Political Determinants of Added Sugars Overconsumption

UCSF Dental Public Health Seminar
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No Conflicts of Interest Disclosures
Overview

• Added Sugars Overconsumption

• Political Determinants of Health
  – Politicization of Science
  – Politicization of Sugar Science
Added Sugars Overconsumption?

The US leads the world in sugar consumption

Source: USDA-ERS, Conadesuca, OECD, Credit Suisse Research, via The Conversable Economist
Children consume 50-70% more added sugars than Dietary Guidelines for American recommends.

DGA 2015:

“Healthy eating patterns limit added sugars to less than 10 percent of calories per day.”
Almost half of added sugars comes from sugary drinks

Figure 2-10.
Food Category Sources of Added Sugars in the U.S. Population Ages 2 Years and Older

Source: Dietary Guidelines for Americans, 2015-2020,
The political determinants of health—10 years on

BMJ 2015 ; 350  doi: http://dx.doi.org/10.1136/bmj.h81 (Published 08 January 2015)
Cite this as: BMJ 2015;350:h81

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Public health professionals need to become more politically astute to achieve their goals
Political Determinant of Health

• Politics = the process of making and executing collective decisions

• Political processes = elections, lobbying, law/ regulation/ policymaking

• Political outputs = laws, taxes, public services, etc. that produce health and other societal outcomes

Political outputs to reduce added sugars overconsumption

- **Affordability**
- **Acceptability**
- **Appeal**
- **Availability**
Engaging Public Health Professionals in Policy

• Public health professionals need to become more politically astute to practice and advance public health policy

• Current courses offer a health services perspective; focus on major health care systems

• Need to acquire broader public health policy-related knowledge, skills, and experiences

Moreland-Russell et al. Policy Help Needed, Experience Required: Preparing Practitioners to Effectively Engage in *Policy Health Promot Prac*t September 2016 17: 648-655,
FRAMING SUCCESSFUL PUBLIC POLICY
ACTION

Scientific Evidence/Data

Political Will/Public Support

Social Infrastructure/Systems in Place

Source: http://media.wix.com/ugd/93faa0_4a2285947c124b129e7aaf7a7b2d985c.pdf
SCIENTIFIC EVIDENCE - DATA/RESEARCH

- INCREASE IN OBESITY/DIABETES RATES
- HEALTH STATUS REPORTS: SSB CONSUMPTION/FOOD ACCESS
- HEALTH AND ECONOMIC EFFECTS OF OBESITY IN AC
- AC DENTAL STRATEGIC PLAN
- LUSTIG, BIBBINS-DOMINGO STUDIES (UCSF)
- SSB TAX IMPACT STUDIES – BERKELEY, MEXICO

Schillinger D¹, Jacobson MF².
Plaintiffs’ argued SSBs do not cause obesity, diabetes, and tooth decay

- Industry financed research
- Manipulating scientific communications
- Applying scientific reductionism
- Dismissing behavioral and econometric studies
- Demanding perfect scientific evidence
“Politcization” of Science (A Political Determinant of Health)

- when an actor overly accentuates the inherent uncertainty of science
- to cast doubt on scientific findings or the existence of scientific consensus
- in pursuit of a particular agenda

Politicization of Science
Studying Funding Bias

1. Use empirical methods to identify whether funding source is associated with research results

2. Use internal documents from industry sponsor to detect how a study was deliberately biased

Bero, L. Why the Cochrane risk of bias tool should include funding source as a standard item. http://www.cochranelibrary.com/editorial/10.1002/14651858.ED000075
1. Empirical Methods

RESEARCH ARTICLE
Relationship between Research Outcomes and Risk of Bias, Study Sponsorship, and Author Financial Conflicts of Interest in Reviews of the Effects of Artificially Sweetened Beverages on Weight Outcomes: A Systematic Review of Reviews

Daniele Mandrioli1,2,*, Cristin E Kearns3,4, Lisa A. Bero1
1 Cesare Maltoni Cancer Research Center, Ramazzini Institute, Bentivoglio, Bologna, Italy, 2 Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States of America, 3 Philip R. Lee Institute for Health Policy Studies, University of California San Francisco, San Francisco, California, United States of America, 4 Department of Orofacial Sciences, School of Dentistry, University of California San Francisco, San Francisco, California, United States of America, 5 Charles Perkins Centre and Faculty of Pharmacy, University of Sydney, Sydney, New South Wales, Australia

* mandinol@ramazzini.it


Schillinger D1, Tran J1, Mangurian C1, Kearns C1.
2. Analyzing Industry Documents

• O’Connor A. Coca-Cola funds scientists who shift blame for obesity away from bad diets.  

