Advancing Behavioral and Social Sciences Research to Meet the Challenges of Obesity and Diabetes

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The NIDDK Research Mission

To support and conduct research to combat diabetes and other endocrine and metabolic diseases, liver and other digestive diseases, nutritional disorders, obesity, and kidney, urologic and hematologic diseases.

- Chronic
- Common
- Consequential
- Costly
Age-adjusted Percentage of Obese and Diabetic U.S. Adults

**Obesity**

- **1994**
- **2000**
- **2010**

**Diabetes (diagnosed)**

- **1994**
- **2000**
- **2010**
Obesity and Diabetes “Fast Facts”

**Prevalence**
- Approx. 2/3 of U.S. adults overweight or obese
- Approx. 1/3 of U.S. adults obese
- Increasing in the young

**Complications/co-morbidities**
Stroke, coronary heart disease, diabetes, hypertension, certain cancers, osteoarthritis, obstructive sleep apnea, gout, non-alcoholic fatty liver disease, gallbladder disease, gynecologic abnormalities

**Costs**
Annual cost: $147 billion

**Diabetes**
- Approx. 25.8 million U.S. cases (8.3% of population)
- 90-95% of diagnosed cases in adults are type 2 diabetes
- Projected to ~50 million by 2050
- Increasing in the young

**Complications/co-morbidities**
Heart disease, stroke, blindness, kidney failure, foot ulcers and lower limb amputations, atherosclerosis, chronic wounds and skin ulcers, periodontal disease, depression, pregnancy-related complications, and urologic complications

**Costs**
Annual cost: $174 billion

[Image of human figure with highlighted areas for obesity and diabetes]
Strategic Planning for Obesity and Diabetes Research Emphasizes Role of Behavioral and Social Sciences in Prevention, Management, and Treatment
Translation Process

**T1 Translation**
Basic science discoveries used to develop new treatments

**T2 Translation**
Testing use of proven therapies in clinical practice & community settings

**Bench**
- Basic Research
  - Discovery
  - Mechanisms
  - Associations

**Bedside**
- Efficacy Trials

**Public Health**
- Effectiveness Trials
- Dissemination & Implementation Research

**NIDDK**
NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES

**NIH**
Basic Behavioral and Social Sciences Research...

- Seeks to answer the question: Why do people behave as they do?
- Research designed to further our understanding of fundamental mechanisms, processes, and patterns of behavioral and social functioning relevant to health and well-being
- Includes how these factors interact with each other, biology, and the environment
- Animal models or in humans
Obesity Related Behavioral Intervention Trials (ORBIT)

http://www.nhlbi.nih.gov/resources/obesity/trials/orbit.htm

- Interdisciplinary teams of basic and applied BSSR scientists conducting studies at seven centers across the country.
- Goal: Translate basic BSSR findings into more effective clinical, community, and population interventions to reduce obesity.
- Study populations include children and their families, Latino and African American adults, African American adolescents, low-income populations, pregnant women, and women in the menopausal transition.

Trans-NIH Initiative: “Translating Basic Behavioral and Social Science Discoveries into Interventions to Improve Health-Related Behaviors (R01)”


- Encourages innovative research that can yield effective clinical, community, and population-based behavioral interventions to improve specific health-related behaviors and/or prevent and reduce problem health behaviors.
Clinical Studies on Prevention and Treatment of Overweight/Obesity and Type 2 Diabetes Across the Lifespan

Critical Periods to Address Obesity/Diabetes Vulnerability

Intrauterine Environment, Childhood, Youth, Pregnancy, Middle Age, Older Age
Diabetes Prevention Program (DPP)

3,234 individuals at risk for type 2 diabetes. Compared to placebo:

- Lifestyle modification lowered risk by 58% (modest weight loss, from exercise and reduced fat and caloric intake)
- Metformin medication lowered risk by 31%

DPP Outcomes Study ongoing
LookAHEAD

5,145 overweight or obese persons with type 2 diabetes
Compared long-term effects of an intensive lifestyle intervention program vs. diabetes support and education on cardiovascular disease (CVD) morbidity and mortality
HEALTHY

School-based study to prevent type 2 diabetes risk factors

- 42 middle schools (Pennsylvania, Texas, California, Oregon, North Carolina), randomized for control or intervention
- Followed 4,600 students from 6th – 8th grade, >50% minority, low SES
- Multi-component intervention targeted changes in school food service and physical education, included a social marketing component, and provided behavior change curriculum

FINDINGS

- The comprehensive school-based program did not result in greater decreases in the combined prevalence of overweight and obesity than in control schools
- Half the students were overweight or obese at the beginning of the study
  - In this sub-group of high risk students, those in intervention schools had significantly greater decreases in the prevalence of obesity than those in control schools
- Overall, the combined rate of overweight and obesity fell by 4% in both intervention and control schools
“If you build it they will come.”
Applying behavioral interventions to manage weight and its comorbidities is complicated.

