Connecting you with experts. Exploring the latest childhood obesity news and research.

We will begin at 3:05 p.m. to allow participants time to join the webinar.
• Spotlight: New Cost-Effectiveness and Impact Estimates for Childhood Obesity Interventions
• One on One
• What’s Next?
  • What’s Ahead for NCCOR in 2016
  • Call for Papers: Youth Energy Expenditure
  • NCCOR’s Catalogue of Surveillance Systems

TODAY’S PROGRAM
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Today’s Speakers

Elaine Arkin
National Collaborative on Childhood Obesity Research

Steven Gortmaker, PhD
Professor, Practice of Health Sociology,
Department of Social and Behavioral Sciences
Harvard T. H. Chan School of Public Health,
Director, Harvard Prevention Research Center
Lead Investigator, CHOICES
Interactive Poll

Today's Poll

How familiar are you with today's topic?

- Very Familiar
  - 0% (0)
- Somewhat Familiar
  - 0% (0)
- Not Familiar
  - 0% (0)
- No Vote
  - 0% (0)
How familiar are you with today’s topic?

A) Very familiar

B) Somewhat familiar

C) Not familiar
New Cost-Effectiveness and Impact Estimates for Childhood Obesity Interventions

Steven Gortmaker, PhD
Professor, Practice of Health Sociology,
Harvard T. H. Chan School of Public Health,
Director, Harvard Prevention Research Center
Lead Investigator, CHOICES
Financial Disclosures

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CHOICES Model

- Examine obesity programs and policies high on national agenda
- Systematic evidence reviews — generally used randomized trials and natural and quasi-experimental evaluations
- Projected impact of effectiveness, population reach, cost, and cost-effectiveness over the next decade
The CHOICES Team

Principal Investigator
Steve Gortmaker

Co-Principal Investigator
Angie Cradock

Modeling Team
Claire Wang | Milt Weinstein | Michael Long
Stephen Resch | Zach Ward
Howard Koh | David Hemenway

Intervention Team
Andrea Pipito | Kelly Blondin
Becky Mozaffarian | Emily Wei

Project Management
Katie Giles

Team Leads
Michael Long | Jessica Barrett | Amna Afzal | Mona Sharifi
Angie Cradock | Erica Kenney | Claire Wang & Amber Hsiao

Research Assistants

Intervention Working Groups

Stakeholder Group Members

Communications Advisors
Obesity in the United States

- At historically high levels
- Excess weight accumulates slowly
  - In young children energy gap is small — **33 kcal/day**¹
  - By adolescence, excess has accumulated for more than a decade — average imbalance **200 extra kcal/day**¹,²
  - For adults more substantial energy gap (for 14% with BMI >35, **500 kcal/day**)²
- Prevention should be the focus

Source: ¹ Wang, Orleans, Gortmaker 2012; ² Hall et al 2013
A Complex Issue

- Multiple risk behaviors shaped by multiple environments
- Requires multiple intervention strategies
- Hundreds of obesity treatment and prevention initiatives implemented with limited evaluative information
- Relative costs or cost-effectiveness of strategies generally not considered
CHOICES

• Which childhood obesity prevention policies and programs will result in the best value for decision makers to implement?

• “Value for money, value for many”¹

Source: ¹ Atun, R. 2015
Cost-Effectiveness Analysis

• Compares the relative costs and outcomes of two or more courses of action to estimate the value of public health programs or policies
Cost-Effectiveness Analysis

Difference in Cost

<table>
<thead>
<tr>
<th>Difference in Cost</th>
<th>Difference in Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher costs</td>
<td>Higher costs</td>
</tr>
<tr>
<td>Worse outcome</td>
<td>Better outcome</td>
</tr>
<tr>
<td>Lower costs</td>
<td>Lower costs</td>
</tr>
<tr>
<td>Worse outcome</td>
<td>Better outcome</td>
</tr>
</tbody>
</table>

- Higher costs, Worse outcome
- Lower costs, Worse outcome
+ Higher costs, Better outcome
+ Lower costs, Better outcome
In the Cost-Effectiveness Analysis, the impact of higher costs is compared to the outcome.

