs and \$1,900 in health, productivity, and crime-related costs. (See the appendix to this chapter for the methodology used by Eisenberg and Neighbors.)

Several caveats pertain to this estimate. Perhaps most notably, one would not be able to prevent all of these costs, no matter how much one invested in prevention. Not all MEB disorders are preventable, given current knowledge, and some may never be preventable. On one hand, from this perspective, the estimate of \$247 billion overstates the potential value of prevention. On the other hand, this estimate includes only costs avoided from preventing disorders that would meet full clinical criteria and does not include costs that would be avoided from reducing problem behaviors and symptoms in the range in which symptoms are not severe enough to meet diagnostic criteria. These costs are generally not included in cost-of-illness

⁷The authors measured health and productivity costs by estimating the lost or diminished income due to morbidity and mortality. This is typically called a human capital approach to valuing health. Estimates from the human capital approach tend to be lower than estimates from willingness-to-pay approaches and are typically considered lower bound estimates (Hirth et al., 2000). Note that they also accounted for costs to other members of society, such as informal care and crime.

⁸Although the reports are not specific about the age groups included, one can infer that they apply to those age 18 and over based on the data sources used.

⁹This is a conservative assumption in two respects. First, it is lower than the adjustment factor of 3-4 estimated by Costello et al. (2007). Second, treatment costs are rising over time; for example, Mark et al. (2005) found that mental health and substance abuse treatment costs for the full population increased from \$60 billion in 1991 to \$104 billion in 2001.

¹⁰Note also that the estimate of total costs accounted for population growth.

studies, but they may be very large. From this perspective, the estimate of \$247 billion understates the aggregate costs of MEB disorders among young people. As well, the estimate does not fully capture the quality of life of the children and their families.

Quantifying the costs of MEB disorders among young people is useful as a way to approximate the potential value of prevention and to compare the burden of these disorders¹¹ among young people with other disease burdens, but very few studies have addressed this topic. In general, as Hu (2006) describes, methodologies in cost-of-illness studies vary and often depend on several assumptions that require further study. In the context of MEB disorders among young people, one important next step for this research literature is to conduct a comprehensive cost-of-illness study for the United States that builds on previous studies, such as Harwood et al. (2000) and Ringel and Sturm (2001), and the estimates created for this report by Eisenberg and Neighbors (2007) and accounts for the substantial use of services outside medical settings shown by Costello et al. (2007). After the initial work is completed to refine the methodology and identify data sources, periodic updates will be much easier to produce. In addition, further research is needed to improve the ability to project lifetime consequences of mental disorders in childhood. In particular, researchers face the challenge of disentangling confounding factors from true causal relationships in observed relationships between mental disorders in childhood and later outcomes.

Miller (in Biglan et al., 2004) provides a much higher estimate of \$435.4 billion in 1998 (\$557.3 in 2007 dollars) for the costs of problem behaviors among youth, defined as underage drinking, heroin or cocaine abuse, high-risk sex, youth violence, youth smoking, high school dropout, and youth suicide acts. More than half was attributable to suffering and quality of life, with the balance consisting of work losses, medical spending, and other resource costs. Averaged across all youth, this would be an average cost of \$12,300 per youth ages 12-20 (\$15,744 in 2007 dollars).

COST-EFFECTIVENESS OF PREVENTIVE INTERVENTIONS

Although the potential benefits from preventing MEB disorders are clearly large, and there is a substantial and growing body of evidence documenting the positive outcomes of prevention interventions, relatively few evaluations have been conducted to assess the cost-effectiveness of the interventions. The evaluations that are available tend to be those associated with the interventions with the longest follow-up and include some

¹¹The discussion that follows refers specifically to emotional and behavioral disorders rather than problems, as it is referring to costs associated with actual disorders.

of the most successful programs. Similarly, cost-effectiveness evaluations tend to be limited to such areas as early childhood development, youth development, and prevention of violence, depression, and substance abuse, in which there has been more research overall. In addition, most of the favorable cost-effectiveness results apply to interventions for higher risk populations, although a small number of universal prevention programs have also been shown to be cost-effective.

Aos and colleagues (2004) reviewed the economic analyses of a large number of relevant interventions. The authors conducted a comprehensive and detailed review and analysis for the Washington state government of prevention and early intervention programs designed to (1) reduce crime; (2) lower substance abuse; (3) improve educational outcomes, such as test scores and graduation rates; (4) decrease teen pregnancy; (5) reduce teen suicide attempts; (6) lower child abuse or neglect; and (7) reduce domestic violence. In addition to the discussion below based in part on their analysis, we refer the reader to this study as a resource for additional empirical results as well as a detailed discussion of methodological issues.

Early Childhood Interventions

Perhaps the most heavily researched preventive programs are early childhood interventions for children from birth to age 5. Some of these programs are primarily home-based, whereas others are primarily center-based. In a meta-analysis of over 25 studies of home visitation programs (by nurses or other trained professionals), Aos et al. (2004) concluded that the average benefits per child were about \$11,000 and costs were about \$5,000.¹² The benefit-cost ratio has been shown to be higher for certain programs; for example, in an economic evaluation of the Nurse-Family Partnership program (see Box 6-2), Karoly et al. (2005) found that the program cost about \$7,000 per child and produced total benefits of about \$41,000 per child for the higher risk sample and about \$9,000 per child for the lower risk sample.¹³ In general, some of the main benefits of home visitation programs, converted into dollar estimates of their value, have been reduced child abuse, improved achievement test scores, and decreased likelihood of arrest later in life. The benefits from reduced child abuse are

¹²All dollar values in this section are in 2002 or 2003 dollars. In addition to average effects for this group of programs, Aos et al. also estimated the benefits of the Nurse Family Partnership at \$26,298 and the costs at \$9,118 and the benefits of the HIPPPY (Home Instruction Program for Preschool Youngsters) as \$3,313 and the costs as \$1,837. They estimated that benefits exceeded costs for the Comprehensive Child Development Program and the Infant Health and Development Program.

¹³Although the estimates provided by Aos et al. and Karoly differ, the difference between benefits and costs is substantial for both.

generally estimated on the basis of reductions in medical, child welfare, and other public service costs and crime costs, based on epidemiological evidence showing correlations between child abuse and these costs later in life. Improved achievement test scores are usually valued on the basis of how earnings relate to education. Finally, arrests are valued in terms of both the costs to the criminal justice systems and victims (particularly health costs for crimes involving injuries) and lost productivity while incarcerated (see also the technical appendix to Aos et al., 2004).

Several different center-based early interventions also appear to have benefits that exceed their costs (see Targeting Early Childhood Development in Preschool in Chapter 6 for further discussion of these programs). In a meta-analysis of over 50 studies of early childhood education programs for low-income 3- and 4-year-olds, Aos et al. (2004) found that, on average, benefits per child were \$17,000 and costs were \$7,000. In an economic analysis of the Abecedarian Early Childhood Intervention, an intensive, multiyear intervention for children from birth to age 5, Barnett and Masse (2006) found that per-child benefits were \$158,000 and costs were \$63,000; the primary benefits were related to cognitive abilities and education, which were valued in terms of estimated impact on future earnings. The intervention was also associated with a reduction in smoking, which was valued in terms of estimated reduction in premature mortality (with a year of life then valued at \$150,000, based on willingness-to-pay estimates in the literature). The Perry Preschool Project, which included 1-2 years of intensive preschool, home visiting, and group meetings of parents, had estimated per-child benefits of \$240,000 and costs of \$15,000 (Belfield, Nores, Barnett, and Schweinhart, 2006); the primary benefits, some of which were observed well into adulthood, were reduced crime, positive academic outcomes, and reduced smoking. The Chicago Child-Parent Centers, a center-based preschool education for disadvantaged children, had estimated benefits per child of \$75,000 and costs of \$7,400 (Temple and Reynolds, 2007); the primary benefits were improved academic outcomes and reduced crime.

Temple and Reynolds (2007) compared the benefit-to-cost ratios of the Perry Preschool Program, the Carolina Abecedarian Program, and the Chicago Child-Parent Centers to other types of interventions designed to benefit children's development. They concluded that preschool education has a more favorable benefit-to-cost ratio than the Special Supplemental Nutrition Program for Women, Infants, and Children, the Nurse-Family Partnership, a class size reduction initiative for grades K-3, and the Job Corps. There has been debate, however, regarding the benefits and costs of pre-K programs, including Head Start (Cook and Wong, 2007), the most heavily funded and widespread early childhood education program. Ludwig and Phillips (2007) attempt to resolve the debate by pointing out that Head

Start costs about \$9,000 per child, and would need to produce academic achievement gains only on the order of .1 to .2 standard deviations to confer equivalent benefits. They argue that the evaluation literature on Head Start strongly favors a benefit of this size or more, and that the program should be viewed as cost-beneficial. Heckman (1999, 2008) argues that investments in early childhood development, particularly for disadvantaged children, have greater payoff in terms of the development of skills needed for future success than do investments in any other period of life. A systematic review of economic analyses of programs targeting mental health outcomes or accepted risk factors for mental illness by Zechmeister and colleagues (2008) concluded that, among the few available studies, the most favorable results were for early childhood education programs.

Youth Development Interventions

Although comprehensive interventions in early childhood have probably received more attention from scholars and policy makers, many comprehensive interventions for older (school-age) children and adolescents also appear to be cost-effective. Aos et al. (2004) found that five of the six youth development programs reviewed,¹⁴ whose aims include improving parent-child relationships and reducing problem behaviors, such as substance use and violence, are cost-beneficial, with benefit-cost ratios ranging from 3 to 28. These authors also found that several programs for juvenile offenders, with a range of goals mostly pertaining to improved behavior, are highly cost-effective, yielding net benefits per child well over \$10,000 in many cases.

Interventions Targeted at Specific MEB Disorders or Substance Use

There are currently few economic analyses of interventions that target the prevention of specific MEB disorders or substance use among young people, although there are a large number of studies that document efficacy, effectiveness, or both (see Chapters 6 and 7). The interventions in these economic analyses address depression, violence and conduct disorder, and substance use. Lynch et al. (2005) performed a cost-effectiveness analysis of a highly successful group cognitive-behavioral therapy intervention to prevent depression among adolescent children of depressed parents (see Box 7-4). They found that the intervention is very likely to be cost-effective,

¹⁴The programs determined to have benefits that exceed costs include the Seattle Social Development Project, Guiding Good Choices, the Strengthening Families Program for Parents and Youth 10-14, the Child Development Project, and the Good Behavior Game. CASASTART was determined to have costs exceeding benefits.

with an incremental cost of \$610 per child and a cost-effectiveness ratio of \$9,275 per QALY¹⁵ (95 percent CI, \$ -12,148 to \$45,641). Foster et al. (2006) found that the Fast Track intervention, designed to reduce violence and conduct disorders among at-risk children, was about 70 percent likely to be cost-effective in preventing conduct disorder for the higher risk group, but it had less than a 0.01 probability of being cost-effective for the lower risk group, which represented the majority of the sample. Aos et al. (2004) found that 10 of the 12 substance use prevention programs (including two programs that focus on smoking prevention) they analyzed were highly cost-effective, with benefit-cost ratios ranging from 3 to over 100.¹⁶ The estimated benefits per child were generally small (less than \$1,000 in most cases), but the costs were even smaller (less than \$200 in all but one program).

Current Knowledge Regarding Intervention Benefits and Costs

Overall, knowledge about the benefits and costs of specific interventions aimed at preventing MEB disorders is promising but still limited. Relative to the number of efficacious or effective interventions (see Chapters 6 and 7), few investigators have conducted cost-effectiveness or cost-benefit analyses. There is also considerable uncertainty about many of the estimates in the available literature. For interventions that exhibit dramatically different levels of benefits compared with costs, this uncertainty may be moot, but in other cases, it is important to consider carefully.

Perhaps the most important source of uncertainty pertains to longer term outcomes. In many economic evaluations, longer term outcomes of participants in an intervention are not observed and instead must be projected on the basis of other data. Many long-term benefits of early prevention programs cannot be measured until middle childhood and adolescence (e.g., juvenile crime). Longitudinal data used to make projections, such as correlations between the incidence of MEB disorders in childhood and in adulthood, do not necessarily represent accurate causal estimates, as Foster et al. (2003) note. Another important source of uncertainty is a lack of statistical power. As Mrazek and Hall (1997) observe, many studies in this

¹⁵Quality-adjusted life-years (QALYs), like DALYs, are measures of health that account for both morbidity and mortality. As mentioned earlier, ratios under \$50,000 per life year lost are generally considered cost-effective; this is regardless of whether life years are adjusted for quality of life (Ubel et al., 2003).

¹⁶The programs determined to have benefits that exceed costs include the Adolescent Transitions Program, Project Northland, Family Matters, Life Skills Training, Project STAR, the Minnesota Smoking Prevention Program, the Other Social Influence/Skills Building Substance Prevention Program, Project Toward No Tobacco Use, All Stars, and Project Alert. DARE and STARS for Families were ineffective, making the costs exceed the benefits by definition.

literature have modest sample sizes and are not sufficiently powered to look at key measures of effectiveness; typically, adequately powered estimates of cost-effectiveness require even larger samples than estimates of effectiveness per se (Ramsey, McIntosh, and Sullivan, 2001). A third, related source of uncertainty results from the outcomes measured: that is, whether interventions that appear to be cost-effective in reducing risk factors closely connected to MEB disorders, but do not measure disorders as an outcome, can actually prevent the incidence of these disorders.

Another source of uncertainty includes potential differences between cost-efficacy and cost-effectiveness. Evaluations of interventions conducted in research settings (efficacy studies) may get different results if conducted in real-world settings (effectiveness studies), raising potential questions about whether the cost-effectiveness (or more accurately, cost-efficacy) would be realized if the intervention were implemented in a nonresearch environment (see Foster et al., 2003, for a brief discussion of this). Similarly, the costs of interventions implemented in real-world settings may differ from the costs in a research setting.

In addition, as discussed in more detail in Chapter 11, a major challenge in prevention research, particularly when dealing with whole communities, is that preventive interventions are likely to have differential impact on individuals in different contexts because a) participants have different risk and protective factors which cause different responses to the intervention; b) the level of participation in interventions varies; and c) interventions are routinely delivered with varying levels of fidelity and adoption. These factors can reduce overall impact compared to that seen in efficacy trials; thus some analyses of behavioral or economic outcomes in community implementation studies may not find significant effects.

There are challenges in measuring the cost of the time of children and other people involved in interventions. Those challenges can lead to poor estimates of costs, creating either an over- or underestimate. Often, however, analysts omit such time costs, introducing a clear bias toward underestimating total costs. For example, some studies do not consider the opportunity cost incurred by teachers delivering an intervention who might otherwise be engaged in productive teaching activities (Aos et al., 2004). Finally, and importantly, other intangibles, most notably the suffering of children and their families, are likely to be costly but extremely difficult to quantify and assign a monetary value. The difficulty in measuring and valuing these costs restricts the potential of CBA and CEA to accurately evaluate the relative merits of preventive interventions for MEB disorders, which may lead to a substantial underestimation of the benefits of successful interventions. Research needs to be devoted to improving measurement methods that will permit assessment of the economic value associated with suffering related to these disorders.

Another important caveat is that the quality of the underlying evidence used to project costs and benefits varies. Aos and colleagues (2004) account for this in their meta-analysis by assigning different weights to studies based on indicators of quality, but such a solution has unavoidable limitations, as the authors acknowledge. Many evaluations do not meet some of the important guidelines for quality of evidence, as stated by such organizations as the Food and Drug Administration (1998) and the Society for Prevention Research (Flay et al., 2005). For example, evaluators have not always published a specific plan of analysis before collecting data, which leaves open the possibility of selectively reporting positive results among many outcomes and analytical approaches.

