Dietary Policies to Improve Cardiometabolic Health in the US

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NOPREN
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Disclosures

• **Research support:** NIH, Gates Foundation, Unilever.

• **Consultant:** World Bank, Bunge.
Policy CVD Work Overview
Food-PRICe

Food-Policy Review and Intervention Cost-Effectiveness
under construction: www.food-price.org

Ongoing 2016-2020; NIH/ NHLBI R01-HL130735, PI Micha
Economic Analyses of Policy Strategies to Improve Diet and Reduce CVD

Completed 2013-2017; NIH/ NHLBI R01-HL115189, PI Mozaffarian
Comparative-Effectiveness of Population Strategies to Improve Diet and Reduce CVD
Comparative-effectiveness project

- **Aim 1.** To evaluate the comparative-effectiveness of evidence-based population interventions to improve diet.

- **Aim 2.** To evaluate the comparative-effectiveness of population diet interventions to reduce CVD, other chronic diseases, mortality and DALYs in the US.

Cost-effectiveness project

- **Aim 1.** To investigate the cost of implementing specific evidence-based policy strategies to improve diet and reduce CVD in the US.

- **Aim 2.** To estimate the cost-effectiveness of evidence-based policy strategies to improve diet and reduce CVD in the US.

- **Aim 3.** To evaluate the political and legal feasibility of cost-effective policy strategies to improve diet and reduce CVD in the US.
**Tufts Team**: Policy formulations, policy costs, policy effects, diet-disease RRs, dietary definitions and mapping

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Yue Huang  
Juju Liu  
Yujin Lee

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Shafika Abrahams-Gessel  
Stephen Sy  
Jenna Marie

**Liverpool Team**: US Food IMPACT model

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**NYU**: Legal feasibility

Jennifer Pomeranz

**Political feasibility**

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**Wake Forest**: Rogan Kersh

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Policy Advisory Group

**Sonia Angell:** Deputy Commissioner, New York City Department of Health and Mental Hygiene.

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**Tracy Fox:** Founder, Food, Nutrition & Policy Consultants.

**Harold Goldstein:** Executive Director of the California Center for Public Health Advocacy.

**Michael Jacobson:** Co-founder, Center for Science in the Public Interest.

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**Neena Prasad:** Director of Global Obesity Prevention, Bloomberg Philanthropies.

**Robert Ratner:** Chief Scientific and Medical Officer for the American Diabetes Association.

**Lynn Silver:** Senior Advisor for Chronic Disease and Obesity, Public Health Institute.
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<td>Food Policy 2017 2017doi: 10.1016/j.foodpol.2017.05.007</td>
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Diet-Related Cardiometabolic Burdens
Nutrition and Health

Risk Factors

Dietary risks
- Tobacco smoking
- High blood pressure
- High body mass index
- Physical inactivity and low physical activity
- High fasting plasma glucose
- High total cholesterol
- Ambient particulate matter pollution
- Alcohol use
- Drug use
- Lead exposure
- Occupational risks
- Low bone mineral density
- Residential radon
- Ambient ozone pollution
- Intimate partner violence
- Childhood sexual abuse

US Burden of Disease Collaborators, JAMA 2013
JAMA | Original Investigation

Association Between Dietary Factors and Mortality From Heart Disease, Stroke, and Type 2 Diabetes in the United States

Renata Micha, RD, PhD; Jose L. Peñalvo, PhD; Frederick Cudhea, PhD; Fumiaki Imamura, PhD; Colin D. Rehm, PhD; Dariush Mozaffarian, MD, DrPH

IMPORTANT In the United States, national associations of individual dietary factors with specific cardiometabolic diseases are not well established.

OBJECTIVE To estimate associations of intake of 10 specific dietary factors with mortality due to heart disease, stroke, and type 2 diabetes (cardiometabolic mortality) among US adults.