- **Higher costs** with a **worse outcome**.
- **Lower costs** with a **better outcome**.

The diagram illustrates two quadrants:

- Top right: Higher costs lead to a better outcome.
- Bottom left: Lower costs lead to a worse outcome.

Thus, choosing the option with lower costs results in a better outcome compared to higher costs.
CHOICES’ Approach

- Identify the best value among 40+ most relevant childhood obesity prevention interventions in the United States
- Intervention settings:
  - School
  - Transportation
  - Clinical
  - Community & government
  - Early and out-of-school care
Intervention Selection Process

- Conduct preliminary evidence review
- Convened expert stakeholder group
- Assessed 75 intervention strategies based on:
  - Evidence for effect on BMI, energy intake, and/or energy expenditure
  - Interest to decision makers
  - Impact on obesity and/or physical activity
  - Potential for clear specification
  - Program logic
  - Feasibility
  - Effects on disparities
  - Sustainability
  - Potential for side effects
  - Acceptability
- Selected 40+ strategies for modeling
• Selection of CHOICES model results for:
  – School
  – Early care and education
  – Community & government
  – Clinical treatment
## School Interventions

<table>
<thead>
<tr>
<th>Intervention Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Meals</td>
<td>Implementation of Federal Nutrition Standards in the National School Lunch and Breakfast Programs as part of the 2010 Healthy Hunger-Free Kids Act, per the USDA Final Rule issued January 2012</td>
</tr>
<tr>
<td>Smart Snacks</td>
<td>Implementation of the national USDA Smart Snacks in School regulation (part of the 2010 Healthy Hunger-Free Kids Act), as specified in the USDA Interim Final Rule issued June 2013</td>
</tr>
<tr>
<td>Intervention Name</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NAPSACC</td>
<td>Require completion of the Nutrition and Physical Activity Self-Assessment for Child Care (NAPSACC) Program for certification from state Quality Rating and Improvement Systems (QRIS) for ECE</td>
</tr>
</tbody>
</table>
# Community & Government Interventions

<table>
<thead>
<tr>
<th>Intervention Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu Labeling</td>
<td>Implementation of federal menu labeling regulations for restaurants and other venues serving prepared foods with 20 or more locations, which require listing calories per item and suggested daily total calorie intake anchor</td>
</tr>
<tr>
<td>Ad Exposure</td>
<td>Elimination of existing federal television advertising tax subsidy for unhealthy foods and beverages targeted at children ages 2 to 19</td>
</tr>
<tr>
<td>SSB Tax</td>
<td>Implement a national sugar-sweetened beverage excise tax of 1 cent per ounce</td>
</tr>
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</table>
# Clinical Interventions

<table>
<thead>
<tr>
<th>Intervention Name</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Bariatric Surgery</td>
<td>Perform bariatric surgery (including Roux-en-Y gastric bypass, laparoscopic adjustable gastric banding, and sleeve gastrectomy) to treat eligible, obese adolescents ages 13 to 19 years</td>
</tr>
</tbody>
</table>
## CHOICES Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases of Childhood Obesity Prevented</td>
<td>Cases of children with obesity in 2025 prevented by the intervention</td>
</tr>
<tr>
<td>Health Care Cost Savings per $1 Invested</td>
<td>Amount of health care cost savings from reduced obesity prevalence for every $1 invested in implementing the intervention</td>
</tr>
<tr>
<td>Intervention Cost per BMI Unit Reduction Per Person</td>
<td>Two-year annualized intervention costs per person receiving the intervention divided by the mean BMI unit reduction per person</td>
</tr>
</tbody>
</table>
CHOICES Model Inputs

- **Effect**: Expected impact on BMI or energy balance
- **Reach**: Number of people affected
- **Cost**: Resources required to implement
Logic Models