A final caveat for this literature is the reminder that, while some studies employ cost-effectiveness analysis, most of the studies in the prevention field have employed cost-benefit analysis. In practice, CEA and CBA results are not strictly comparable. However, in this literature, because most of the studies yield strong conclusions (positive in most cases), it is unlikely that the basic findings would be sensitive to the choice of method. As this literature evolves and more interventions with borderline cost-effectiveness are evaluated, examining the sensitivity of conclusions to alternative assumptions will be important.

CONCLUSIONS AND RECOMMENDATIONS

The potential value of prevention of MEB disorders among young people is enormous. MEB disorders among young people result in significant costs to multiple service sectors. Such disorders threaten children's future productivity and wellness and disrupt the lives of those around them.

Conclusion: The economic, social, and personal costs of MEB disorders among young people are extraordinarily high.

To date, there is some evidence that the benefits of some specific interventions outweigh the costs. However, the scientific literature on the cost-effectiveness of prevention is still young, and it faces a number of conceptual and practical obstacles.

Conclusion: The current body of research on costs, cost-effectiveness, and cost-benefits of preventive mental, emotional, and behavioral interventions is very limited.

Much of the strongest evidence to date is for interventions that improve protective factors or reduce risk factors demonstrated through research to

be closely related to MEB disorders (see Chapter 4). For example, multiple economic evaluations of early childhood development programs have demonstrated benefits that exceed costs.

It is also notable that among the limited number of interventions shown to be cost-effective, many were either targeted to higher risk children (e.g., the early childhood programs such as the Perry Preschool Project) or were cost-effective only for a higher risk subgroup within the analysis (e.g., the Fast Track study). Aside from a small number of substance use prevention programs (see review by Aos et al), few universal interventions have been demonstrated to be cost-effective for preventing MEB disorders. Future research is needed to determine whether selective and indicated prevention programs are inherently more likely to be cost-effective in the context of MEB disorders, or if this finding is an artifact of the programs that happen to have been subjected to economic evaluations thus far.

Conclusion: Of those few intervention evaluations that have included some economic analysis, most have presented cost-benefit findings and demonstrate that intervention benefits exceed costs, often by substantial amounts.

However, few studies measure effects on diagnosable MEB disorders as an outcome, and most do not conduct sufficient longitudinal follow-up to fully capture potential long-term benefits. Also, considerable uncertainty remains about some of these estimates. Economic analyses are important for quantifying the potential value of prevention and assessing the actual value of existing interventions.

Many scholars in the prevention field have called for more regular economic analyses (Flay et al., 2005; Spoth et al., 2008; Zechmeister et al., 2008).¹⁷ Many preventive interventions have been shown to be highly effective but have not yet been evaluated for cost-effectiveness in real-world settings. Guidelines on how to conduct high-quality cost-effectiveness studies are needed to help shape the development of this area of research as it continues to evolve.

Recommendation 9-1: The National Institutes of Health, in consultation with government agencies, private-sector organizations, and key researchers interested in preventing MEB disorders among young

¹⁷This is an issue not only for prevention but also for treatment of mental disorders in children. A comprehensive review of economic evaluations of child and adolescent mental health interventions (most of which are treatment, not prevention) found only 14 had been published to date, although the authors speculated that two or three times that many would be in print within five years (Romeo, Byford, and Knapp, 2005).

people, should develop outcome measures and guidelines for economic analyses of prevention and promotion interventions. The guidelines should be widely disseminated to relevant government agencies and foundations and to prevention researchers.

For interventions involving young people, long-term outcomes are often pivotal for determining cost-effectiveness, as significant benefits are likely to accrue into adulthood, yet current knowledge is remarkably weak in most contexts. Long-term follow-up data should be collected whenever possible. As electronic data systems become more integrated and accessible, one promising avenue is through administrative databases, which do not necessarily depend on expensive efforts to track down and interview participants.¹⁸ Cost-effectiveness analyses should also make clear the various sources of uncertainty. If the cost-effectiveness results are dramatically positive or negative, wide intervals may not raise questions about the overall conclusion that an intervention is cost-effective, but publishing such information will make the assessment more transparent. Special attention should be given to addressing the fact that costs from an intervention in one sector may be evident in other sectors. While this has been done for early childhood, less attention has been focused on this issue in other developmental stages, such as adolescence.

Economic analyses should also be comprehensive in their accounting of relevant costs and benefits. The work by Costello et al. (2007), for example, illustrates the importance of measuring costs across a range of service venues. Again, integration of electronic data systems may be a valuable tool for capturing these costs. To capture the benefit of reductions in specific MEB disorders, interventions should measure diagnostic outcomes whenever possible.

Evaluations should begin to address the fact that multiple interventions over the span of childhood may have important dynamic complementarities (Heckman, 2007). For example, participation in an early childhood intervention such as Head Start may enhance a child's ability to benefit from a later intervention to prevent substance use. Although it would be difficult to randomize children to different sequences of interventions over a long time span, empirical research to address these complementarities to the extent possible would be very informative.

Similarly, understanding the causal links between aspects of poverty (e.g., food insecurity, disadvantaged neighborhoods, low-quality schools) and mental health should be improved. These links may reveal some of the most important mechanisms by which to prevent MEB disorders in cost-

¹⁸Of course, researchers would need to overcome hurdles related to informed consent and privacy restrictions.

effective ways, but it is very difficult to establish incontrovertible causal relationships due to the many likely confounders in observational data.¹⁹

While there have been calls for increased economic analyses, the number of projects that include calculation of costs and cost-effectiveness will increase only if guidelines on how to conduct these types of analyses are widely available and the additional costs recognized.

Recommendation 9-2: Federal agencies and foundations funding intervention research should incorporate guidelines and measures related to economic analysis in their program announcements and provide supplemental funding for projects that include economic analyses. Once available, supplemental funding should also be provided for projects with protocols that incorporate recommended outcome measures.

Although one might argue that grant awards should be increased rather than providing supplemental funding to those that conduct economic analyses, there is a precedent for providing supplemental funding in other areas. For example, the National Institutes of Health (NIH) provides research supplements for projects involving underrepresented minorities and individuals to improve the diversity of the research workforce. Although these supplements are modest, NIH has reported that they are an effective means of encouraging institutions to recruit from currently underrepresented groups.

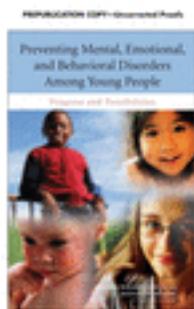
Evaluations of the costs and cost-effectiveness of prevention interventions will increase only if researchers include them in their protocols. Studies designed to determine the effectiveness of interventions in a real-world setting should be clear not only on what the intervention costs, so that a community can judge the feasibility of funding the project, but also the cost-effectiveness, or expected benefits, so that the community can determine the potential value of their investment.

Recommendation 9-3: Researchers should include analysis of the costs and cost-effectiveness (and whenever possible cost-benefit) of interventions in evaluations of effectiveness studies (in contrast to efficacy trials).

Finally, cost-benefit and cost-effectiveness studies of mental health promotion interventions—scarce in the literature to date—would be very useful in permitting a meaningful comparison of the relative desirability of prevention and promotion approaches.

¹⁹For discussions of links between poverty and mental health among children, see, for example, Ripple and Zigler (2003) and the Center on the Developing Child at Harvard University (2007).

In concluding this discussion, it is important to note that the significant societal benefits of preventing mental, emotional, and behavioral problems among young people may warrant intervention even when there is no specific cost-effectiveness data available, particularly if there is evidence that an effective intervention is available. Waiting for future cost-effectiveness analyses to become available, which might take years to develop, would put many young people at unnecessary risk.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

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ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Advances in Prevention Methodology

Since the 1994 Institute of Medicine (IOM) report, *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*, substantial progress has been made in the development of methodologies for the measurement, design, and analysis of the effects of preventive interventions, as well as in the identification of antecedent risk and protective factors and their effects. These new methodological tools are necessary to assess whether an intervention works as intended, for whom, under what conditions, at what cost, and for how long. Although not unique to prevention, answers to these fundamental research questions are needed to help a policy maker determine whether to recommend an intervention and to help a community know whether it can reasonably expect that a newly implemented program is likely to lead to benefit.

Methodological advances are due in part to technical developments in biostatistical methods, causal inference, epidemiology, and other related quantitative disciplines. However, many of the new approaches have been developed by federally funded methodology centers (see Box 10-1) to respond to specific scientific and practical questions being raised in ongoing evaluations of prevention programs. In particular, evaluations of preventive interventions that have been conducted as randomized field trials (Brown and Liao, 1999; Brown, Wang et al., 2008) have contributed not only to the development of alternative study designs and statistical models to examine intervention impact, but also to dramatic improvements in statistical computing. This has led to more insightful statistical modeling of intervention effects that takes into account the longitudinal and multilevel nature of prevention data.

BOX 10-1

Centers for Research on Prevention Science and Methodology

The Prevention Science and Methodology Group (PSMG) is an interdisciplinary network that has been supported by the National Institute of Mental Health (NIMH) and the National Institute on Drug Abuse (NIDA) for the past 20 years. It brings together prevention scientists conducting cutting edge randomized trials and expert methodologists who are committed to addressing the key design and analytic problems in prevention research. PSMG has attempted to anticipate needs for methodological development and to have new methods ready when the trials demand them (Albert and Brown, 1990; Brown, Costigan, and Kendziora, 2008).

As the field of prevention science has matured over the past 15 years, PSMG has worked on such problems as generalized estimating equations (GEE) as a way to account for uncertainty in longitudinal and multilevel inferences (Zeger, Liang, and Albert, 1988; Brown, 1993b), methods to assess intervention impact with growth models (Muthén, 1997, 2007; Muthén, Jo, and Brown, 2003; Muthén and Curran 1997; Curran and Muthén 1999; Muthén and Shedden 1999; Carlin, Wolfe et al., 2001; Muthén, Brown et al., 2002; Wang, Brown, and Banderen-Roche, 2005; Muthén and Asparouhov 2006; Asparouhov and Muthén, 2007) and variation in impact by baseline characteristics (Brown, 1993a, 1993b; Jalongo, Werthamer et al., 1999; Brown, Costigan, and Kendziora, 2008), mediation analysis (MacKinnon, 2008), multilevel models for behavior observations (Dagne, Howe et al., 2002; Dagne, Brown, and Howe, 2003, 2007; Howe, Dagne, and Brown, 2005; Snyder, Reid et al., 2006), modeling of self-selection factors (Jo, 2002; Jo and Muthén 2001; Jo, Asparouhov et al., in press), and randomized trial designs specifically for prevention studies (Brown and Liao, 1999; Brown, Wyman et al., 2006; Brown, Wang et al., 2008). Besides its close collaboration with ongoing

Prevention methodology, or the use of statistical methodology and statistical computing, is a core discipline in the field of prevention science (Eddy, Smith et al., 2005) and is one of the new interdisciplinary fields embodied in the NIH Roadmap.¹ It aims to invent new techniques or apply existing ones to address the fundamental questions that prevention science seeks to answer and to develop ways to present these findings not only to the scientific community but also to policy makers, to advocates and community and institutional leaders, and to families, the ultimate potential beneficiaries of prevention programs and often, their potential consumers.

Methodologists make inferences about program effects by relying on three things: (1) measures of key constructs, such as risk and protective factors or processes, symptoms, disorders, or other outcomes, and program implementation, fidelity, or participation; (2) a study design that

¹See <http://nihroadmap.nih.gov/>.

trials (Brown, Costigan, and Kendziora, 2008), PSMG has continued to maintain close ties to the developers of the Mplus statistical package (Muthén and Muthén, 1998-2008), allowing for a seamless integration of new statistical models, broad application of these models in existing software, and application of these new methods in existing trials.

A similar interdisciplinary methodological group, the Methodology Center, is located at Pennsylvania State University and is funded by NIDA and the National Science Foundation. The Methodology Center works in collaboration with prevention and treatment researchers to advance and disseminate statistical methodology related to research on the prevention and treatment of problem behavior, particularly drug abuse. This group has developed longitudinal models that address the unique aspects of changes in drug use over time including latent transition analyses (Collins, Hyatt, and Graham, 2000; Chung, Park, and Lanza, 2005; Chung, Walls, and Park, 2007; Lanza, Collins et al., 2005) and two-part growth models (Olsen and Schafer, 2001); missing data routines for large, longitudinal datasets (Schafer, 1997; Schafer and Graham, 2002; Demirtas and Schafer, 2003; Graham 2003; Graham, Cumsille, and Elek-Fisk, 2003); designs and inferences that take into account varying dosages or levels of exposure to an intervention or adaptive interventions (Bierman, Nix et al., 2006; Collins, Murphy, and Bierman, 2004; Collins, Murphy, and Strecher, 2007; Murphy, 2005; Murphy, Collins, and Rush, 2007; Murphy, Lynch et al., 2007), and cost effectiveness (Foster, Porter et al., 2007; Foster, Johnson-Shelton, and Taylor, 2007; Olchowski, Foster, and Webster-Stratton, 2007).

determines which participants are being examined, how and when they will be assessed, and what interventions they will receive; and (3) statistical analyses that model how those given an intervention differ on outcomes compared with those in a comparison condition. This chapter discusses statistical designs and analyses, as well as offering comments about measures and measurement systems. While there are important technical issues to consider for measurement, design, and analysis, the community and institutional partnerships that are necessary to create and carry out a mutually agreed-on agenda are critical to the development of quality prevention science (Kellam, 2000).

We discuss first the uses of randomized preventive trials, which have led to an extraordinary increase in knowledge about prevention programs (see Chapters 4 and 6). Because well-conducted randomized preventive trials produce high-quality conclusions about intervention effects, they have achieved a prominent place in the field of prevention research. Despite

their clear scientific value, randomized experiments of prevention programs are often viewed warily by communities and institutions, and their place in community prevention studies is often questioned. Since trials can be conducted only under the aegis of communities and their organizations, this chapter presents information about these trials so community leaders and policy makers can make informed decisions about whether such trials match their own community values and meet their needs, or if alternative designs are needed.

The chapter also reviews the use of other designs, including natural experimental designs and nonexperimental designs to examine a program's effects, whether a training model works, and whether a program can be implemented with sufficient strength or fidelity in different communities.

Next comes an overview of statistical analysis methods that incorporate longitudinal and multilevel data from prevention studies to model how interventions affect young people's development in different contexts. We discuss the unique strengths of qualitative data in prevention research and ways that qualitative and quantitative data can be used alongside one another. Finally, the chapter identifies challenges that have not yet been met in addressing the fundamental research questions in the prevention field.

EVALUATING A PREVENTIVE INTERVENTION WITH A RANDOMIZED PREVENTIVE TRIAL

Randomized preventive trials are central in evaluating efficacy (impact under ideal conditions) or effectiveness (impact under conditions that are likely to occur in a real-world implementation) of specific intervention programs that are tested in particular contexts (Coie, Watt et al., 1993; Kellam, Koretz, and Moscicki, 1999; Howe, Reiss, and Yuh, 2002; Kellam and Langevin, 2003). The design for a randomized trial divides participants into equivalent groups that are exposed to different interventions, and analysis that appropriately compares outcomes for those exposed to different interventions leads to inferential statements about each intervention's effects. A well-conducted randomized trial is a high-precision instrument that leads to causal statements about a program's effect so that one can be assured that any observed differences are due to the different interventions and not some other factor.

Randomization strengthens confidence in the conclusions about an intervention's impact by ensuring the equivalence of the intervention and the control groups. Because of random assignment, participants in the two intervention conditions are nearly equivalent prior to the study, both on measured characteristics, such as age, gender, and baseline risk, and on relevant characteristics that may not be measured, such as community readiness. With randomized assignment to these groups, it is possible to

test for the effect of an intervention even when a community is undergoing major, uncontrolled societal changes, such as a recession. Other designs, for example those that compare a cohort exposed to intervention with the cohort in a previous year, may be more likely to reach erroneous conclusions because of differences between the two groups (e.g., different economic circumstances) that may be undetected or difficult to account for in the analysis.