DESIGN, SETTING, AND PARTICIPANTS A comparative risk assessment model incorporated data and corresponding uncertainty on population demographics and dietary habits from National Health and Nutrition Examination Surveys (1999-2002: n = 8104; 2009-2012: n = 8516); estimated associations of diet and disease from meta-analyses of prospective studies and clinical trials with validity analyses to assess potential bias; and estimated disease-specific national mortality from the National Center for Health Statistics.
Poor diet accounted for 318,656 estimated annual cardiometabolic deaths, or roughly 1,000 premature deaths/day

Micha et al, JAMA 2017
Poor diet accounted for nearly 1 in 2 (45.4%) of all US cardiometabolic deaths. Achieving healthy dietary changes to improve CMD is an urgent priority.

Micha et al, JAMA 2017
Policies to Address Suboptimal Diet & Improve Cardiometabolic Health
Population-Based Dietary (Food) Policies

1. Prices
   - Tax
   - Subsidy

2. Reformulation
   - Product reformulations, e.g., TFA, sodium, sugar

3. Labeling
   - Front of Package label
   - Nutrition Facts Panel
   - Menu calorie label
   - Health warning label

4. Marketing
   - Mass media campaigns
   - Marketing restrictions

5. Food/ Built environment
   - Schools, childcare facilities
   - Government workplaces
   - Workplace wellness policies
   - Cafeterias, restaurants

6. Feeding programs
   - SNAP
   - WIC

7. Healthcare
   - Private health insurance incentives
   - Government health insurance incentives, Medicare/ Medicaid
Selected Meta-analysis

School environment
Effectiveness of School Food Environment Policies on Children’s Dietary Behaviors: A Systematic Review and Meta-analysis

RCTs (33) or quasi-experimental designs (41)

Direct Provision of Healthful Foods & Beverages

- Interventions providing healthful foods/beverages were mainly in classrooms (“direct” provision) or via increased availability in cafeterias, tuck shops or vending machines (“indirect” provision). F&V were most common.

Quality Standards for Competitive Foods & Beverages

- Competitive food/beverage policies generally targeted SSBs and unhealthy snacks. Strategies included product-specific restrictions; standards on nutrients, calories, or portion sizes; or both. SSBs and unhealthy snacks were most common.

Quality standards for school meals

- Policies on school meal (mainly lunch) standards generally targeted F&V, dietary fats, and sodium.
Policy Elements & Characteristics of Dietary Policy Design to Improve Cardiometabolic Health

(Tax example)

- Level of Government
- Target Population
- Dietary Target
- Dietary Target Definition
- Type of Tax
- Tax base
- Tax rate
- Taxed Entity
- Implementation mechanism
- Revenue/ Earmarking
CEA of Selected Policies
#1 Sodium Reformulation CEA
Quantifying the potential US health and economic effects of the FDA voluntary salt reformulation proposal

• Baseline scenario ‘no action’ (assuming current trends continue in the future)
  1. Optimal: 100% of applicable foods meet 2- and 10-year sodium targets
  2. Modest: 50% of applicable foods meet 2- and 10-year targets
  3. Pessimistic: 100% of applicable foods meet 2-year targets with NO further progress

• Map sodium reformulation proposed changes from:
  • FDA 16 food groups to NHANES sodium data
  • Reformulation in FDA food groups -> change in sodium consumption in each subgroup (age, gender and race)
  • Change in sodium consumption -> change in SBP -> effect upon CVD incidence/prevalence/mortality risk -> reflection on QALYs
CEA of Selected Policies

#2 SNAP+ CEA
Background and Rationale

• The Supplemental Nutrition Assistance Program (SNAP) is the largest federal nutrient assistance program in the U.S.

• In the past 10 years, there has been a 158% increase in SNAP participation.

• Currently, ~48 million low-income Americans participate in SNAP (1 in 6 Americans).

• SNAP cost $80 billion annually, > half of the entire USDA budget.