- Identify steps between intervention implementation and health outcomes
- Integrate evidence along multiple pathways
Systematic Evidence Reviews

• Conducted for each intervention to determine effect on BMI/BMIz or energy balance based on dietary intake and physical activity changes

• Prioritized evidence from
  – Experimental and quasi-experimental or natural experiments
43 Interventions

Title Screen: 129,469

Abstract Screen: 22,264

Article Review: 3,724

Article Abstraction: 635
CHOICES’ Model Inputs

- **Effect**: Expected impact on BMI or energy balance
- **Reach**: Number of people affected
- **Cost**: Resources required to implement
CHOICES’ Model Inputs

- **Effect**: Expected impact on BMI or energy balance
- **Reach**: Number of people affected
- **Cost**: Resources required to implement
Cost

- Cost of activities required to implement intervention
- Modified societal perspective on costs
- Includes all costs regardless of payer
- Does not include cost of intervention participants’ time
CHOICES’ Model

- Determine inputs
  - Reach
  - Effect
  - Cost
- Model impact of intervention on BMI, obesity rates, mortality, and health care costs
Microsimulation

- Models individual people over 2015-2025
- Calculates uncertainty intervals using Monte Carlo simulations programmed in JAVA
- More than 1,000 iterations for population of 1,000,000 simulated individuals scaled to national population size
  - Can represent population heterogeneity
  - Geographic location (state-specific model estimates)
  - Intervention effects on disparities
  - Individual-level body measures and behaviors
Microsimulation

• Models use data from:
  – U.S. Census and American Community Survey
  – Behavioral Risk Factor Surveillance System
  – National Health and Nutrition Examination Surveys
  – National Survey on Children’s Health

• Longitudinal data concerning weight and height from:
  – National Longitudinal Survey of Youth
  – National Longitudinal Study of Adolescent to Adult Health
  – Early Childhood Longitudinal Study-Kindergarten
  – Panel Survey on Income Dynamics
  – NHANES I Epidemiologic Follow-Up Study

• Health care costs from the Medical Expenditure Panel Survey
• Smoking initiation and cessation rates from the National Health Interview Surveys
• Mortality rates by smoking and BMI from the NIH-AARP Diet and Health Study.
Analytic Framework

Baseline scenario

2010 Virtual US Population

Simulate Forward to 2025

Population Factors
- BMI Trends
- Population Growth

Individual Factors
- Body Growth
- Other Behavior
- Smoking
- Mortality

Intervention scenario

2010 Virtual US Population

2015: Start Intervention

Intervention

Simulate Forward to 2025

Population Factors
- BMI Trends
- Population Growth

Individual Factors
- Body Growth
- Other Behavior
- Smoking
- Mortality

Model outcomes

- Intervention
  - Population reach
  - Annual costs

- Short-term
  - BMI reduction

- Long-term
  - Health care costs averted
  - Years with obesity prevented
  - Change in obesity prevalence
Intervention

2010 Virtual US Population

Effect Example: Reduction of 1 unit of BMI over 18 months (starting at age 10) and maintenance

Intervention specification:
- Recruitment
- Cost
- Effect

Sample intervention parameters in each iteration to account for uncertainty
• Two main approaches:
  – Treating obesity after onset (example: bariatric surgery)
  – Preventing excess BMI/weight gain through policy and programmatic interventions
Bariatric Surgery

• One treatment approach evaluated by CHOICES
• Among eligible 13 to 19 year-olds with obesity (BMI of 40 or greater)
• Perform bariatric surgery (including Roux-en-Y gastric bypass, laparoscopic adjustable gastric banding, and sleeve gastrectomy)
• Assumes 4-fold increase in adolescents receiving procedure
Impact of Bariatric Surgery

- Has a large effect on reducing BMI for those who receive it (mean reduction of 14.5 BMI units)
- But it does not substantially reduce obesity prevalence
- Of eligible adolescents, only 1 in 500 receive the surgery
- It is costly: $1,611 per BMI unit change
- Preventive interventions have smaller effects, but can reduce obesity prevalence because they reach millions of children