In prevention science, evaluation trials are usually conducted only after substantial preliminary data demonstrate that the intervention shows promise. Initially a theoretical model of the development of a disorder, or etiology, is used to specify risk and protective factors that can be selectively targeted in preventive interventions. For example, social learning theory posits that for many children, conduct disorder arises from the learned behavior of children exposed to repeated coercive interactions in the family. This etiological theory is then used to identify potential mediators (risk or protective factors), such as inconsistent and punitive parental responses to the child and association with deviant peers, in a causal model for outcomes of substance abuse disorders or delinquency.

A theory of change is then used to identify an existing intervention or to develop a new preventive intervention aimed at these target risk or protective factors. In a program aimed at preventing substance abuse and delinquency among children who are returning to parental care from a foster placement, a parent training intervention might be designed to reduce punitive statements, to enhance communication with the child, and to improve linkages with the child's own parents and teacher in preparation for the critical transition period of return to the family of origin. The timing of the intervention may be a consideration as well as the content. Key transition periods may occur when a stage of life begins, such as entry into elementary or middle school or during times of stress, such as a parental divorce or separation.

Measures are developed to assess these risk (e.g., punitive and inconsistent parenting) and protective factors (e.g., communication and monitoring of the child over time) to assess the effect of the intervention on parental behavior, and to determine whether changes in these hypothesized mediators actually lead to reductions in deviant behavior among young people.

In a pilot study with a few dozen families, data can be collected to check whether the trainers are delivering the program as designed to the original custodial parents, whether the parents are changing their interactions with their children appropriately, and whether the predicted immediate behavior changes are seen among the children. After successful completion of this initial work, a randomized trial with a larger number of families can then be used to test this preventive intervention on a defined population of foster children (e.g., those in group care) and at a set time preceding their

return to their families. Upon the trial's completion, intent-to-treat analyses are typically used to assess overall effects as well as examine the conditions under which the intervention effect varies by child, family, or service provider characteristics. To understand how behavior is modified over the longer term by this intervention, the children are typically followed for a year or more beyond the end of the intervention services. Finally, mediation analyses are used to understand how the effects of an intervention actually take place. Both efficacy and effectiveness trials require appropriate analytical models to produce valid statements about intervention effects (Brown, Wang et al., 2008).

Substantial investment in both time and money is required to conduct a randomized preventive trial. This process begins with framing the theoretical basis for a preventive intervention; then moves on to partnering with communities around an appropriate design, selection and recruitment of the sample, random assignment to intervention conditions, collection of data while adhering to the protocols specified by the design; and finally analysis of data and reporting of the results. The payoff for this work is described in three sections below.

Evaluating the Effects of Preventive Interventions

Some randomized preventive trials examine questions of program efficacy, or impact under ideal conditions and can also help determine whether the intervention affects hypothesized mediators and proximal targets in expected ways. These efficacy trials are conducted in settings in which the intervention fidelity is maintained at a high level, usually by having trained researchers deliver the intervention rather than by individuals from the community. The intervention itself can be delivered in research laboratory settings outside the community (Wolchik, Sandler et al., 2002) or in schools or other settings that serve as the units that are randomized to the intervention or control conditions (Conduct Problems Prevention Research Group, 1992, 1999a, 1999b; Reid, Eddy et al., 1999; Prado, Scwhartz et al., 2008). Efficacy trials require randomization of youth to either the new intervention or to standard settings so that a comparison of outcomes can be made. Some communities have a concern that youth assigned to the control or standard setting do not receive the intervention and thereby do not receive its potential benefit. These concerns can at times be mitigated, as discussed below.

Other randomized trials address questions of effectiveness, or impact under settings that are likely to occur in a real-world implementation of a preventive intervention (Flay, 1986). An effectiveness trial tests a defined intervention that is delivered by intervention agents in the institutions and communities in a manner that would ultimately be used for large-scale

implementation. This typically requires a stronger community partnership and involvement in all aspects of the study design and conduct. Any community concerns about withholding a new intervention from youth who are randomly assigned to the control or standard condition need to be addressed directly, because of ethical and human subject concerns, as well as from the practical side of maintaining the study design in a field setting. Often, communities come to consider randomization as a fair way to assign a novel intervention program to its community, given insufficient resources to deliver to everyone at once. Communities may want to test one intervention that they have already adopted but not fully implemented; it may be acceptable to compare an enhanced version of this intervention to that already being used (Dolan, Kellam et al., 1993). Also, for some studies, it may be possible to provide the new intervention later to those who were initially assigned to the control setting (Wyman, Brown et al., 2008); such wait-list designs, however, allow for only short-term, not long-term evaluations of impact.

Using Preventive Trials to Improve an Intervention

An equally important goal of randomized preventive trials is to search for ways to improve in an intervention. A specific intervention that targets a single risk factor, such as early aggressive behavior, can be used in a randomized trial to test a causative link between this risk factor and later behavior or emotional disorders (Kellam et al., 2008). Specifically, if one found that the intervention did change the target risk factor, and this led to reduced disorders, it would provide support for the underlying etiological theory. For example, elaborated statistical analyses of intervention impact can show who benefits from or is harmed by an intervention, how long the effects last, and under what environmental circumstances these effects occur. Interventions may deliver different levels of benefit or harm to different kinds of participants or in different environments (Brown, Wang et al., 2008), and information about these differences can extend the causal theory as well as guide decisions on whether to adopt or expand a prevention program or to attempt to improve outcomes through program modification.

For example, one first grade intervention was found in a randomized trial to produce improvement in mathematics achievement, but all of this gain occurred among children who began school with better than average mathematics achievement; those who were below average gained nothing compared with children in the control group (Ialongo, Werthamer et al., 1999). However, a behavioral component of this intervention was found to have a beneficial impact on precursors to adolescent drug use (Ialongo, Werthamer et al., 1999). In follow-up research studies, the mathematics curriculum has been discontinued but the behavioral program has been

continued. For the school district, the benefits of this trial were more immediate.

In another example, a study of young adolescents at risk for delinquency tested three active preventive intervention conditions against a control: a parent intervention alone, a peer-based intervention, and a combined peer and parent intervention. The parent condition alone produced a beneficial outcome; the combined peer-parent intervention produced results similar to the control; and the peer-based intervention produced more delinquency than did the other conditions (Dishion, Spracklen et al., 1996; Dishion, Burraston, and Poulin, 2001; Dishion, McCord, and Poulin, 1999). Detailed examination revealed that the at-risk adolescents were learning deviant behavior from the more deviant peers in their group before, during, and after the program. This adverse, or iatrogenic, effect when a peer group includes a high proportion of delinquent youth, is thought to be a major factor in explaining why boot camps and other similar programs often show a negative impact (Welsh and Farrington, 2001). In this way, analysis of intervention failures can be highly informative in guiding new prevention programs.

Testing Whether a Program's Population Effect Can Be Improved by Increasing the Proportion Who Participate

In randomized trials with individual- or family-level assignment, often a large fraction of those randomly assigned to a particular intervention never participates in that intervention, even after consenting (Braver and Smith, 1996). This minimal exposure from not coming to intervention sessions means that they cannot benefit from the intervention. Would the intervention be more effective if one could increase participation? Or would outreach to a more difficult-to-engage portion of the population be counterproductive, because they already have the skills or resources that the intervention develops, or because the intervention does not meet their needs? Given the generally low level of participation in many effective interventions, it has been increasingly important to identify ways to increase a program's reach into a community to those who could benefit (Glasgow, Vogt, and Boles, 1999).

Some designs help evaluate these self-selection effects. One option is to use "encouragement designs" under which individuals are randomly selected to receive different invitation strategies, reinforcers, or messages to encourage acceptance of an intervention. This approach can be seen in an evaluation of the impact of Head Start programs by the Administration for Children and Families (2005). Because these programs were already available in most counties in the United States, and the program is viewed as a valuable resource, especially for poor families, it was considered unethical to use a design that withheld a child's access to this program. Instead, in

selected Head Start sites around the country, 3-year-old children and their families were randomized to one of two conditions: enrolling in a Head Start center at age 3 (early Head Start) or enrolling in the same center at age 4 (later Head Start). Those entering at age 3 were also accepted for enrollment at age 4. About 75 percent of the families enrolled their children in Head Start at the assigned age. Among the remaining 25 percent, some 3-year-olds randomized to early Head Start enrolled at age 4, some randomized to later Head Start enrolled at age 3, and some did not enroll in Head Start at all.

This encouragement trial attempts to modify the time of enrollment in Head Start. If all enrollments matched the assigned condition, standard or intent-to-treat analyses would provide legitimate causal inferences about the effects of the timing of enrollment. Because one-quarter of the parents made enrollment decisions contrary to the assigned condition, the intent-to-treat analysis, which makes no allowance for deviations from the assigned condition, provides a biased estimate of the causal effect of the intervention.

Use of Preventive Interventions to Test and Elaborate Theories of Change and Development

Although using preventive interventions to test and elaborate theories of change and development is the least practical reason for conducting trials, it may be the most important for generating new knowledge. The empirical findings from prevention science experiments can also be used to refine and modify the etiological theories that were used to guide the development of the intervention. Indeed, this bootstrap process—using an incomplete theory to guide the development of an intervention (Sandler, Gersten et al., 1988) and then using the empirical results to advance the theory and fill in critical gaps—is a hallmark of the current prevention science model. It is also an atypical model in experimental sciences. A traditional epidemiological approach to treatment of an existing disorder, such as schizophrenia, generally uses a randomized trial to test a specific treatment at a certain dosage and length, with the analyses showing whether the treatment had a positive effect. Before conducting a treatment trial using this traditional approach, the hypothesized etiological model is often highly developed, and only when the pharmacokinetics and other factors are well understood is the treatment tested in a rigorous randomized trial.

With modern preventive trials, the experimental trial is, in contrast, often used to inform etiological theory at the same time. An etiological model of drug use, for example, is based on malleable risk and protective factors that can then be targeted by an intervention (Kraemer, Kazdin et al., 1997; Botvin, Baker et al., 1992; Botvin, 2004). The preventive intervention tests both the malleability of identified risk factors and the causal

chain leading from these risk factors to distal outcomes (Snyder, Reid et al., 2006). These causal chains can be tested with mediation modeling (MacKinnon, 2008), which decomposes the overall effects into those that follow hypothesized pathways and those whose pathways are not identified. A mediation model that explains most of an intervention's impact through the hypothesized pathways confirms the underlying theoretical model of change, whereas if the hypothesized pathways contribute little explanatory power, a new theory (or better mediating measures) needs to be developed to explain an intervention's effects.

More detailed models of etiology can be developed with analyses that examine the variations across subgroups and environments in the impact of an intervention on both mediators and distal outcomes (Kellam, Koretz, and Moscicki, 1999; Howe, Reiss, and Yuh, 2002; MacKinnon, 2008). For prevention of drug use, for example, a universal intervention that (1) builds social skills to resist the use of drugs, (2) gives feedback to young people about the true rate of peers' drug use, and (3) enhances coping skills could well have very different effects on young people who are current drug users and those who are nonusers. Understanding such differences can lead to an elaboration of knowledge of how peer messages and media images influence initiation and escalation behavior, as well as the roles played by personal and social skills (Botvin and Griffin, 2004). Griffin and colleagues (2001), for example, identified psychological well-being and lower positive expectancy toward drug use as key mediators between competence skills and later substance use.

Preventive trials can also examine the causal role of a particular risk factor when it is targeted by an intervention. For example, continuing aggressive or disruptive behavior early in life is a strong antecedent to a wide range of externalizing behaviors for both boys and girls (Ensminger, Kellam, and Rubin, 1983; Harachi, Fleming et al., 2006). While these behaviors are much less frequent for girls than for boys, the long-term risk of any problem behavior is high for both sexes (Bierman, Bruschi et al., 2004). Nevertheless, there are important differences in the specific risks and mediation pathways (Moffitt, Caspi et al., 2001; Ensminger, Brown, and Kellam, 1984). The long-term link between individual-level aggression in first grade and adult antisocial personality disorder has been found to be both stronger and also more malleable by the Good Behavior Game (see Box 6-11) for boys compared with girls (Kellam, Brown et al., 2008), which points to differences in the causal role of this risk factor for boys and girls.

Using Randomized Trials to Address Other Questions

Randomization can be used in highly flexible ways in studies of preventive interventions (Brown et al., 2005; Brown, Wang et al., 2008), often

answering different questions from the traditional randomized trial that focuses on efficacy or effectiveness alone (West et al., 2000). For example:

- **Head-to-Head Impact.** How beneficial is a preventive intervention program compared with another type of intervention? Preventive interventions can be compared not only with one another, but also with a service-based or treatment approach. In elementary school systems in the United States, for example, many incoming first grade children do not do well in the first couple of years of school; nevertheless, most of these failing children are not provided remedial educational services until the third grade. It is feasible to compare the impact of a universal classroom-based preventive intervention aimed at improving children's ability to master the social and educational demands at entry into first grade with a more traditional model that provides similar services at a later stage for children in serious need.
- **Implementability.** What effects come from alternative modes of training or delivery of a defined intervention? After demonstrating that an intervention is effective, one can examine different means of implementing that intervention, holding fixed its content. Webster-Stratton (1984, 2000) has used such trials to demonstrate that self-administered videotapes are effective and a cost-effective way of delivering the Incredible Years program (Box 6-3) outside the clinic.
- **Adaptability.** How does a planned variation in the content and delivery of a tested intervention affect its impact? For example, the third-generation Home Visitor Trial, conducted by Olds and colleagues in Denver (2004), compared the delivery of a home-based intervention by a paraprofessional with the standard intervention delivered by nurse home visitors.
- **Extensibility.** What impact is achieved when an intervention is delivered to persons or in settings different from those in the original trial? One question being addressed is whether Olds's work on nurse home visitors, which originally focused on high-risk new mothers, would work as well for all pregnancies. Encouragement designs (described above) are also extensibility trials, since they can be used to expand the population that would normally participate in these interventions.
- **Sustainability.** Does impact continue as the time since completion of training increases? A sustainability trial compares the outcomes achieved by those who completed training earlier with outcomes for those who have just completed training or have not yet been trained (controls). For example, teachers can be randomized to

start training at one of three times. At the end of the second training period, a sustainability trial would compare the outcomes achieved by the teachers who were trained first with those of the newly trained teachers and the teachers in the third training group.

- **Scalability.** What impact is achieved when an intervention is expanded to more settings? Using the same rolling system of teacher training as an example, a scalability trial would assess whether such an intervention maintains its effect as it is expanded system-wide. As it expands, the number of teachers requiring training and supervision increases, and therefore a scalability trial tests the system-level responses to these demands.

Using Randomized Preventive Trials to Meet the Needs of the Community

Field experiments of prevention programs are guided by federal requirements to maintain protection of human subjects. But they also require additional active community support and oversight in the design and conduct of the trial. Through partnerships with researchers, communities and institutions can play a major role in all aspects of the trial, including framing the research around community goals, norms, and values; shaping the questions that are asked during the research, granting access to people, data, and intervention and evaluation sites; and holding researchers accountable for the study and reporting back to the community. These community and institutional partnerships provide an added level of commitment and assurance of ethical conduct of research beyond those regulations required by universities and research institutions for human subjects' protection. Most often these partnerships are facilitated by setting up community and institutional advisory boards that provide direction to researchers and memoranda of understanding between all parties.