• Choi CAP. Exclusive: how candy makers shape nutrition science.  
  [Link](http://bigstory.ap.org/article/f9483d554430445fa6566bb0aaa293d1/ap-exclusive-how-candy-makers-shape-nutrition-science)

• Hacked emails show Coca-Cola Aims to Influence Hilary Clinton and the Media  
  [Link](http://www.forbes.com/sites/nancyhuehnergarth/2016/10/17/hacked-emails-show-coca-cola-aims-to-influence-hillary-clinton-and-the-media/#6c17ab1a5f1a)
2. Analyzing Industry Documents

Special Communication
November 2016

Sugar Industry and Coronary Heart Disease Research
A Historical Analysis of Internal Industry Documents

Cristin E. Kearns, DDS, MBA1,2; Laura A. Schmidt, PhD, MSW, MPH1,3,4; Stanton A. Glantz, PhD1,5,6,7,8

Author Affiliations | Article Information
Sugar Industry Trade Groups Concerned with Health Effects

http://journals.plos.org/plosmedicine/article?id=info:doi/10.1371/journal.pmed.1001798
Data Sources

<table>
<thead>
<tr>
<th>SEARCH</th>
<th>RESULTS</th>
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<tr>
<td>WorldCat</td>
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<td>“Sugar Research Foundation”</td>
<td>Project 226: 1965-66</td>
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<td>Google</td>
<td>Roger Adams Papers</td>
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<tr>
<td>“Sugar Research Foundation” and “archives”</td>
<td>1959-1971: 1551 pages</td>
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<tr>
<td>Diet/Heart Statements</td>
<td>D. Mark Hegsted Papers</td>
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<tr>
<td></td>
<td>1965-1966, 31 pages</td>
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<td>NAS, USPHS, AHA, AMA</td>
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## SRF CVD Projects: 1965-1974

<table>
<thead>
<tr>
<th>Year Initiated</th>
<th>Project Type</th>
<th>#</th>
<th>$</th>
<th>Publications</th>
<th>Citations to 2-2015</th>
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<tbody>
<tr>
<td>1965</td>
<td>Literature Review: Fat vs. Carbohydrate</td>
<td>1</td>
<td>$6,500</td>
<td>2</td>
<td>62</td>
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<tr>
<td>1966</td>
<td>Animals: Frequency of Feeding and EKG Changes</td>
<td>1</td>
<td>$324</td>
<td>0</td>
<td>-</td>
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<tr>
<td>1967</td>
<td>Starch vs. Sucrose and Blood Lipids</td>
<td>4</td>
<td>$64,974</td>
<td>6</td>
<td>118</td>
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<td>1967</td>
<td>Humans: Sucrose, Caffeine and Free Fatty Acids</td>
<td>1</td>
<td>$12,000</td>
<td>5</td>
<td>192</td>
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<tr>
<td>1968</td>
<td>Diet and Blood Lipids</td>
<td>1</td>
<td>$3,600</td>
<td>0</td>
<td>-</td>
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<tr>
<td>1969</td>
<td>Glucose Intolerance and CHD</td>
<td>1</td>
<td>$4,200</td>
<td>3</td>
<td>88</td>
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<tr>
<td></td>
<td>Total Total in 2015 Dollars</td>
<td>9</td>
<td>$91,598</td>
<td>16</td>
<td>460</td>
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SRF Project 226

CARIOVASCULAR DISEASE

#226 Carbohydrates in Cholesterol Metabolism
Dr. D. M. Hegsted and Dr. R. B. McGandy

A review of the scientific literature linking dietary carbohydrate to cholesterol was made and published, with a bibliography of 92 references. In their conclusions the authors said "Limiting evidence from studies on man as well as from researches on laboratory animals show a slightly significant role for the kind and amount of dietary carbohydrate and the regulation of serum lipids. These effects are somewhat more pronounced when diets low in carbohydrate are consumed. Since diets low in fat, high in sugar, are rare, we conclude that the practical significance of differences in dietary carbohydrate is minimal in comparison to those related to dietary fat and cholesterol."
Dissemination of Project 226

- Sugar has no role in CHD
- “no doubt” CHD can be adequately managed by reducing dietary cholesterol, and substituting saturated fat with polyunsaturated fat
- Some industry funding disclosed, but not SRF’s
Historical Context: What’s Wrong with the American Diet?

Diet Related to Heart Disease

Two separate scientific sessions last week contributed to the growing medical conviction that excess fats in the diet play an important part in the development of heart disease.

At the World Congress on Cardiology in Washington, specialists from the United States, Italy, Northern Europe, Japan, South Africa and Iraq agreed that high-fat diets, which are characteristic of rich nations, may be the scourge of Western civilization. The diets were linked with hardening and degeneration of the arteries. The United States has the highest death rate in the world from these causes, it was pointed out.