Need to pursue studies that will advance our understanding of what works for whom under what circumstances, including an understanding of how an individual influences and is influenced by his or her environment (social, economic, built, ...).

Bottom line:
Type 2 Translation in Diabetes and Obesity

Centers for Diabetes Translation Research (CDTRs): P30
- Research resources to close the gap between efficacy research and practice
- Support consultation/resource Cores in areas relevant to the NIDDK translation research program (e.g. R34/R18s)
- Encourage broad use of Centers—regionally and nationally

Translational Research to Improve Obesity and Diabetes Outcomes (R18)
PAR-12-172
- Test practical, sustainable, and cost efficient adaptations of efficacious strategies or approaches prevent and treat diabetes and/or obesity
- Approaches tested should have the potential to be widely disseminated to clinical practice, individuals and communities at risk
New Trans-NIH initiative announced August 2012, spearheaded by NIDDK and joined by NCI, NICHD, NIA and OBSSR

Establishes an accelerated review/award process to support time-sensitive research to evaluate a new policy or program expected to influence obesity related behaviors (e.g., dietary intake, physical activity, or sedentary behavior) and/or weight outcomes in an effort to prevent or reduce obesity.
Type 2 Translation: Partnerships

National Collaborative on Childhood Obesity Research (NCCOR)

- Public-private partnership: Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), the Robert Wood Johnson Foundation (RWJF), and the U.S. Department of Agriculture (USDA)

- Mission: To improve the efficiency, effectiveness, and application of childhood obesity research, and to halt – and reverse – childhood obesity through enhanced coordination and collaboration

- Resources for researchers: [http://nccor.org](http://nccor.org)
DPP Lifestyle Intervention and DEPLOY: A Success Story

How can we implement the highly successful DPP lifestyle intervention more cost effectively on a wide scale, while retaining the same health benefits?

Diabetes Education and Prevention with a Lifestyle Intervention Offered at the YMCA (DEPLOY)

Study Design:
- Comparative effectiveness trial
- Group-based DPP based lifestyle intervention at YMCA vs. brief education only
- 92 participants at risk for diabetes

Study Questions:
- Can the YMCA deliver group-based lifestyle intervention?
- Could it achieve similar weight loss to DPP’s lifestyle intervention?
- Would it be less costly than DPP?
DEPLOY: Weight Loss & Maintenance

• The answer to first two questions is yes: The intervention group had a 6% weight loss vs. the 2% weight loss in the control condition at 6 and 12 months
• This is weight loss comparable to that seen in DPP

DEPLOY: Costs and Cost-effectiveness

<table>
<thead>
<tr>
<th>PRE Diabetes Treatment</th>
<th>Cost per year</th>
<th>$US /QALY</th>
</tr>
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<tbody>
<tr>
<td>Intensive Lifestyle</td>
<td>$1,500</td>
<td>$11,000*</td>
</tr>
<tr>
<td>Group Lifestyle at YMCA</td>
<td>$240†</td>
<td>Cost Saving‡</td>
</tr>
</tbody>
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* https://research.tufts-nemc.org/cear/ratio0.aspx
‡ Herman, et al. 2005 Diabetes Care
DEPLOY: Public Health Impact

2011: Congressional legislation established the CDC-led National Diabetes Prevention Program

- Goal is to establish local evidence-based lifestyle change programs for people at high risk for type 2 diabetes
- Inaugural partners (YMCA and United Health Group) delivering an intervention based on DEPLOY
- Already provided services to thousands of patients
Looking to the Future...

NIH Workshop to Advance Basic Behavioral Science in Obesity Research

April 24 – 25, 2013
NIH campus, Bethesda, MD

**Topic Areas**

- Impulsivity and Executive Function
- Memory and Reward
- Stress and Self-Regulation

http://www2.niddk.nih.gov/News/Calendar/Obesity2013.htm