As mentioned above, communities often have major concerns about random assignment itself, which can be seen by parents, service providers, and administrators as manipulating, or as providing fewer opportunities for children, or as interference by outside researchers in the ways that children interact with schools, communities, or health systems. Also, service providers are concerned that the assessments made by researchers could be used to evaluate their performance. By active engagement of broadly representative community leaders, institutional leaders, and researchers around the issues of randomization, issues of trust and the social contract with researchers arise and need to be worked through to provide a base for conducting research in the community. For example, randomization can be seen as providing an equal chance for every child to receive a new intervention that cannot immediately be given to everyone. This process

of “flipping a fair coin” can be seen as an equitable way of distributing limited resources. From this process can come a study design that is acceptable from the community’s and institution’s perspective as well as that of the researchers.

Community-based participatory research, an intensive approach that involves the community in all phases of the research process, including specification of research questions and approaches (see Israel Schulz et al., 2003), is another potential approach to ensuring that trials meet the needs of the community. Similarly, partnerships that involve the systematic evaluation of interventions developed by community organizations in response to community priorities and values can increase their value to the community (see also Chapter 11).

Scientific Logic Behind the Use of Randomized Preventive Trials

Some in the scientific community believe that it is not possible to conduct field trials of prevention programs to produce sound causal inferences about these programs. However, good randomized preventive trials share many of the qualities that scientists have come to expect from controlled clinical trials, including random assignment to intervention and procedures to limit attrition and selective dropout or bias in measurement (Brown, 2000, 2002; Brown, Costigan, and Kendziora, 2008). Preventive trials, however, have some unique aspects.

First, it is virtually impossible to conduct a completely masked (or blind) psychosocial field trial the way double-blind clinical trials are conducted, in which neither the treating physician nor the patient knows whether an active drug or a placebo is used. A double-blind protocol provides a built-in protection against outcomes being influenced by patient or physician preferences, expectations, or beliefs. In psychosocial preventive interventions, this type of blinding does not happen. The intervention agents, often teachers or parents, must receive training in the intervention and participate in its delivery. Furthermore, the participants are generally aware that they are receiving the intervention, if for no other reason than they experience a different environment determined by the intervention.

The fact that randomized field trials cannot blind either the intervention agents or the study participants has important implications for the assessment of outcomes. It is important that these assessments be conducted by staff who do not know the participant’s intervention condition. This is much easier to manage when participants are assigned individually to intervention or control conditions. It is more challenging in settings in which the intervention is applied to a whole group, such as a school, a classroom, or a medical or social service setting. Steps to reduce the chance that assessment biases influence conclusions about the intervention’s effect include revealing

as little of the actual study design to the assessment staff as possible, conducting follow-up assessments in a random order of individuals or groups (e.g., schools), and incorporating direct observations of behaviors whenever possible (Brown and Liao, 1999; Brown, 2003; Snyder, Reid et al., 2006; Brown, Wang et al., 2008).

Second, preventive field trials often require long evaluation periods and repeated measures that extend over different stages of life. By contrast, typical clinical trials often have relatively brief follow-up periods. The long follow-up periods for randomized field trials increase the potential for missing observations (“missingness”) and loss of study participants, which creates major challenges in both design and analysis. Often, multistage designs or designs with planned missingness can increase the efficiency of follow-up (Brown, Costigan, and Kendziora, 2008) as well as protect against potential sources of attrition bias (Brown, Indurkha, and Kellam, 2000). Furthermore, effective fieldwork procedures now exist that help maintain low attrition (Murry and Brody, 2004). Advanced analytical techniques are also available for handling missing data, even in the face of high levels of missingness (Schafer, 1997).

Another aspect of psychosocial preventive interventions is that they are often delivered in existing group settings, such as the classroom, school, family, or community. These group settings are “social fields” that are strongly linked to many of the predictive risk or protective factors that affect mental health and drug abuse. They also establish norms, determine the relevant set of task demands for the child, and provide formal or informal evaluations by natural raters that shape and mold children’s response to the demands in that particular social field (Kellam, Branch et al., 1975; Kellam and Rebok, 1992; Kellam, 1990).

Because many preventive interventions are carried out in these existing social fields, they are tested in preventive trials that often randomize whole groups rather than randomize at the level of individuals in the groups (Raudenbush, 1997; Murray, 1998; Brown and Liao, 1999). A major consequence is that the statistical power of such a design depends most heavily on the number of groups in the study rather than the total number of participants. Thus a trial involving 500 students in each of 4 schools with the schools randomly assigned to 2 interventions has statistical power similar to a traditional 1-level design with 4 individuals assigned to 2 interventions. The large number of students in this design contributes relatively little precision to inferences about impact because of the small number of schools in the design.

The requirement for sufficient statistical power in group-based designs has led some researchers to conduct trials in a large number of schools or other group settings. Life Skills Training, for example, was carefully tested in 56 middle schools with approximately 70 children per school (Botvin and

Griffin, 2004). Although a modest number of children per school is often sufficient to evaluate the overall strength of a group-based intervention compared with a control setting, additional participants may be required for more complex analyses. An examination of theory-driven hypotheses about how the intervention may vary as a function of baseline risk requires substantially more participants than would be required for examining overall impact (Brown, Costigan, and Kendziora, 2008).

Ways to Reduce Trial Size in Group-Based Randomized Trials

In some circumstances, group-based trials are prohibitively expensive unless special designs and strategies are used to make them cost-effective. One approach is the statistical technique of blocking. Blocks refer to higher level units, such as a school, in which both the intervention and the control conditions are included. For example, assigning classes in the same school to different interventions would be a classroom-based design with the school used as a blocking factor, whereas assigning all classes from the same school to the same intervention would be a school-based trial without blocking.

In deciding whether to randomize at the individual, classroom, or school, for example, one needs to take into consideration both the most efficient way to deliver the intervention and the possibility of contamination, that is, when controls are inadvertently exposed to the intervention. In general, randomizing units that are at the same level as the unit of intervention (e.g., randomizing classes within a school for a classroom-based intervention) will provide the highest level of statistical power, provided contamination is limited (Brown and Liao, 1999).

Other approaches can also be followed to increase statistical power in group-based randomized trials. Designs that force balance on group-level characteristics and then randomize or that form matched pairs of these groups followed by random assignment of one in each pair to each condition can sometimes lead to increases in statistical power. With small numbers of schools or other units, however, matching can sometime reduce power by decreasing the degrees of freedom that are available for testing intervention effects.

Analytical methods can increase power as well. For example, a group-level covariate, such as the level of positive norms toward drug use in a school at baseline, can be used to adjust for differences by intervention condition that remain after randomization for a school-based drug prevention trial. Indeed, the inclusion of a baseline variable measured at the level at which randomization occurs can often increase statistical power more than the inclusion of individual-level baseline variables.

Even when there are no natural settings (e.g., schools) to use in implementing a prevention program (e.g., for families experiencing divorce), the

intervention may still be designed and delivered in a group setting in the community (Wolchik, Sandler et al., 2002; Sandler, Ayers et al., 2003).

BUILDING RIGOROUS CAUSAL INFERENCES FROM RANDOMIZED FIELD TRIALS

At the time of the 1994 IOM report, prevention scientists generally had a limited understanding of the underlying framework for drawing causal conclusions about their interventions from randomized and nonrandomized experiments. There is now a greater understanding and appreciation of the design requirements that must be met for a trial to provide an adequate basis for making clear statements about the causal effect of an intervention.

The most commonly used model for making causal inferences about the effects of an intervention is based on the Neyman, Rubin, Holland (NRH) approach of counterfactuals (Neyman, 1923; Rubin, 1974, 1978; Holland, 1986). Although these key publications were available before the 1994 IOM report was written, understanding of the significance of this work and its implications for study designs has matured since then.

This theoretical approach considers that each individual in a two-arm trial could potentially have two outcomes, one when assigned to the first arm of the trial and a second when assigned to the second arm. Using this “potential outcome” model, the true intervention impact for that individual is then defined to be the difference in these two outcomes. However, it is impossible to observe both outcomes for a single participant; the trial makes only one outcome available to measure. The remaining unobserved outcome for each individual is a counterfactual: what would this person have been observed to do if he or she had received the other intervention. Because it is not possible to observe the outcome under both the assigned intervention and the counterfactual, it is not possible to assess this causal impact for a single individual. With a randomized experiment, however, it is possible to compare the average response for those assigned to one intervention with the average response of those assigned to the other condition. The difference in average responses for those assigned to the two conditions (often adjusted for covariates) is generally interpreted as a causal effect of the intervention.

The NRH approach provides conditions under which the difference in the average responses to the treatments is, in fact, an unbiased estimate for the average causal effect in the population. In nontechnical terms, the assumption that the estimate is unbiased depends on the following conditions being met (Rubin, 1974):

- the sample selected for study is representative of the population;
- as a whole, the participants assigned to the two intervention conditions are equivalent to one another;

- the intervention received is the same as the one randomly assigned;
- any differences in assessment are unrelated to the intervention condition;
- attrition or loss to follow-up is unrelated to the intervention condition; and
- each individual's response under the assigned intervention is unaffected by the intervention conditions assigned to all others in the sample.

Adhering to a specified study protocol for maintaining equivalence will go a long way toward satisfying many of these criteria. For example, when the assignment to an intervention is in fact random or a stratified random process, the second condition of equivalent intervention groups is satisfied. Likewise, attrition bias and assessment bias can both be minimized if the procedures for recontacting and reassessing participants in the follow-up period are performed blind to intervention condition (Brown and Liao, 1999; Brown, Indurkha, and Kellam, 2000) or corrections are made for missing data at baseline.

Possible Inferences in Response to Self-Selection

One innovative change in the way prevention trials are now analyzed is to account for self-selection factors that differentiate those who choose to participate in the prevention program from those who do not. Consideration of self-selection factors is critical in examining the effects of prevention programs aimed at individual young people or families. Some decline to participate at all, others may participate in the intervention initially but drop out before the study is completed, and others may continue to participate throughout the intervention period.

It is tempting to compare the outcomes by level of participation and interpret any differences as being due to the effects of the intervention. For example, one might find that, on average, those exposed to the full intervention had poorer outcomes overall compared with those who did not participate. This might suggest the conclusion that the intervention was harmful. However, these observed differences alone are not a sufficient basis for statements about program effect or causality, and indeed such an intervention could well be beneficial for those who participate, despite the finding above. The problem with making conclusions taking into account level of participation is that the participants with greater involvement may have a higher baseline risk than those with more limited or no participation, and therefore those who self-select into the intervention could end up having worse outcomes than those who do not participate, regardless of intervention effect.

The design and analysis of studies can aid in distinguishing the effect of the intervention from the effects of self-selection. Individual participation can be measured only in those randomized to the intervention group, because those in the control group are not offered the opportunity to participate. Nevertheless, a randomized trial design makes it possible to treat the control group as a mixture of would-be participants and would-be nonparticipants. Thus, with appropriate assumptions, it is possible to arrive at causal inferences about the intervention effect on those who would be participants in an intervention. This is an example of the general approach called “principal stratification” (Bloom, 1984; Angrist, Imbens, and Rubin, 1996; Frangakis and Rubin, 1999, 2002; Jo and Muthén, 2001; Jo, 2002; Jo, Asparouhov et al., in press). Such analyses are extremely valuable in that they characterize not only the effects of an intervention on participants, but also who chooses to participate in an intervention.

Distinct Ethical Issues for Conducting Preventive Trials

In treatment studies, the existing standards for ethical conduct of research dictate that it is improper to withhold an effective, safe treatment from participants. Thus because there are successful treatments for schizophrenia, it would be inappropriate and unethical to evaluate a new antipsychotic drug in a randomized trial that assigned some psychotic individuals to receive a placebo. The ethical considerations are different, however, in testing an antipsychotic drug for its ability to prevent schizophrenia or psychotic episodes in individuals exhibiting prodromal or preclinical signs or symptoms of schizophrenia. Although a few small randomized trials suggest that low-dose risperidone along with family therapy may provide some preventive value for adolescents who are at high risk for developing schizophrenia (McGorry, Yung et al., 2002), the potential for causing side effects or otherwise harming individuals with these powerful drugs must be considered. In the case of a disorder that has not yet been manifest and an intervention that is known to have significant side effects, “doing no harm” has to be considered in order to decide whether it is ethical to conduct this kind of trial.

One potential way to deal with some of these ethical concerns, when there is a very real possibility of doing harm, is to use a mediational model to predict who is likely to benefit most from this type of antipsychotic drug. This type of mediation design (Pillow, Sandler et al., 1991) uses the trial’s inclusion/exclusion criteria to limit the trial to those whose signs or symptoms most closely match those targeted by the intervention. Limiting participants in the trial to those with prodromal symptoms as well as brain abnormalities associated with schizophrenia identifiable by magnetic resonance imaging, for example, may tip the benefit-cost ratio sufficiently

to justify a trial (with appropriate consent) of a potentially risky pharmacological intervention. The burgeoning availability of genetic and other biological information with tenuous links to specific disorders also elevates ethical considerations (see Chapter 5).

Sometimes a design that would clearly be unethical or impractical with individual-level random assignment can be appropriate if conducted with group-level random assignment. This approach was used for practical reasons in a large preventive trial aimed at preventing the spread of HIV among Thai military conscripts through changes in sexual practices. Rather than randomly assign individuals in the same company to two different conditions, companies were matched within battalions and then randomly assigned to an active behavioral intervention or a passive diffusion model (Celentano, Bond et al., 2000). Part of the rationale in such studies is that a community-wide preventive intervention cannot be implemented across a country at the same time, thus randomly assigning some of the communities to this intervention deviates from what would normally happen simply by using a fair method of assigning which communities receive the intervention first.

Using Wait Lists to Randomly Assign When an Intervention Is Delivered

In many situations, a community or government agency decides that all its young people should receive a new preventive intervention, even though the intervention itself has not yet been well evaluated. Indeed, in suicide prevention, for which few programs have been evaluated rigorously, communities frequently decide to saturate the community with a program. Under certain circumstances it is still possible to evaluate the effectiveness of such an intervention using a randomized design. For example, a standard wait-list design can be used to randomly assign half of the participants or groups to receive the intervention immediately and half to receive it later.

Communities are often accepting of a standard wait-list design because there are benefits to both conditions: a community that initially receives the intervention has an opportunity to benefit immediately; the community with a delayed start has the opportunity to benefit from any enhancements of the intervention made on the basis of the initial experience. A disadvantage with this design is that, because everyone receives this intervention within a short time frame, only short-term effects can be examined. However, if groups are randomized, such as schools, and the wait list is delayed until the following cohort in the delayed schools, evaluation of longer term effects is still possible. This is because the first cohort contains participants who never receive the intervention.

A type of randomized design that has only recently been used in prevention studies is called a dynamic wait-list design (Brown, Wyman et al.,

2006). In contrast to the standard wait-list design, in which an intervention is delivered either immediately or after a specified delay, the dynamic wait-list design randomly assigns participants to one of three or more times to start the intervention. For time-to-event outcomes, the dynamic wait-list design has more statistical power because it increases the number of time periods, with most of the statistical gain occurring in moving from two to four or six time periods (Brown, Wyman et al., 2006). This design was used in the school-based Georgia Gatekeeper Training Trial (Wyman, Brown et al., 2008), in which 32 schools were randomly assigned to one of 5 start times for the training program, and the primary outcome was the rate at which suicidal youth were identified by the school.

Ethical Issues for Prevention When Variation in Intervention Impact Is Found

Researchers are beginning to identify different degrees of benefit or harm from an intervention across different subgroups on the basis of baseline characteristics and contexts. If one finds that one subgroup shows consistent benefits and another shows that the same intervention causes them to do worse, then both the use and the nonuse of this program will cause some harm to a segment of the population. Another situation that may arise is a finding of benefit on some outcomes but compensatory harm on others. There is reason to believe that genetic variations, whose prevalences are due to evolutionary pressures, provide either advantages or disadvantages in adaptive response to specific environments (see Chapter 5). As one begins to look at how a complex preventive intervention affects individuals with specific genetic characteristics, it would not be surprising to find allelomorphic variation in outcomes, or that positive as well as negative outcomes can occur for those with a single allele. Any of these occurrences raises questions about the use of an intervention and should suggest continued work to adapt the intervention to specific individual and environmental situations.