• SNAP participants have poor dietary habits and are at higher risk for disease.
Policy Scenarios

1. 30% subsidy on fruits and vegetables (F&V)

2. 30% subsidy on F&V AND sugar-sweetened beverage (SSB) restriction

3. 30% subsidy on F&V, whole grains, nuts/seeds, seafood, plant-based oils AND 30% disincentive on SSBs, junk food, and processed meats
Methods

Inputs:
1. SNAP demographics, 35+ yrs (NHANES)
2. Targeted dietary factors (2009-2014)
3. Policy effect
4. Diet-disease effects
5. Policy costs
6. Healthcare costs

CVD PREDICT
Microsimulation Model

Pandya et al., Med Decis Making, 2017
CEA of Selected Policies

#3 Medicare/Medicaid CEA
Previous Economic Incentives for Improving Health through Health Insurance

• Medicaid Incentives for Prevention of Chronic Diseases (MIPCD) focusing on
  • Diabetes prevention
  • Weight loss
  • Smoking cessation
  • Hypertension
  • High cholesterol

• However, the incentive program did not include **dietary** components as a foundation for achieving these goals
Study Aim

• To estimate the cardiovascular health and economic impact of a nationwide healthy food incentive program in Medicare, Medicaid, and dually-eligible beneficiaries using a validated microsimulation model (CVD PREDICT)

• Medicare beneficiaries
  • Individuals aged 65y+, end stage of renal disease, or disabled.

• Medicaid beneficiaries
  • Individuals who met percent of federal poverty level and eligibility category (e.g., children, pregnant women, disabled)

• Dual-eligibles
  • Low income elderly or disabled individuals who are jointly enrolled in Medicare and Medicaid.

Source: Kaiser Family Foundation, 2010
Policy Scenarios

1. The nationwide incentive program would subsidize 20% expenditure of fruits and vegetables (F&V incentive)

2. The nationwide incentive program would subsidize 20% expenditure of healthful foods including fruits, vegetables, whole grains, nuts/seeds, fish/seafood, and plant-based oils (HF incentive)
CEA of Selected Policies

#4 Added Sugar Label CEA
Despite Recent Decline, US Added Sugar Intake Remains High

- Diets high in added sugar, particularly SSB, increase the risks of obesity, type II diabetes, cardiovascular disease.
- Overconsumption of SSB alone has been linked to 40,000 US cardiometabolic deaths/year.¹
- Average US intake exceeds 300 Kcals/day (>15% of total daily calories).

1. Micha et al 2017 JAMA
Population-level approaches are needed to reduce intake

- DGA Recommends Limiting Added Sugar to <10% of daily calories.
- May 2016, FDA announced first major revision to the Nutrition Facts Panel (NFP) since 1993.
- Among numerous changes, manufacturers will be required to label added sugar content and percent daily value.
- Implementation date uncertain, likely early 2020
Study Aim

To quantify the cardiometabolic and economic effects of implementing FDA’s added sugar labeling policy over a 20-year horizon, and to further account for the extent of industry reformulation.
FDA Added Sugar Labeling Policy

Modeled scenarios

1. Reduction in added sugar intake due to labeling
2. Reduction in added sugar intake due to labeling + industry reformulation response
IMPACT US Food Policy Model

- Microsimulation
- Population Attributable Risk approach
- Simulates the lifecourse of “close-to-reality” adults (30 yrs+)
- All uncertainty incorporated in probabilistic sensitivity analysis
- Accounting for age and population trends in SSB intake and added sugar intake (2003 – 2009)
- Accounting for trends in BMI and type II diabetes, incidence and mortality trends for CHD and stroke, and trends in all-cause mortality and population trends
- Results stratified by age, sex, race
Key Inputs & Sources

• Baseline dietary intake, demographics and other risk factors
  • NHANES (2003 – 2014)

• Diet-disease relative risks
  • Micha 2017 JAMA

• Policy effect: 6.8% (±3%) reduction in intake due to labeling
  • Shangguan 2017 [submitted]

• Costs
  • Policy costs: FDA labeling Regulatory Impact Analysis
  • Cardiovascular disease cost: RTI
  • Diabetes cost: American Diabetes Associations
Dietary Policy Priorities

The current epidemic of nutrition-related disease requires a multifaceted approach

- National tax and subsidy framework to reflect the real costs of food.
- Strong health-aligned incentives in all food assistance programs.
- Industry incentives (and disincentives) to develop and market healthier foods.
- Comprehensive school and workplace wellness programs.
- Quality standards on salt and trans fat; marketing to children.
- Long-term agricultural policies for production, storage, transport, and sales of healthier foods.
- Modernize dietary guidelines to match the science.
Thank you!

Please send any follow up questions to renata.micha@tufts.edu