Cases of Childhood Obesity Prevented

- School Meals: 1,800,000
- Smart Snacks: 200,000
- NAPSACC: 0
- Menu Labeling: 0
- Ad Exposure: 0
- SSB Tax: 400,000
- Bariatric Surgery: 0
Health Care Cost Savings per $1 Invested

- School Meals: $0.42
- Smart Snacks: $4.56
- NAPSACC: $0.03
- Menu Labeling: $5.90
- Ad Exposure: $32.53
- SSB Tax: $30.78
- Bariatric Surgery: $0.00
• We cannot expect to treat our way out of the obesity epidemic:
  – **Treatment** of childhood obesity makes a relatively small impact on obesity prevalence – too little too late
  – **Preventive strategies** are critically important for addressing the epidemic
Multiple Strategies Needed

• No one prevention strategy will solve the childhood obesity epidemic
• We must implement multiple strategies in multiple settings
• If you want immediate health care cost savings, you need to implement interventions that impact both adults and children
Cases of Childhood and Adult Obesity Prevented

SSB Tax

Menu Labeling

0 1000000 2000000 3000000

Childhood Obesity  Adult Obesity
Additional Outcome

• The SSB Tax intervention would produce an estimated $12.5 (2015) billion/year in tax revenue.

• The elimination of the tax subsidy for marketing junk food and beverages to children would produce an estimated $80 (2015) million/year in tax revenue.
Impact on Disparities

• We need to be mindful of the existing inequities that impact access to interventions and/or to opportunities for physical activity and healthy diets
  – Some interventions can help to address disparities
Conclusions

• Policy makers must invest in prevention to reduce childhood obesity
• Interventions early in the life course have the best chance of reducing long-term obesity prevalence and related mortality and health care costs

Contact CHOICES
617-384-8545
cgiles@hsph.harvard.edu

Visit CHOICES
www.ChoicesProject.org
@CHOICESEproject
ONE ON ONE
Questions?

Please type your question(s) in the chat box located on the right.
Question:

What types of interventions will the project study in the future?
Question:

What are the benefits and disadvantages of modeling these interventions separately versus cumulatively?
Question:

Are there any other measures of impact or cost-effectiveness that you plan to include in future studies?
Questions from the Audience
What's Next?
What’s Ahead for NCCOR in 2016

• **Healthy Communities Study**
  • **Purpose:** Examining 130 demographically diverse communities and an estimated 5,000 children and their parents to explore promising programs and policies designed to address local childhood obesity rates.
  • **Results available in 2016!**

• **Childhood Obesity Declines Project**
  • **Purpose:** Exploring communities’ perceptions of potential drivers of reported declines in childhood obesity, particularly those that influenced disparities. Communities include Anchorage, AK; New York, NY; Granville County, NC; and Philadelphia, PA.
  • **Results expected in 2016!**
Call for Papers: Youth Energy Expenditure

- NCCOR’s Youth Energy Expenditure workgroup is developing a Youth Compendium of Physical Activities, a comprehensive and standardized list of the measured energy cost of youth activities.
- NCCOR invites investigators to contribute original research articles that will directly inform the development of the Youth Compendium of Physical Activities.
- Articles will be published in a special, open-access supplemental issue of the *Journal of Physical Activity and Health* in 2016.
NCCOR’s Catalogue of Surveillance Systems

• NCCOR’s Catalogue of Surveillance Systems provides more than 100 publicly available data sources relevant to childhood obesity research

• NCCOR is currently seeking recommendations for additional datasets to include in the Catalogue

• To submit your suggestions, visit www.nccor.org/nccor-tools/catalogue/feedback
Further Questions?

For questions about NCCOR or upcoming activities email the NCCOR Coordinating Center at nccor@fhi360.org
Thank you!