EMERGING OPPORTUNITIES FOR PREVENTION TRIALS

Preventive Trials for Disorders with Low Prevalence

The prevention field still has relatively little information about effective interventions for conditions that occur infrequently. In designing prevention trials for low-base-rate disorders and outcomes, such as schizophrenia (Faraone, Brown et al., 2002; Brown and Faraone, 2004) and suicide (Brown, Wyman et al., 2007), the sample sizes necessary to obtain sufficient statistical power often seem prohibitively large. For example, a universal

preventive trial aimed at a 50-percent reduction in youth suicide in the general population would require more than 1,000,000 person-years of observation. Although a study this large is often considered impractical, some novel alternatives exist. One approach is to combine data across a cluster of similar trials by using a common outcome, such as death from suicide or unintentional causes, for a long-term follow-up assessment. Data on mortality outcomes can be collected relatively cheaply using the National Death Index. An approach that aggregates data across studies will have to take into account variation in impact across studies with random effects, just as in meta-analysis (Brown et al., in press).

An important strategy that other health fields use to test interventions on low-base-rate outcomes is to assess the impact of the intervention on a more common surrogate endpoint that has been identified as an antecedent risk factor for the outcome of interest. The rate of HIV seroconversion, for example, is sufficiently low in the general U.S. population that most HIV prevention trials use a reduction in HIV risk behavior as their primary outcome. Likewise, suicide attempts can serve as a surrogate for suicide itself, because there are roughly 100 times more suicide attempters than suicide completers, and attempt is a strong predictor of future suicide. The use of suicide attempts as an outcome would allow for sufficient statistical power with a much smaller study population.

Evaluating the Components of Interventions and Adaptive Interventions

Trials to examine the functioning of distinct components of an intervention may be needed, as when a comprehensive prevention program, such as Life Skills Training (see Box 7-1), has multiple components or modules that have been incorporated over the years. Although an intervention is normally tested in its entirety, the contribution of separate components can be examined through such approaches as study designs that deliver selected components (Collins, Murphy, and Bierman, 2004) or by examining the strength of different mediational pathways (West, Aiken, and Todd, 1993; West and Aiken, 1997).

Testing components is also necessary in preventive interventions that are designed to be flexible, so that the program can be tailored to the specific needs of the participants. Fast Track, for example (see Box 6-14), was a randomized trial aimed at preventing the consequences of aggressive behavior from first grade through high school (CPPRG, 1992, 1999a, 1999b). Over the course of the 10-year study, each participant in the intervention condition received specific program components that were deemed most appropriate based on his or her risks and protective factors at a given point in life. By the end of the study, the set of interventions and their dosages or durations differed substantially from person to person. Analyti-

cal techniques are available to disentangle some of the effects of dosage from different levels of need, but the use of designs, especially with multiple levels of randomization, may provide clearer insight into the effects of the intervention components (Murphy, van der Laan et al., 2001; Murphy, 2003; Collins, Murphy, and Strecher, 2007).

Testing Prevention Components

There is also interest in testing whether small, relatively simple elements of a prevention program can be successfully applied in different contexts. For example, implementation of the Good Behavior Game in first and second grade, which gave teachers an extensive period of training and supervision and included the creation of a support structure in the school and the district, was found to have long-term benefits for high-risk boys (Kellam, Brown et al., 2008; Petras, Kellam et al., 2008). In an effort to provide this intervention at reduced cost, others have attempted to implement the Good Behavior Game intervention using much less training and system-level support (Embry, 2004). Because the training received as part of one intervention becomes part of a teacher's toolkit, it would be useful to evaluate the subsequent effects of the differences in teachers' training and support in conjunction with the Good Behavior Game on levels of aggressive behavior in their students. Program components can be tested by themselves by randomizing which teachers, or other such intervention agents, are to receive no training, low training, or high training.

Using the Internet for Randomized Preventive Trials

The Internet presents new opportunities to deliver preventive interventions to a diverse and expanding audience and to test the interventions in large randomized trials. With the delivery of a prevention program through the web, the opportunity exists to test new or refined components using random assignment and to revise the program in response to these results using methods described by Collins, Murphy, and Bierman (2004) and West, Aiken, and Todd (1993).

Internet-based programs are also likely to present methodological challenges. First, a randomized trial would typically depend on data from self-reports obtained through the Internet, and uncertainty as to the validity of these data, as well as the proportion of participants willing to respond to long-term evaluations, could limit the evaluation plan. It may be necessary to use a multistage follow-up design (Brown, Indurkha, and Kellam, 2000; Brown, Wang et al., 2008), which would include a phone or face-to-face interview for a stratified sample of study participants.

Sequencing of Preventive Trials and Selective Long-Term Follow-Up

In most health research, trials are staged in a progression from basic to clinical investigations to broad application in target populations, allowing for an ordered and predictable expansion of knowledge in specific areas (e.g., Greenwald and Cullen, 1985). In the prevention field, rigorous evaluations of the efficacy of a preventive intervention can be lengthy, as are studies of replication and implementation. However, opportunities exist for strategic shortcuts. One approach is to combine several trials sequentially. For example, in a school-based trial, consecutive cohorts can serve different purposes. The first cohort of randomly assigned students and their teachers would comprise an effectiveness trial. In the second year, the same teachers, who continue with the same intervention condition as in the first year, along with a second cohort of new students, can be used to test sustainability. Finally, a third student cohort can be used to test scalability to a broader system, with the teachers who originally served as the intervention's controls now also trained to deliver the intervention.

A related issue involving the staging of trials is determining when there is sufficient scientific evidence for moving from a pilot trial of the intervention to a fully funded trial. In the current funding climate, researchers often design a small, pilot trial to demonstrate that an intervention looks sufficiently strong to proceed with a larger trial. Reviewers of these applications for larger trials want to have confidence that the intervention is sufficiently strong before recommending expanded funding. However, as pointed out by Kraemer, Mintz et al. (2006), the effect size estimate from the pilot trial is generally too variable to provide a good decision-making tool to distinguish weak from strong interventions. There is need for alternative sequential design strategies that lead to funding of the promising interventions.

Another methodological challenge involving the review process is deciding when an intervention's early results are sufficiently promising to support additional funding for a long-term follow-up study. A limited number of preventive interventions have now received funding for long-term follow-up, and many of these have demonstrated effects that appear stronger over time (Olds, Henderson et al., 1998; Wolchik, Sandler et al., 2002; Hawkins, Kosterman et al., 2005; Kellam, Brown et al., 2008; Petras, Kellam et al., 2008; Wilcox, Kellam et al., 2008). It is difficult for reviewers to assess whether an intervention's relatively modest early effects are likely to improve over time or diminish, and therefore some of the most promising prevention programs may miss an opportunity for long-term funding.

NONRANDOMIZED EVALUATIONS OF INTERVENTION IMPACT

Conducting high-quality randomized trials is challenging, but the effort and expense are necessary to answer many important questions. However, many critical questions cannot be answered by randomized trials (Greenwald and Cullen, 1985; IOM, 1994). For example, Skinner, Matthews, and Burton (2005) examined how existing welfare programs affected the lives of families. Their ethnographic data demonstrated that many families cannot obtain needed services because of enormous logistical constraints in reaching the service locations.

In other situations, there may be no opportunity to conduct a true randomized trial to assess the effects of a defined intervention, because the community is averse to the use of a randomization scheme, because ethical considerations preclude conducting such a trial, or because funds and time are too limited. Even so, many opportunities remain to conduct careful evaluations of prevention programs, and much can be gained from such data if they are carefully collected. Indeed, much has been written about the limits of the knowledge that a standard randomized trial can provide, and natural experiments can sometimes provide complementary information (West and Sagarin, 2000).

When a full randomized trial cannot be used to evaluate an intervention, an alternative study should be designed so that the participants in the intervention conditions differ as little as possible on characteristics other than the intervention itself. For example, it will be difficult to distinguish the effect of an intervention from other factors if a community that has high readiness is compared with a neighboring community that is not at all ready to provide the intervention. It may be necessary to work with both communities to ensure that they receive similar attention before the intervention starts as well as similar efforts for follow-up.

Pre-Post Designs

A pre-post design is another alternative to randomization. Such studies evaluate an intervention on the basis of the changes that occur from a baseline (the “pre” measurement) to after the intervention period (the “post” measurement). This type of design can provide valuable information, particularly when it supports a hypothesized developmental model involving known mediators that lead to expected prevention targets. However, the pre-post design suffers from confounding with developmental changes that are occurring in young people. On one hand, with drug use in adolescents, for example, the sharp increases in drug use with age—as well as seasonal effects—could completely mask the potential benefit of an intervention. On the other hand, lower drug use after the intervention than before would sug-

gest that the intervention has prevention potential. Also, pre-post designs can lead to erroneous conclusions if they involve selecting participants at high risk and assessing whether their risk goes down; improvement might be expected simply because of a regression to the mean effect.

Interrupted Time-Series Designs

An important way to improve pre-post designs is to include multiple measurements of variables of interest. A good example of this is the interrupted time series (or multiple baseline design extended to several groups), in which multiple measurements of the target behavior are made both before and after the intervention. Varying the timing of the intervention across participating individuals or groups, especially if assignment to an intervention time is randomized, can further strengthen the evaluation design. Policy changes, such as wide-scale implementation of a new program, changes in the law or changes in enforcement of existing laws, often provide opportunities to evaluate an intervention in this type of natural experiment. One example is the evaluation of policies that restrict tobacco sales to minors (Stead and Lancaster, 2005). In their examination of the effect of positive reinforcement to tobacco stores and sales clerks to avoid tobacco sales to minors, Biglan and colleagues (1996), for example, repeatedly assessed the proportion of stores making underage sales both before and after the intervention, demonstrating that the behavior of clerks is modifiable.

Regression Discontinuity Designs

Another type of natural experiment that provides an opportunity for program evaluation occurs when strict eligibility criteria, such as age or level of risk along a continuum, are imposed for entrance into a program. In such cases, the difference in regression intercepts, or the expected outcome when other variables are equal, for the outcome measure among those who were eligible and those who were not eligible provides an estimate of the intervention effect (Cook and Campbell, 1979). Gormley, Gayer, and Phillips (2005) used this design in concluding that a universal statewide prekindergarten program had a large impact on achievement.

ADVANCES IN STATISTICAL ANALYSIS OF PREVENTION TRIALS

At the time of the 1994 IOM report, virtually all published analyses were limited to examining an intervention's impact on an outcome variable measured at a single point in time at follow-up. Analyses of impact in randomized field trials and longitudinal analyses were conducted independent of one another. Now, however, it is customary to use growth modeling tech-

niques to examine trajectories of change using more extensive longitudinal data, with corresponding gains in statistical power (Muthén and Curran, 1997) and interpretability (Muthén, Brown et al., 2002). Growth models can be a valuable tool in understanding the impact of interventions.

Using Growth Models

Most theories of change in prevention research posit an evolving effect on the individual that varies over time as new developmental stages are reached. Although it should be possible to detect intervention effects at a critical transition period using an outcome measured at a single time point, it is also possible to examine the impact of interventions using longitudinal data to show differences in individuals' developmental trajectories or growth patterns (e.g., repeated measures of aggression or symptoms) by intervention condition.

Often the patterns of growth can be summarized with a few parameters. By fitting individual-level data to linear growth curves, for example, an intervention's effect can be summarized based on the difference in mean rates of growth for intervention and control participants. Other approaches might include latent growth modeling of different aspects of growth using quadratics and higher order polynomials, piecewise growth trajectories, and nonlinear growth models (Muthén, 1991).

The effects of interventions may vary not only as a function of time, but also across individuals. For example, a universal intervention may have a stronger effect over time on those who start with higher levels of risk compared with those with lower levels of risk, as is now found in a number of preventive interventions (Brown and Liao, 1999; Brown, Wang et al., 2008). Growth models that include an interaction between intervention condition and baseline levels of risk (Muthén and Curran, 1997, 1999) can capture such variation in impact over time.

Growth mixture modeling is another analytic approach that allows individuals to follow one of several different patterns of change over time (Muthén and Shedden, 1999; Carlin, Wolfe et al., 2001; Muthén, Brown et al., 2002; Wang, Brown, and Bardeen-Roche, 2005). Its advantage over the interaction model described in the previous paragraph is its flexibility; for example, if the intervention causes low- and high-risk youth to receive benefit but youth with moderate risk are harmed, growth mixture models should detect these differential effects. Intervention effects can be modeled for each pattern of growth in risk behaviors over time, such as stable low levels of drug use, escalating levels, stable high levels, and decreasing levels. The results of such analyses may show, for example, that although a universal intervention reduces drug usage among those who begin using drugs early, it may have the unintended effect of increasing drug usage in what

began as a low-risk group. A result of this type should lead to a redesign of the intervention.

Latent transition analyses (Collins, Graham et al., 1994) are also used to examine changes in drug usage trajectories over time. These methods can directly model the changes in patterns of drug use over time and changes through exposure to an intervention. To distinguish drug initiation from escalation or similar qualitative versus quantitative differences in delinquency (Nagin and Land, 1993), methods that allow censoring, truncation, and so-called two-part models (Olsen and Schafer, 2001) can now be used in growth mixture modeling and other complex analyses (Muthén and Muthén, 1998-2008).

For behavioral observation data, which has a prominent place in prevention research (Snyder, Reid et al., 2006), multilevel random effects can be used to incorporate large tables of contingent responses or associations in complex mediation analyses (Dagne, Brown, and Howe, 2007). Similarly, analysis of trajectories can involve not only continuous data but also binary data (Carlin, Wolfe et al., 2001), count data (Nagin and Land, 1993), and time-to-event or survival data (Muthén and Masyn, 2005). In addition, many analytical tools are available to examine different types of variables in the same model, so that continuous measures can be used to assess the impact of an intervention on growth trajectories through one stage of life while impact on adult diagnoses is measured as a dichotomous variable (Muthén, Brown et al., 2002).

All these methods provide opportunities to specify and test precise questions about variation in the impact of an intervention. However, erroneous conclusions are possible if the underlying processes are not carefully modeled (Carlin, Wolfe et al., 2001; Wang, Brown et al., 2005).

Multilevel Modeling of Intervention Effects

Multilevel modeling of contextual effects, such as the school, has also been well integrated into the evaluation of preventive trials. At the time of the 1994 IOM report, it was rare for published analyses of group-based randomized trials to correct for nonindependence among the participants in a group. As a result, they could erroneously report impact when it was not statistically significant. In a trial with 20 schools, half of which are randomized to a prevention program, the correct statistical test of impact is based on the number of schools, not the number of children, which may be several orders of magnitude larger (Murray, 1998). Now it is expected that published papers of group-based randomized experiments will use multilevel analysis (Raudenbush, 1997) or generalized estimating equations and sandwich-type estimators (Zeger, Liang, and Albert, 1988; Brown, 1993b; Flay et al., 2005) to account for group randomization.

Modeling That Incorporates Growth and Context in the Same Analysis

At the time of the 1994 IOM report, it was customary to report only the overall impact of an intervention in a population. Since then, statistical modeling has advanced so that longitudinal and multilevel modeling can now be handled in the same analysis. It is common to see analyses that include both individual growth and multiple levels of nesting, such as children nested within classrooms and schools (Gibbons, Hedeker et al., 1988; Brown, Costigan and Kendziora, 2008). Analyses can examine how change occurs across multiple levels (Raudenbush and Bryk, 2002) and examine impact across both individuals and contextual levels with different types of growth trajectories (Muthén, Brown et al., 2002; Muthén and Asparouhov, 2006; Asparouhov and Muthén, 2007).

