

Scan for Author
Audio Interview

The Next Generation of Obesity Research

No Time to Waste

Griffin P. Rodgers, MD

Francis S. Collins, MD, PhD

THE OBESITY EPIDEMIC IS NOT THE FIRST MAJOR health crisis that the United States has faced. In recent decades, progress has been made against such daunting challenges as tobacco use, infant mortality, and HIV/AIDS. However, obesity may pose the most significant challenge yet because it involves changing approaches to 2 fundamental aspects of daily life: food consumption and physical activity. To have any chance of release from obesity's ever-tightening grip, the nation will require broad-based efforts in every corner of society: homes, schools, community organizations, all levels of government, urban design, transportation, agriculture, the food industry, the media, medical practice, and, without question, biomedical research.

Research Is Needed to Determine What Works

Americans spend more than \$60 billion annually on weight-loss programs and products, yet scant evidence exists that these expenditures translate into lasting weight loss. Given the health consequences of obesity, the United States needs rigorous data on what approaches can help achieve and maintain healthy body weights over the long term.

Indeed, research has provided—and will continue to provide—the foundation of evidence needed to confront the obesity crisis in the most effective and efficient manner. Among the many questions to address are: Why are some individuals more susceptible to obesity? Can the knowledge of biology and behavior be used to develop and better target intervention strategies? What current strategies really work? For whom? Can these approaches be scaled up?

To address this need, research must proceed swiftly on 2 parallel fronts. The first is to devise practical and effective strategies for intervention, with special emphasis on preventive strategies that can be rapidly implemented in health care and community settings. The second is to evaluate community-based efforts that will soon be launched or are already under way, to gather data about their effectiveness, and to use that information to develop evidence-based interventions that can be applied on a wider scale.

Strengthening the Foundation

Basic research aimed at expanding understanding of the molecular basis of obesity will lay the groundwork for efforts to identify new and better therapeutic options. For example, elucidating molecular signals that drive appetite or exercise-mediated metabolic effects may enable development of better weight loss medications that do not have the adverse effects associated with previously marketed weight loss drugs. Basic research may also uncover new possibilities for prevention of or early intervention for obesity, such as recent discoveries indicating that epigenetic mechanisms that manifest during gestation or infancy may be associated with obesity.¹

Admittedly, these goals are elusive. Support for basic research aimed at yielding more immediate results is critical. For example, more work is needed to understand why bariatric surgery works as well as it does, including efforts to explain why patients with type 2 diabetes can experience benefits even before significant weight loss occurs.

Another near-term priority should be research focused on understanding the environmental risk factors for obesity. Heredity clearly plays a major role, yet the recent obesity epidemic cannot be blamed on the human gene pool since it has remained essentially constant over the last few decades. Thus, environmental factors must be assessed both for causes of the problem and for answers. An example of the potential benefits of environmental research is a randomized trial that demonstrated modest, but potentially important, reductions in extreme obesity and diabetes among low-income housing residents offered the opportunity to move to neighborhoods with lower levels of poverty.²

Not only should obesity research focus on changing unhealthy environments, it should focus on changing the environment early in life. Results of a recent study underscore the importance of intervening early: once overweight or obese children and teenagers develop type 2 diabetes, response to treatment is disappointing.³

How early should interventions start? Maternal obesity during pregnancy increases the risk that the child will develop obesity, type 2 diabetes, or both. Consequently, short-term interventions before or during pregnancy may yield long-lasting benefits for both mother and child. This fall, a new NIH-supported research consortium plans to launch a set of lifestyle

Author Audio Interview available at www.jama.com.

Author Affiliations: National Institutes of Health, Bethesda, Maryland.
Corresponding Author: Griffin P. Rodgers, MD, National Institutes of Health, 9000 Rockville Pike, Bethesda, MD 20892 (griffin.rodgers@nih.gov).

intervention studies aimed at overweight or obese pregnant women. Follow-up will continue at least 1 year after birth.

The next generation of obesity research must also advance understanding of behavioral risk factors throughout the first years of life. Recognizing that early behavior patterns usually begin at home, the NIH recently funded a study to evaluate a family-based behavioral treatment for obese preschoolers.

Behavioral and other kinds of research should further explore strategies involving innovative technologies. For example, interventions using mobile technologies may enhance the ability of medical professionals to reach people in real time. NIH-funded researchers recently reported encouraging results about how a combination of mobile technology, remote coaching, and financial incentives could lead to healthier eating and physical activity behaviors in adults.⁴

It is also imperative to support clinical trials that focus on patients at high risk for obesity-related complications. For example, the NIH-led Diabetes Prevention Program (DPP) trial, which involved overweight or obese adults with prediabetes, showed that exercise and dietary changes leading to modest weight loss (5%-7% of body weight) could prevent or delay development of type 2 diabetes.⁵ The DPP was effective in both men and women and all racial/ethnic groups studied, including those disproportionately burdened by obesity.