Handling of Missing or Incomplete Data

A major advance has been the treatment of missing data in statistical analysis of longitudinal data. When the previous IOM report was written, most published analyses of intervention impact simply deleted any missing cases. Now most impact analyses make use of full maximum likelihood methods (Dempster, Laird, and Rubin, 1977) or multiple imputations (Rubin, 1987; Schafer, 1997; Schafer and Graham, 2002; Demirtas and Schafer, 2003; Graham 2003; Graham, Cumsille, and Elek-Fisk, 2003). These techniques are especially important for evaluating impact across long periods of time, because data will be incomplete for many of the participants and differentially across contexts.

Intent-to-Treat and Postintervention Modeling

The traditional standard of intent-to-treat analyses used to analyze clinical trials has been extended to multilevel and growth modeling for randomized field trials. This approach overcomes the challenges in handling dropin and dropout and other types of missing data that regularly occur in prevention trials (Brown, Wang et al., 2008). So-called intent-to-treat analyses, or analyses based on the assigned rather than the actual intervention or treatment, are generally used as the primary set of models to examine intervention effects overall and for moderating effects involving individual-level and group-level baseline characteristics.

These traditional methods of examining the effects of an intervention can be supplemented with postintervention analyses. The postintervention approach takes into account the intervention actually received by each participant (Wyman, Brown et al., 2008), the dosage received (Murphy, 2005; Murphy, Collins, and Rush, 2007; Murphy, Lynch et al., 2007), and

the level of adherence (Little and Yau, 1996; Hirano, Imbens et al., 2000; Barnard, Frangakis et al., 2003; Jo, Asparouhov et al., in press), as well as the intervention's effect on different mediators (MacKinnon and Dwyer, 1993; MacKinnon, Weber, and Pentz, 1989; Tein, Sandler et al., 2004; MacKinnon, Lockwood et al., 2007; MacKinnon 2008).

METHODOLOGICAL CHALLENGES AHEAD FOR PREVENTION RESEARCH

As the field of prevention science matures, important new developments in methodological research will be needed to meet new challenges. Some of these challenges include (1) integrating structural and functional imaging data on the brain; (2) understanding how genetics, particularly gene-environment interactions, can best inform prevention; (3) testing and evaluating implementation strategies for prevention programs; and (4) modeling and expressing effects of prevention for informing public policy.

Incorporating imaging and genetics data into analyses will require the ability to deal with huge numbers of voxels, polymorphisms, and expressed genes. The large literature on data reduction techniques and multiple comparisons may provide a basis for methods for studying mediational pathways, expressed genes, and gene-environment interactions that may influence prevention outcomes and should be considered in intervention designs. Also, as the body of evidence for effective programs continues to grow, demand will increase for evaluations of alternative strategies for implementing such programs. Finally, the ability to model the costs as well as the effectiveness of different preventive interventions for communities will allow for policy decisions made on the basis of the best scientific findings. These issues are discussed in more detail in Part III.

CONCLUSIONS AND RECOMMENDATIONS

Since the 1994 IOM report, new methodological tools have been developed that enable more nuanced analysis of outcomes, more sophisticated designs that enable randomized assignment, and more reliable outcomes. These advances in modern statistical approaches have been particularly useful in the context of field trials of preventive interventions that face particular randomization challenges not usually relevant to clinical trials.

Conclusion: Significant advances in statistical evaluation designs, measures, and analyses used in prevention research have contributed to improved understanding of the etiology of emotional and behavioral disorders and related problem behaviors since 1994.

Prevention methodology has enabled the use of refined statistical and analytical techniques to be used in an iterative manner to refine interventions, for example, by identifying components or groups for which the intervention is most successful and to further develop theories about causal mechanisms that contribute to the development of problems or to an intervention's results.

Conclusion: Improved methodologies have also led to improved interventions, etiological theories, and theories of change.

The highest level of confidence in the results of intervention trials is provided by multiple well-conducted randomized trials. In addition, for some areas of prevention, the types of designs that are typically used have relatively limited ability to produce unambiguous causal inferences about intervention impact because of statistical confounding or inadequate controls, low statistical power, lack of appropriate outcome measures, or attrition. In these situations, it is important to develop additional evaluation designs that provide more rigorous testing of these interventions. Furthermore, few interventions have been tested for long-term outcomes despite the availability of appropriate methodologies. Several interventions have demonstrated effects on reducing multiple disorders and other related outcomes, such as academic performance. The value of preventive interventions would be significantly strengthened if long-term results could be demonstrated on a more consistent basis.

Recommendation 10-1: Research funders should invest in studies that (1) aim to replicate findings from earlier trials, (2) evaluate long-term outcomes of preventive interventions across multiple outcomes (e.g., disorders, academic outcomes) and (3) test the extent to which each prevention program is effective in different race, ethnic, gender, and developmental groups.

Being able to obtain replicable results is one of the hallmarks of science, since lack of replicability raises questions about generalizability. Direct replicability corresponds to a test of the same intervention under very similar conditions. Systematic replicability refers to testing of the intervention under conditions that are deliberately modified (e.g., intervention agent, trainer, length of program, target population) in order to examine whether the results change with these modifications (see Chapter 11 for discussion of adaptation to different populations). Given limited funding, lack of interest by review groups in direct replication, and the current state of knowledge about the effects of preventive interventions, we recommend that systematic replications are more appropriate than direct replications.

Funding is often limited for evaluations that assess outcomes beyond the end of an intervention or a short time after the intervention. Yet demonstrating outcomes that endure increases confidence in an intervention and provides a more comprehensive test of the impact of the intervention on children's lives and its benefit to society. Assessment of long-term outcomes would ideally include consideration of the sustainability of outcomes across developmental periods (Coie, Watt et al., 1993). Given that most preventive interventions are designed to mitigate developmental processes that can lead to mental, emotional, and behavioral disorders and problems over time, assessment of whether proximal outcomes at one developmental period are sustained in distal outcomes at a later developmental period is needed. Several of the programs discussed in Chapters 6 and 7, including the Nurse Family Practitioner, Life Skills Training, Good Behavior Game, Strengthening Families 10-14 and the Family Check-up, have met this criterion. Although the Society for Prevention Research (Flay, Biglan et al., 2005) has suggested 6 months as a minimum follow-up period,² the committee considers this to be a necessary but insufficient time frame for the majority of outcomes.

As statistical and methodological approaches have been developed in response to ongoing evaluations over the past 15 years, advances in this area must continue to keep pace with and respond to new knowledge that affects prevention science. The significant rise in interventions with evidence of effectiveness, the importance of implementing interventions with fidelity, and the lack of empirical evidence on how to successfully implement interventions will call for the development of new methodologies to explore various implementation and dissemination strategies (see also Chapter 11). This might include exploration of such questions as implementability, adaptability, extensibility, sustainability, and scalability.

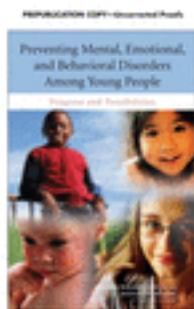
Conclusion: Methodologies to evaluate approaches to implementation and dissemination are less well developed than methodologies related to efficacy and effectiveness.

Other recent research advances, including the results of imaging and other developmental neuroscience studies and findings related to the role of gene-environment interactions (see Chapter 5), provide new challenges and opportunities for intervention research and will require thoughtful considered of design strategies.

²For "outcomes that may decay over time," the Society for Prevention Research (undated) recommends that evaluations include "at least one long-term follow-up at an interval beyond the end of the intervention (e.g., at least 6 months after the intervention (page 2))." The Society for Prevention Research standards also acknowledge that the interval may need to differ for different types of interventions.

Recommendation 10-2: The National Institutes of Health should be charged with developing methodologies to address major gaps in current prevention science approaches, including the study of dissemination and implementation of successful interventions.

The methodologies developed should include designs to test alternative approaches to implementation and dissemination of evidence-based and community-generated prevention programs (see Chapter 11). Priority areas should also include approaches that link neuroscience methods and clinical research with epidemiology and prevention in understanding the etiology of mental health and of disorders and approaches that link theories developed through neuroscience research with preventive intervention approaches designed to test causal mechanisms (see Chapter 5).



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

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ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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13

Toward an Improved Approach to Prevention

The preceding chapters described the substantial scientific progress in the conceptualization, design, assessment, and evaluation of preventive intervention approaches for children, youth and families since the 1994 Institute of Medicine (IOM) report, *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*. There has been laudable progress in the science of mental health promotion and prevention of MEB disorders. It is now evident that the incidence of some of these disorders, such as depression, can be significantly reduced. There is also evidence to support multiple approaches aimed at strengthening individual, family, and community competencies that have been causally linked to mental, emotional, and behavioral health, either by reducing malleable risk factors for disorders or enhancing protective factors. We call on the nation to put this knowledge into practice. At the same time, as discussed in earlier chapters, we have identified significant gaps in current knowledge and key areas in which more research and infrastructure changes are needed to fully release the potential to significantly reduce MEB disorders among young people.

The promise of preventing MEB disorders, evident in the research over the past several decades, has prompted numerous federal agencies and stakeholder organizations to encourage grantees and community organizations to adopt evidence-based interventions. The National Institutes of Health (NIH) and other agencies have funded multiple parallel research projects. It is now time for a coordinated, strategic approach that brings together the range of resources, provides consistent advice to communities, and strategically aligns research priorities to needs. As discussed in

the preceding chapter, although there are a number of interagency efforts, they tend to be focused on a single program or an isolated issue related to prevention rather than on a holistic vision. Historically, prevention has received far less attention than treatment in either mental health or physical health. A fundamental paradigm shift needs to occur. The substantial progress in prevention science summarized in this report calls for the adoption of a prevention perspective and a resolve to test and determine the most promising application of specific evidence-based preventive approaches.

Recommendation 13-1: The federal government should make the healthy emotional and behavioral development of young people a national priority, establish public goals for the prevention of specific MEB disorders and for the promotion of healthy development among young people, and provide needed research and service resources to achieve these aims.

Accomplishing this will require a more systematic approach at multiple levels—national, state, and local—and continued progress in prevention research.

A NEW NATIONAL DISCOURSE

The 1994 IOM report strongly recommended the creation of a mechanism to coordinate research and services across federal departments, suggesting the creation of a national scientific council as one model, possibly under an office in the White House. A variety of national-level groups (New Freedom Commission on Mental Health, 2003; U.S. Public Health Service, 2000) have concurred in saying that the nation should consider a strong, broad-based public health infrastructure to both monitor and deploy resources in mental and physical health care.

Current federal policy, research, and practice relevant to prevention of MEB disorders are fragmented across a wide variety of agencies. Research on prevention (and treatment) is organized to address individual disorders and problems. However, evidence that common risk factors lead to multiple interrelated disorders and problems, coupled with significant evidence on possible approaches to mitigating these factors, calls for a concerted strategic, national effort to coordinate research, policy, and practice aimed at preventing MEB disorders and promoting healthy development. This effort would build on the significant evidence currently available and continue to be informed by new research as it emerges.

Recommendation 13-2: The White House should create an ongoing mechanism involving federal agencies, stakeholders (including profes-

sional associations), and key researchers to develop and implement a strategic approach to the promotion of mental health and the prevention of MEB disorders and related problem behaviors in young people. The Departments of Health and Human Services, Education, and Justice should be accountable for aligning their resources, programs, and initiatives with this strategic approach and for encouraging their state and local counterparts to do the same.

One of the first tasks would be to establish specific, measurable goals for the next 10 years (see Recommendation 13-1) and a strategy to support the accomplishment of goals. In establishing goals, consideration should be given to the prevalence of disorders, costs associated with those disorders, and the strength of the evidence that the disorder is preventable. Promising areas include the prevention of depression, substance abuse, and conduct disorder. Existing surveys provide data on substance use and adolescent (ages 12-17) depression. The Federal Interagency Forum on Child and Family Statistics has recently added an indicator related to the prevalence of depression among youth in its Key National Indicators of Well-Being report and includes indicators of alcohol and drug use. The forum has also identified the need for measures of positive behaviors.¹ This could serve as a starting point. Similarly, consideration should be given to the approaches that both promote healthy development and have the greatest potential to affect multiple disorders, such as those aimed at strengthening families.

In developing the strategy, priority should be placed on educating the public on the potential to improve support of the nation's young people, including efforts to reduce the stigma associated with mental, emotional, and behavioral problems, and on engaging relevant professional and inter-governmental organizations in a coordinated approach to improving support systems for young people and their families. Development of the strategy would have multiple components:

- Identify and evaluate all federal programs and policies to determine which ones should be recommended to states and communities based on an agreed standard of evidence; these programs should be given highest priority for dissemination.
- Create networks of prevention delivery programs involving schools, primary health care, behavioral health care, and other community-based programs that are sites for investigation and innovation for both family-centered preventive intervention and individual-centered intervention.

¹See <http://www.childstats.gov>.

- Explore the possibility of set-asides or targeted funding for promotion and prevention activities, similar to the set-aside proposed for the Mental Health Services Block Grant (see Recommendation 12-1).
- Consult with leading researchers, major stakeholder and professional organizations, and constituency groups in developing priorities, goals, and a shared action agenda.
- Coordinate with relevant foundations to identify priority partnerships aimed at better understanding the implementation of evidence-based programs, possibly through the Child Mental Health Foundations and Agencies network, a collaborative of public and private agencies and foundations interested in issues of child development and public policy.
- Coordinate with NIH on the development of a 10-year research agenda (see Recommendation 13-5) and plan, organize, and support further research, led by NIH, to
 - Further examine the impact of programs and policies to determine the extent to which they prevent the development of problems, promote mental health, or both. That research should assess the impact of interventions on multiple disorders and problems.
 - Experimentally evaluate strategies for getting effective programs and policies widely and effectively adopted.
- Oversee development of approaches to monitor the prevalence of disorders and key risk and protective factors, as well as relevant service use across a range of delivery systems (see Recommendations 2-1 and 2-2).
- Identify specific opportunities to braid the funding of research and practice so that the impact of programs and practices that are being funded by service agencies, such as the Substance Abuse and Mental Health Services Administration (SAMHSA), are experimentally evaluated through research funded by such agencies as NIH or the Institute of Education Sciences (IES) (see Recommendation 12-2).
- Consider the potential to develop a standardized system to measure core promotion and prevention outcomes that could be used and adapted by states and communities across the country to monitor performance, potentially building on existing community monitoring systems.
- Oversee the development and implementation of consistent, rigorous standards of evidence for endorsement of prevention programs (see Recommendation 12-4).

Both service and research components of the relevant agencies should be involved. These include, in the U.S. Department of Health and Human

Services, the National Institutes of Health (NIH), SAMHSA, the Health Resources and Services Administration (HRSA), the Administration for Children and Families (ACF), the Centers for Medicare and Medicaid Services (CMS), the Centers for Disease Control and Prevention (CDC), and the Office of the Assistant Secretary for Planning and Evaluation (ASPE); in the U.S. Department of Education, IES and Safe Schools; and in the U.S. Department of Justice, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) and the National Institute of Justice (NIJ). The need for high-level coordination across multiple agencies, the broad implications of healthy development for multiple components of society, and the significant cost associated with MEB disorders call for ongoing White House involvement. The White House has played a leadership role in other related issues, such as violence against women, mental health policy (the New Freedom Commission), strengthening youth, and drug control policy. A new, ongoing interagency mechanism focused on the emotional and behavioral health of young people could build on and extend the current White House effort to help America's youth. This current effort, a "nationwide effort to raise awareness about the challenges facing our youth, particularly at-risk boys, and to motivate caring adults to connect with youth in three key areas: family, school, and community,"² already recognizes many of the core findings outlined in this report.

The specific mechanism could take many forms, including a new White House office, an ongoing commission, or a White House-led strategic coordinating group. Regardless of the form it takes, it should have adequate authority to direct agency resources in a coordinated manner, facilitate a paradigm shift that emphasizes promotion and prevention, and have a long-term mandate.