While demonstrating success in a clinical trial is important, equally important is translating the results to help a nation with more than 150 million overweight or obese people. With that goal in mind, NIH funded a pilot translation study that showed DPP-based interventions can be delivered effectively through local YMCAs (community centers), an effort now being scaled up by the Centers for Disease Control and Prevention and others. Building on this model, another NIH-funded study is testing whether a similar approach can be used to disseminate encouraging interim results of the Look AHEAD lifestyle intervention trial for obese adults with type 2 diabetes.⁶

Testing Effectiveness of Interventions

Faced with the alarming statistics on childhood obesity, policy makers in many communities are not waiting for the results of rigorously designed research studies and are taking whatever action they can to tackle the problem. However, research is important to determine which of these well-intentioned policies and programs are working and for whom. Such information is crucial to direct resources and energies to those strategies most likely to have a positive effect in reducing the obesity crisis.

What seems reasonable to try is not always effective and may even have unanticipated effects. For example, recent research has called into question the widespread assumption that proximity to healthy food is key to healthy weight. In areas where people use cars to shop, food choices may be driven more by affordability than proximity.⁷ More research is needed to understand why an obesity intervention succeeds or fails in a particular community or population. By studying community-

initiated programs and policy changes, researchers can generate useful data or insights for more deliberately designed studies.

To advance this type of real-world research, the NIH recently launched an effort that will make it possible to more rapidly fund studies of imminent program or policy changes. This will enable researchers to collect time-sensitive data just prior to implementation of a new program or policy designed to reduce obesity. Having baseline information will facilitate evaluation of the effectiveness of these approaches and will serve as a basis for ongoing comparisons.

Additionally, research can provide much-needed information for policy makers venturing into uncharted terrain to address the obesity epidemic. Like their predecessors who fought long and hard for no-smoking laws and restrictions on cigarette sales and advertisements, leaders in medicine and government who propose policies to address obesity, such as mandatory nutrition education in public schools and new taxes or quantity limits on sugary soft drinks, may be accused of supporting a “nanny state” model, unless they have rigorous data to support their efforts.

Rising to the Challenge

Biomedical research is essential for confronting the complex factors that underlie the nation's obesity crisis in a timely and effective manner. However, science alone is not enough to overcome a problem of this magnitude. While there are many key differences between the obesity epidemic and the health threats posed by tobacco use, infant mortality, and HIV/AIDS, the nation's clinicians, researchers, policy makers, food producers, business owners, educators, community leaders, and citizens should consider what it took to make significant progress against those formidable foes. Can the United States again rise to the challenge and change its attitudes, policies, behaviors, and environments in some fundamental ways? The health of the next generation depends on the answer.

Conflict of Interest Disclosures: The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Online-Only Material: The Author Audio Interview is available at jama.com.
Additional Contributions: We thank the additional cochairs of the NIH Obesity Research Task Force, Alan E. Guttmacher, MD, and Susan B. Shurin, MD, for their helpful comments on this article. They were not compensated for their contributions.

REFERENCES

- Perkins E, Murphy SK, Murtha AP, et al. Insulin-like growth factor 2/H19 methylation at birth and risk of overweight and obesity in children. *J Pediatr*. 2012; 161(1):31-39.
- Ludwig J, Sanbonmatsu L, Gennetian L, et al. Neighborhoods, obesity, and diabetes: a randomized social experiment. *N Engl J Med*. 2011;365(16):1509-1519.
- Zeitler P, Hirst K, Pyle L, et al. A clinical trial to maintain glycemic control in youth with type 2 diabetes. *N Engl J Med*. 2012;366(24):2247-2256.
- Spring B, Schneider K, McFadden HG, et al. Multiple behavior changes in diet and activity: a randomized controlled trial using mobile technology. *Arch Intern Med*. 2012; 172(10):789-796.
- Knowler WC, Barrett-Connor E, Fowler SE, et al; Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*. 2002;346(6):393-403.
- Wing RR; Look AHEAD Research Group. Long-term effects of a lifestyle intervention on weight and cardiovascular risk factors in individuals with type 2 diabetes mellitus. *Arch Intern Med*. 2010;170(17):1566-1575.
- Drewnowski A, Aggarwal A, Hurvitz PM, et al. Obesity and supermarket access: proximity or price? *Am J Public Health*. 2012;102(8):e74-e80.