Just as there have been significant advances in prevention science in the past 15 years, it is highly likely that there will be considerable progress in the next 15 years with the development of new, more refined prevention strategies. The nation should have a mechanism in place to benefit from rapid deployment of these advances. The creation of an ongoing strategic mechanism to coordinate federal efforts will facilitate consideration of how these advances are best applied. A major need for the immediate future is to systematically study how to effectively translate these strategies to broad-based prevention programs and to identify mechanisms for federal support of community and state efforts. The time is ripe for interventions to be delivered and tested in primary care, in the mental health care sector, in schools, in community organizations, and in families.

Mental health efforts are often fragmented and of uneven quality for children, youth, and families, as they are for adults (IOM, 2006b) and for

²See <http://www.helpingamericasyouth.gov/whatishay.cfm>.

physical health care (IOM, 2001). In the long run, consideration needs to be given to an effective, broad-based, strong public health network that can provide adequate data to monitor progress and support the delivery of high-quality preventive services focused on mental and physical health in a variety of sectors. Linked services for the promotion of mental and physical health can respond to the growing recognition that mental health is dependent on good physical health and vice versa.

The committee was struck by the pervasive role played by poverty in development of a range of MEB disorders and related problems. Similarly, the health care system in the United States, which limits access to and quality of care for many of the most poor and disenfranchised, complicates effective prevention. National attention should be paid to narrowing income and health care disparities as a fundamental part of the promotion of mental health and prevention of MEB disorders.

DEVELOPING STATE AND LOCAL SYSTEMS

Prevention science has identified the major malleable risk factors for the development of most MEB disorders and related problems. The number of efficacy trials and the experimental and statistical methods needed to make reliable conclusions have exploded since 1994. Numerous interventions have been tested in two or more randomized controlled trials, and several have been tested in multiple U.S. communities or implemented nationwide in European countries.

The inability of the mental health care system to respond to the demands for treatment is well documented. Many young people receive treatment in systems outside the formal mental health care system, such as schools, primary medical care, child welfare, and criminal justice. Not all cases of MEB disorder can be prevented, but a concerted effort to determine the proportion of such disorders that can be prevented is now possible. Shifting the focus toward prevention may help alleviate pressures on treatment resources; this would need to be empirically tested through community- or statewide implementation of prevention.

The mental, emotional, and behavioral health of young people cannot, and should not, be the responsibility of the mental health care system alone. Improvements or potential savings from effective prevention inherently benefit systems other than, or in addition to, the system implementing an intervention. Similarly, the failure of one system involved in a young person's life can have costs for another. For example, there is evidence that improving social and emotional functioning improves academic outcomes. Interventions involving both families and schools seem to have a high level of success. Increasingly, parents are bringing their children to physicians' offices with behavioral concerns. Schools and primary care settings may be

less stigmatizing for children and families and may enable exploration of emotional and behavioral health issues more openly than a mental health setting.

Successes in other areas, such as prevention of smoking, suggest that approaches that involve complementary components at multiple levels are needed. Involving multiple community systems has the potential to leverage resources and implement approaches that support young people throughout their development rather than only in a particular grade or a particular school.

Multiple federal programs have required state and local grantees to implement evidence-based programs. This has both raised awareness regarding evidence-based programs and created a missed opportunity to learn about effective implementation and how adaptation of programs to local circumstances might affect outcomes. This information is needed not only at the national level, but also to inform the community on progress, determine changes needed, and sustain interest in community-wide efforts. Creating systems that support the implementation of preventive interventions, allow their continuous improvement, and facilitate the introduction of new approaches, while evaluating results, should complement national research and planning efforts.

Recommendation 13-3: States and communities should develop networked systems to apply resources to the promotion of mental health and prevention of MEB disorder among their young people. These systems should involve individuals, families, schools, justice systems, health care systems, and relevant community-based programs. Such approaches should build on available evidence-based programs and involve local evaluators to assess the implementation process of individual programs or policies and to measure community-wide outcomes.

Both the identification of problems and resources and the development of solutions will vary by community. However, monitoring systems, a key component of public health, should be integral to any state or community-wide system in order to track the incidence and prevalence of MEB disorders as well as key risk and protective factors and provide information needed to guide efforts. Many states are implementing monitoring systems similar to available national surveys, such as Monitoring the Future, the Youth Risk Behavior Survey, and the National Household Survey of Drug Use and Health (Mrazek, Biglan, and Hawkins, 2004; Boles et al., 2006). These surveys provide estimates of substance use and, in some cases, data on adolescents' self-reported antisocial behavior and high-risk sexual behavior. States and communities need to develop monitoring systems that are capable of providing data on other targeted disorders. In addition,

these systems can be used to mobilize support for community-based prevention efforts. For example, annual data on adolescent depression could be used to motivate support for the implementation of evidence-based depression preventions. This requires, however, that data be summarized and delivered to key target audiences in a timely, clear, and useful manner. Web-based systems for delivering this information show great promise (Mrazek, Biglan, and Hawkins, 2004). Ideally, a template for a community monitoring system would be developed at the national level and available to all communities, and the national system recommended by the committee (see Chapter 2) would adopt use of unique identifiers to enable use by state and local networks.

MONITORING, FUNDING, AND TRAINING

National and state systems will have to be supported by adequate monitoring systems, funding, and trained personnel. In addition, rigorous standards must be developed and implemented to provide clear guidance to states and communities on the readiness for implementation of specific interventions. The committee's recommendations call for action in each of these areas by federal agencies and by relevant training programs.

- **Monitoring system.** There is a need to develop approaches to report on the prevalence of disorders and key risk and protective factors and to report on the utilization of mental health care services across multiple service systems that work with young people (see Chapter 2).
- **Standards.** Federal and state agencies need to identify and prioritize the use of evidence-based programs by applying scientific criteria to assess programs (see Chapter 12).
- **Funding.** Federal agencies need to increase resources to states and local communities to implement approaches to prevention, ideally partnered with research funding, targeted to communities with greatest need (see Chapters 8, 11, and 12).
- **Training.** Guidelines, model training programs, and accreditation standards are needed for training both researchers and practitioners on prevention of MEB disorders and promotion of mental health. Research training programs that facilitate creation of multidisciplinary training teams will advance translational prevention research efforts aimed at integrating developmental neuroscience and preventive intervention research (see Chapters 5 and 12).

REFINING AND EXPANDING PREVENTION RESEARCH

Substantial progress has been made since the 1994 IOM report in identifying mechanisms to affect risk or protective factors for MEB disorders, developing specific approaches to affect those factors, and strategies to prevent specific disorders, such as depression and substance abuse. However, despite the high prevalence of MEB disorders and the promise apparent from prevention research, research on prevention has not received attention or funding commensurate to that of treatment research.

Recommendation 13-4: Federal agencies and foundations funding research on the prevention of MEB disorders should establish parity between research on preventive interventions and treatment interventions.

Multiple federal agencies, across several departments, fund research related to prevention. Research priorities differ across agencies, making it difficult to systematically identify and address new research needs. Continued progress over the next decade and the nation's ability to reduce the prevalence of disorders will require that efforts to implement what is currently known are married with rigorous efforts to address gaps in research knowledge.

Recommendation 13-5: The National Institutes of Health, with input from other funders of prevention research, should develop a comprehensive 10-year research plan targeting the promotion of mental health and prevention of both single and comorbid MEB disorders. This plan should consider current needs, opportunities for cross-disciplinary and multi-institute research, support for the necessary research infrastructure, and establishment of a mechanism for assessing and reporting progress against 10-year goals.

Several specific recommendations related to gaps in research knowledge have been identified throughout the report and should be considered in development of this plan:

- **Screening.** Approaches needed to develop and test models for screening in school and primary care settings (see Chapter 8).
- **Intervention effectiveness.** Development of new and more effective interventions, as well as research aimed at replicating findings with a range of target populations and demonstrating outcomes over time, ideally across developmental phases (see Chapters 7 and 10).

- **Multi-institute collaborations.** Collaborative funding of interventions that target risk factors common to multiple disorders and assess multiple outcomes (see Chapters 4 and 12).
- **Cultural relevance.** Research on how interventions developed with one cultural or ethnic group work with other groups (see Chapter 11).
- **Economic analyses.** Need for guidelines, measures, and funding for economic analyses (see Chapter 9).
- **Dissemination and implementation.** Methodologies and strategies for dissemination and implementation of preventive interventions, including research on (1) state and community-wide implementation, (2) alternative approaches to implementation that vary such factors as type of provider or training, (3) potential strategies for use of the mass media and Internet, and (4) identification of program components that might facilitate implementation (see Chapter 11).
- **Competencies.** Need for improved understanding of etiology and development of competencies, their protective role, and development of measurement tools (see Chapter 4).
- **Neuroscience and prevention.** Approaches to linking findings from brain research and research on gene-environment interactions with intervention research, to test hypotheses related to epigenetics and neuroscience, and development of guidelines on ethics of using individually identifiable information (see Chapter 5).
- **Gaps in current research.** Interventions for such groups as young adults and young people with chronic health problems, in such settings as primary care, comprehensive interventions, and approaches to addressing poverty (see Chapters 6 and 7).

To assist in the implementation of a prevention research agenda and to help distinguish prevention research from treatment research, this report calls on the prevention community to adopt a definition of prevention that focuses on populations that do not currently have a disorder, including three levels of intervention: *universal* (for all), *selective* (for groups or individuals at greater than average risk), and *indicated* (for high-risk individuals with specific phenotypes or early symptoms of a disorder). However, it also calls on the prevention community to embrace mental health promotion as within the spectrum of mental health research. In addition, prevention researchers are advised to broaden the focus of their research to include consideration of cost-effectiveness and the impact of interventions on multiple outcomes.

ENVISIONING THE FUTURE

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. Implementation of the recommendations of this report will move it firmly in the direction of such a society.

This movement can be guided by a vision of what families, schools, neighborhoods, health care providers, and community organizations could be like. There would be a well-organized system of organizations, programs, and policies to ensure strong families and schools and nurturing neighborhoods. Young people would have access to high-quality, well-administered schools, access to health care and other community services, and healthy environments, activities, and food. The system would include the following elements specific to prevention:

1. Factors shown to improve the physical and mental health of children and their caregivers are explicitly addressed by the systems that provide services to them. Responsibility for and investment in interventions affecting children's development and long-term futures is shared by multiple service systems, including education, child welfare, primary care, and mental health.
2. Families and children have ready access to the best available evidence-based preventive interventions, delivered in their own communities in a culturally competent and respectful (nonstigmatizing) way.
3. Preventive interventions are provided as a routine component of school, health, and community service systems, reducing stigma to a minimum.
4. A well-organized public health monitoring system is in place at the national and community levels to track the incidence and prevalence of MEB disorders in young people and used to appropriately direct resources as well as to monitor the cost and impact of prevention and treatment efforts.
5. Services are coordinated and integrated with multiple points of entry for children and their families (e.g., through schools, health care settings, and community-based organizations, such as youth centers and churches).
6. As further new discoveries, interventions, or adaptations occur, including such innovations as the use of the Internet for preventive purposes, these are incorporated into already existing networks for the delivery of services.

7. Families are informed that they have access to resources when they need them without barriers of culture, cost, or type of service.
8. Families and communities are partners in the development and implementation of preventive interventions and learn to manage their access and utilization of prevention services.
9. The development and application of appropriate preventive intervention strategies contribute to narrowing rather than widening health disparities.
10. Teachers, child care workers, health care providers, and other professionals who work with young people are routinely trained on approaches to support the behavioral and emotional health of young people and the prevention of MEB disorders.

The type of system envisioned above, which routinely provides universal interventions that support healthy development for all and systematically identifies groups and individuals at greater risk to provide them with specific services, could result in very different outcomes for the nation's young people. Table 13-1 illustrates what a system might look like at various developmental phases.

International Perspectives

The committee was impressed with evidence showing that some of the prevention advances being suggested for the United States are already in place in other developed nations. A comprehensive review of international policies and programs is outside the scope of this report. However, a brief discussion and a few examples illustrate that our recommendations are not merely utopian dreams, but rather a call for the nation to make available to children and families the types of services and initiatives that are already being implemented in other countries.

Europe as a whole is working toward a comprehensive strategy on mental health, with a strong focus on mental health promotion and the prevention of MEB disorders (Jane-Llopis and McDaid, 2006). As this process unfolds, it could inform how the United States should integrate prevention into systems at the federal, state, and local levels while taking into account the distinct needs of different communities. At the World Health Organization Ministerial Conference on Mental Health in 2005, member states of the European Region endorsed a European Action Plan for Mental Health that includes the promotion of mental health and prevention of mental illness (World Health Organization, 2005). In support of the implementation of the action plan, the European Commission produced a Green Paper on Mental Health. This document outlined a framework to increase the coherence of health and nonhealth policies in support of mental

TABLE 13-1 Examples of Potential Components of A Prevention System That Supports Developmental Phases

Developmental Stage	In the Absence of Interventions	Illustrative Intervention Opportunities
Conception, pregnancy, postpartum	High risk of postpartum depression	Pregnant women screened routinely for risk factors and provided needed interventions, such as mood management training, home visitation, and nutritional counseling to prevent maternal depression during child's critical developmental stages
	Baby at risk for problems of attachment, later preschool or school problems, or later depression if mother is depressed	Well-baby visits to screen and intervene for developmental problems, abnormal feeding patterns, interactions with mother or other caretaker
Infancy	Infant at risk for abnormal development	Screening is offered for age-appropriate behaviors and evidence of normal brain development
	Early behavioral difficulties increase risk for later bonding problems, negative patterns of parent-child interactions	On-time remedial interventions are offered, such as parent training and referral to a developmental specialist
Preschool years	Child does not receive early cognitive stimulation	Caregivers are encouraged to read to their children
	Child does not learn self-efficacy, prosocial skills, or appropriate school behaviors	In-home and out-of-home enrichment experiences such as early childhood education are offered for the child to build skills needed for school and social success
		Families receive needed parenting support to foster nurturing relationships
Primary school	Child has difficulty establishing positive relationships with peers, caregivers, or teachers	Families and schools increase nurturance and decrease punitive experiences
	Child does not experience early successes	Children learn skills to enhance school performance and manage problem behaviors

continued

TABLE 13-1 Continued

Developmental Stage	In the Absence of Interventions	Illustrative Intervention Opportunities
Middle school	Early adolescent engages in risky behaviors, such as smoking, using alcohol or other drugs, delinquency, or risky sexual behavior	Families and schools provide high-level reinforcement for prosocial behavior
	Early adolescent experiences few academic successes and bonds with deviant peers	Young people at risk due to academic or peer interaction problems are identified and provided with individual or family intervention options
High school	Adolescent lacks self-esteem, has limited academic success, engages in antisocial behaviors, and does not develop positive health habits	Family and school-focused programs shape attitudes and behaviors around substance abuse, delinquency, and sexual behaviors and provide self-identity and coping skills
	Depression, conduct disorder, and substance abuse increase	Adolescents are routinely screened for early signs of depression and other MEB disorders, with appropriate interventions provided
Young adulthood	Young adult flounders in transition to independence, including continued education, employment, marriage, and childrearing	Community programs support decisions about education, work and relationships, and model parenting skills, including constructive parent-child communication
	Young adults struggle with readiness to have and to parent children	Interventions are available in college, the workplace, and community settings as needed to reduce obstacles to raising a family, including academic, job-related, and marital difficulties

health at the level of member states and communities (European Commission, 2005). The green paper launched a process that included consultation with relevant European institutions, governments, health professionals, and stakeholders in the research community and other civic sectors (European Commission, 2006). These deliberations on mental health include a strong emphasis on mental health promotion and prevention of mental illness.

To work toward developing a comprehensive strategy to address promotion and prevention in mental health, 29 European countries have formed the European Network for Mental Health Promotion and Mental Disorder Prevention. The aim of the network is to serve as an information resource to disseminate evidence-based knowledge and tools and to develop integrated approaches to training, policy, and implementation (Jane-Llopis and Anderson, 2006). Individual countries have linked their prevention programs to the shared policies of the European Union. This includes an emphasis on prenatal programs and a healthy start in life, along with early education programs, which are generally more developed and available than in the United States (Jane-Llopis and Anderson, 2006). In addition, many countries are working to integrate mental health promotion and prevention efforts both with the systems that address physical health and with antipoverty programs, recognizing that poverty is a major factor in the development of MEB disorders (Jane-Llopis and Anderson, 2005).

Many European countries experience challenges to translating this interest in promotion and prevention into action; these challenges are similar to those described in this report, including financing, infrastructure, and implementation support (Jane-Llopis and Anderson, 2006). However, there are also notable successes in nationwide implementation and comprehensive national approaches in Europe and elsewhere that offer promising models from which lessons can potentially be learned.

Some countries have undertaken nationwide or widespread implementation of specific evidence-based programs. For example, Parent Management Training, a program originally developed in the United States, has been adapted in Norway and implemented nationwide through the creation of a national implementation and research center that coordinates training for providers, supervision, consultation, and research in support of implementation with strong partnership at the regional and local levels (Ogden, Forgatch et al., 2005).

Australia has launched a National Mental Health Promotion, Prevention, and Early Intervention Action Plan (Commonwealth of Australia, 2000) as part of a multiyear effort to position mental health as a new strategic direction. It includes the implementation of multiple policies and programs as part of a national effort. As a component of a national initiative on depression, the Triple P Program (a multilevel parenting program; see Chapter 6) was tested on a population level in multiple Australian communities. It demonstrated significant reductions in the number of children with recognizable and borderline behavioral and emotional problems and the number of parents who reported depression, stress, and coercive parenting, although reductions were modest (Sanders, 2008).

The Netherlands has a comprehensive national infrastructure for health promotion and prevention that includes public health, mental health, and

addiction. This infrastructure includes mechanisms that support research and dissemination of evidence-based programs and involves multiple sectors, such as the health system, the justice system, and schools. It is supported by a specialized professional workforce of trained health promoters and prevention workers, about half of whom are primarily or partly focused on mental health (Jane-Llopis and Anderson, 2006). One of the areas of priority is the care of children of mentally ill parents. The Netherlands, as well as Finland, have implemented countrywide systems to support the children of mentally ill parents in their health care systems (see Box 13-1).

Scotland launched the National Programme for Improving Mental Health and Well Being in 2001. The key aims include raising awareness and promoting mental health and well-being, eliminating stigma and discrimination, preventing suicide, and promoting and supporting recovery from mental illness. The priority areas include, among others, the mental health of infants, children, and young people. The national programme includes campaigns; research, evaluation, and training initiatives; monitoring; partnerships; and implementation support at the national level as well as services and partnerships at the local level (National Programme, 2003). It is guided by a National Advisory Council made up of a range of stakeholders from the public and private sectors in a variety of settings, including schools, prisons, and the health system (Jane-Llopis and Anderson, 2006). The committee is not aware of outcomes data from this initiative.

Systematic attempts to affect the entire population have great value in public health, and integrative models in Europe and other countries may offer efficient approaches to supporting the development of young people, although empirical evidence to date appears to be lacking. Although these models still need more comprehensive study, as the United States moves forward with prevention, federal, state, and local governments should look for evidence-based progress in other countries and applicable lessons learned that can be adapted to systems here.

CONCLUDING THOUGHTS

The gap between what is known and what is being done is far too large. It can be addressed only by continuing to refine the science and by a strong commitment to develop the infrastructure and put in place systems that allow for equitable delivery of preventive interventions on a population-based, large-scale basis. The United States needs to build on the extensive research now available by addressing gaps in the available research and developing a shared vision and strategy for applying the knowledge at hand.

When *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research* was published in 1994, the majority of available

BOX 13-1
Health System–Based Approaches to Prevention
in the Netherlands and Finland

The Netherlands and Finland have both developed system-wide approaches that initially focused on children of depressed parents and now include prevention work with children of parents with mental illness.

The Netherlands

The Netherlands began in the 1970s to develop a network of prevention and health promotion teams. These teams were placed in multiple health sectors (e.g., public health, mental health, addiction clinics) and supported by prevention-oriented national institutes and national research centers. The work is part of a national health policy that allots about 5-10 percent of the budgets of community mental health centers for prevention of mental disorders.

The experience has been that having preventionists certified to do preventive care has made a difference. It also facilitates the adoption and dissemination of evidence-based programs when they become available and application of continuous quality improvement processes. Preventionists have a network in which they collaborate with research institutes. This structure enables a constant interplay between research and practice. It also has provided a vital infrastructure through which to deliver preventive services. Preventive care for children of the mentally ill is an integral part of the mental health and primary health care system.

Care of children of parents with mental illness is one of five mental health priority areas. To make care of children of mentally ill parents a regular part of the systems of care (not an isolated activity), adults with mental illness are routinely asked if they have children. If children are present, the family automatically qualifies for services. Parents and children receive informal home visits and are offered an array of services, including play and talk groups, information support groups, online websites, brochures, videos, school-based education, a buddy system for children and for parents, home-based mother-baby interventions, and parent training. Delivery of services is accompanied by extensive postgraduate training for providers. Many of the practitioners have been educated in Dutch academic and training programs that first focus on prevention, health education, and health promotion.

Finland

In Finland, under the leadership of Tytti Solantaus, a nationwide program has been developed effectively in a stepwise fashion starting in 2001. The Finnish Child Welfare Act states that if a parent is identified as receiving treatment, the needs of children should be addressed. Before 2001, there had not been a systematic program to do so. The initiative began with the Efficient Family Program, the aim of which is building care of patients' children into routine practice, with every parent receiving support. This was deliberately conceived as a change from an

continued

BOX 13-1 Continued

individual- and treatment-centered program to a family- and prevention-centered one. Mass media campaigns, national and local conferences, and seminars were offered, and the clinics' leadership and the clinicians were eager to learn. Training began with extensive training of master trainers, who then trained many others.

Over time, a decision was made to implement a series of interventions. This included the Family Talk Intervention (see Box 7-3), a 1-2 session intervention using a book for parents, the Let's Talk About Children discussion, peer groups, and family courses for parents and children. In addition, clinicians or adults (including parents) responsible for children could request a network meeting attended by all professionals involved in the care of a child to devise a coordinated plan. Health help booklets were also provided. This was combined with an extensive campaign to address postpartum depression. Implementation was accompanied by evaluations, with a randomized trial comparing the Family Talk Intervention with the Let's Talk About Children discussion under way.

Based on research showing that nurses, doctors, psychologists, social workers, and therapists can master the Let's Talk About Children discussion, the Finnish system now requires that each of these professionals be responsible for initiating child preventive services when working with mentally ill parents.

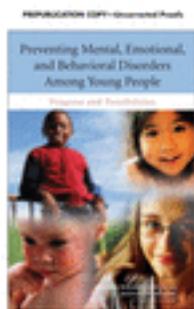
In this approach, prevention services in the Finnish system are not segregated, but rather routinely included in the work of all clinicians. At the end of 2006, there were 650 fully trained professionals and 80 qualified trainers in a country of 5 million. The work, which began with parental depression, has been extended to drug and alcohol problems, parents with cancer, and other severe physical illnesses. The specific example of children of mentally ill parents takes place against the larger backdrop of Finland's long tradition of adapting evidence-based preventive interventions in health and mental health nationwide. Their system is set up to accommodate new interventions as they become available.

SOURCES: Beardslee, Hosman et al., in press; Solantaus and Toikka, 2006; Toikka and Solantaus, 2006.

studies were efficacy studies, with a few addressing the effectiveness of interventions. The report called on the field to continue to develop rigorous efficacy and effectiveness evaluations while at the same time moving further toward the final stage in the proposed prevention research cycle to "facilitate large scale implementation and ongoing evaluation of the preventive intervention program in the community." It is now clear, however, that achieving community ownership and implementation of science-based preventive interventions is not only an issue of dissemination of information about effective interventions, but also a matter of empirically evaluating strategies achieving effective adoption, implementation, and maintenance

of evidence-based preventive interventions. The next major milestone will be the translation of existing knowledge into population-wide reductions in the incidence and prevalence of emotional and behavioral problems. One of the areas of greatest need is to develop strategies and outcome measures to ensure that high-quality evidence-based approaches are successfully adapted for use in a broad array of different cultural, ethnic, and linguistic settings. As research on development and implementation of specific interventions continues, states and communities need to also continuously refine effective interventions and implementation approaches.

Similarly, while there has been sustained research over the past 15 years, we recommend attention to areas that have heretofore been neglected, such as effectiveness in real-world situations, cost-effectiveness, integration of genetics and neuroscience with intervention research, and the careful monitoring of rates of disorder and present risk factors to assess whether population-based improvements can be achieved. Without adequate surveillance, what the burden of disorder is for the society or where best to direct national resources will not be fully known.



Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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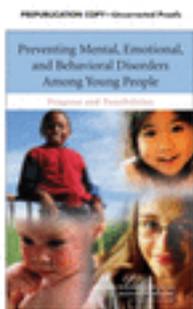
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Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Appendix D

Preventive Intervention Meta-Analyses

Pregnancy Prevention

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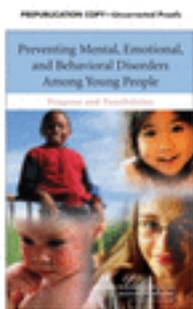
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Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities

Mary Ellen O'Connell, Thomas Boat, and Kenneth E. Warner, Editors; Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions; Institute of Medicine; National Research Council

ISBN: 0-309-12675-4, 576 pages, 6 x 9, (2009)

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Appendix F

Intervention Research Portfolio One-Year Snapshot: Summary Analysis

TABLE F-1 Intervention Research Portfolio One-Year Snapshot: Summary Analysis

Intervention type	NIMH (2006)	% of total (n = 51)	NIDA (2006)	% of total (n = 79)	NIAAA (2007)	% of total (n = 53)
Universal	9	18%	35	44%	29	55%
Selective	14	27%	23	29%	11	21%
Indicated	12	24%	22	28%	15	28%
Treatment	16	31%	2	3%	0	0%
Treatment of parent	0	0%	1	1%	0	0%
Not enough information to determine intervention type	1	2%	1	1%	2	4%
Multiple intervention types (<i>note that these are also included in the numbers above</i>)	1	2%	4	5%	3	6%
Trial type						
Efficacy	26	51%	26	33%	19	36%
Effectiveness	17	33%	29	37%	28	53%
Implementation/Dissemination	3	6%	14	18%	2	4%
Not enough information to determine trial type	9	18%	20	25%	10	19%
Multiple trial types (<i>note that these are also included in the numbers above</i>)	3	6%	9	11%	4	8%
Economic analysis						
Efficacy and Effectiveness	0	0%	1	1%	2	4%
Effectiveness and Implementation/Dissemination	3	6%	7	9%	4	8%
Economic analysis	4	8%	9	11%	4	8%
Target outcome						
Depression	13	25%	2	3%	1	2%
Anxiety	8	16%	1	1%	0	0%
Conduct problems	10	20%	22	28%	4	8%
Other EBD outcomes (except substance abuse)	16	31%	10	13%	1	2%
Substance use/abuse	7	14%	72	91%	53	100%

Substance use-related problems unspecified	0	0%	3	4%	20	38%
HIV/AIDS	14	27%	16	20%	7	13%
Risky sexual behavior	15	29%	22	28%	7	13%
Academic performance	9	18%	17	22%	3	6%
Other outcomes	9	18%	22	28%	17	32%
Not enough information to determine outcome	0	0%	1	1%	0	0%
Multiple outcomes (<i>note that these are also included in the numbers above</i>)	17	33%	42	53%	33	62%
Targeted risk factor						
Individual	35	69%	27	34%	23	43%
Screened early symptoms, deficits or behaviors	16	31%	20	25%	16	30%
Diagnosed disorder	17	33%	6	8%	1	2%
Other individual risk factor	7	14%	9	11%	7	13%
Family	3	6%	10	13%	0	0%
Parents with mental or substance abuse disorder	0	0%	2	3%	0	0%
Family disruptions	1	2%	0	0%	0	0%
Child abuse, neglect, family violence	1	2%	1	1%	0	0%
Foster care placement	1	2%	2	3%	0	0%
Other family risk factor	0	0%	5	6%	0	0%
Community or multilevel	14	27%	16	20%	8	15%
Poverty	10	20%	13	16%	4	8%
Other community risk factor	4	8%	6	8%	5	9%
High-risk unspecified	1	2%	6	8%	4	8%
No risk factor indicated	7	14%	31	39%	24	45%
Not enough information to determine if risk factor targeted	0	0%	0	0%	1	2%

TABLE F-1 Continued

	NIMH (2006)	% of total (n = 51)	NIDA (2006)	% of total (n = 79)	NIAAA (2007)	% of total (n = 53)
Target mediator						
Child skills or beliefs	45	88%	61	77%	42	79%
Family	9	18%	33	42%	14	26%
School	2	4%	5	6%	2	4%
College	0	0%	0	0%	6	11%
Community	2	4%	3	4%	6	11%
Policy	0	0%	0	0%	5	9%
Other mediators	6	12%	4	5%	8	15%
Not enough information to determine mediator	2	4%	8	10%	3	6%
Targeted developmental phase						
Prenatal	0	0%	1	1%	3	6%
Early childhood (0-5)	4	8%	6	8%	1	2%
Childhood (6-9, elementary school)	13	25%	18	23%	0	0%
Early adolescence (10-13, middle school)	17	33%	36	46%	10	19%
Adolescence (14-17, high school)	20	39%	30	38%	11	21%
Young adulthood (18-25)	12	24%	7	9%	36	68%
Children or youth, age unspecified	6	12%	6	8%	1	2%
Not enough information to determine development phase	2	4%	4	5%	0	0%
Demographics: race/ethnicity						
White, non-Hispanic	1	2%	4	5%	0	0%
Hispanic	3	6%	4	5%	1	2%
African American	6	12%	7	9%	3	6%
American Indian	1	2%	6	8%	0	0%
Minority unspecified	0	0%	3	4%	0	0%
Multiethnic unspecified	0	0%	12	15%	2	4%
Race not specified	44	86%	51	65%	48	91%

Other demographics						
New immigrants to US	0	0%	3	4%	0	0%
International	6	12%	7	9%	5	9%
Rural	4	8%	9	11%	6	11%
Urban	7	14%	10	13%	4	8%
Cultural adaptation of existing intervention						
	3	6%	10	13%	1	2%
Location of intervention						
Research setting	7	14%	4	5%	0	0%
MH or SA service system	2	4%	1	1%	1	2%
Health care system	4	8%	3	4%	7	13%
School (K-12)	13	25%	39	49%	5	9%
College	1	2%	1	1%	25	47%
Home	4	8%	4	5%	2	4%
Other settings	10	20%	19	24%	14	26%
Not enough information to determine setting	17	33%	22	28%	12	23%
Provider of intervention						
Research staff	27	53%	25	32%	21	40%
MH or SA provider	3	6%	2	3%	1	2%
Health care provider	1	2%	2	3%	3	6%
Paraprofessional	1	2%	1	1%	0	0%
Teacher	1	2%	13	16%	3	6%
Other school staff or school staff unspecified	2	4%	5	6%	6	11%
Media (videos, DVDs, CD-ROMs, etc)	6	12%	12	15%	15	28%
Other providers	11	22%	14	18%	17	32%
Not enough information to determine provider	7	14%	24	30%	11	21%

NOTE: Abstracts could be coded in more than one category so totals may not equal the number of abstracts.