Civilization’s Dilemma

Dr. J. N. Morris of London, who called the artery afflictions “the epitome of health problems of this country,” can change ways of living. The latter seems more hopeful.”

The underprivileged countries, where little fat is available in the diet, appear, in this instance, to be privileged, it was pointed out.

Question of Calories

During the week-long meeting of the American Chemical Society here, Dr. Ancel Keys of the University of Minnesota, who was at the cardiology meeting also, said that it was not the number of calories in the diet so much as it was their source which determined whether an individual was eating his way to heart troubles. Dr. Keys pointed out that large amounts of dietary fat increased the amount of a fatty material called cholesterol in the blood, and that deposits of cholesterol in the arteries was the root of the heart disease problem.

September 1954, New York Times
If the American public switched to a low-fat diet, this change would mean an increase in the per capita consumption of sugar by more than a third.

SRF President H.B. Hass, 1954
Concerned the AMA had “indicate[d] that, in low fat diets, the kind of carbohydrate ingested may have an influence on the formation of serum cholesterol.”
1962-1964
Perception of CHD Risk Increases

“From a number of laboratories of greater or lesser repute, there are flowing reports that sugar is a less desirable dietary source of calories than other carbohydrates, eg – [Professor John] Yudkin.”

SRF Vice President John Hickson, 1964
1964- SRF Considered How to Counter Negative Risk Perceptions

• Public opinion poll
  • “to learn what public concepts we should reinforce and what ones we need to combat through our research and information and legislative programs.”

• Symposium
  • “bring detractors before a board of their peers where their fallacies could be unveiled.”

• Fund CHD Research
July 1965 - Surge in Media Attention

“Briefly, it may be the sugar you eat, rather than, or in addition to, the type of fat in your diet that increases your risk of heart attack...up to now, the sugar hypothesis has been mainly theoretical, supported by only a few studies.”

NY Herald Tribune
Serum Cholesterol

Serum Triglycerides

Annals of Medicine Series, 1965
SRF Commissions Literature Review
SRF Involvement with Review

$6500 [\$48,900]  

24 times
“Our particular interest had to with that part of nutrition in which there are claims that carbohydrates in the form of sucrose make an inordinate contribution to the metabolic condition, hitherto ascribed to aberrations called fat metabolism. I will be disappointed if this aspect is drowned out in a cascade of review and general interpretation.”
1966- SRF to Hegsted

“Let me assure you this is quite what we had in mind and we look forward to its appearance in print.”

SRF Vice President John Hickson
MEDICAL PROGRESS

DIETARY FATS, CARBOHYDRATES AND ATHEROSCLEROTIC VASCULAR DISEASE

ROBERT B. McCANDY, M.D.,† B. M. HEGSTED, Ph.D.,‡ AND F. J. STARE, M.D.¶

BOSTON

There is considerable evidence relating nutrition, presumably through its influence on the levels of circulating lipids, to the relentless progression of atherosclerotic vascular disease and to the well-known clinical sequelae that plague contemporary, highly developed societies. Unfortunately, it is difficult to unravel the precise and unique role of diet or of blood lipids in a disease in which a great many factors are known to be involved—a severe limitation to descriptive clinical and epidemiologic studies. On the other hand, since dietary alterations can significantly influence blood lipids, nutrition may be of some importance in the treatment and presumably in retarding or preventing atherosclerotic vascular disease. It may seem perfectly reasonable that “normalization” of one of the factors known to be associated with coronary heart disease and thrombotic cerebrovascular accidents would be beneficial. Until there is more than the currently available meager, direct evidence on the value of nutritional management, however, there will inevitably be doubt and controversy. In this respect, dietary recommendations designed to reduce the level of blood lipids have much in common with other investigative but unproved medical practices—specifically, the use of various drugs to lower blood lipids. Undoubtedly, such drugs will be of increasing importance as part of the treatment of coronary heart disease. It is highly unlikely that any type of drug therapy can ever take the place of dietary changes for essentially the total population, particularly the adolescent and young adult males, whose rising levels of blood lipids lead to marked coronary atherosclerosis even in the third or fourth decade of life.

Dietary fats and carbohydrates, which together constitute about 85 per cent of a person’s total caloric intake, have attracted the greatest attention as major factors influencing blood lipids. The wide variety of their sources makes possible a consider-

*From the Department of Nutrition, Harvard School of Public Health. Inquiries for reprint should be addressed to Dr. Stare at Harvard School of Public Health, 665 Huntington Avenue, Boston, Massachusetts 02115.

†The research referred to in this review that have been sponsored by the National Institutes of Health, the HYDOR Foundation, Incorporated, the Special Diets Industry Board, and the Fund for Research and Teaching, Department of Nutrition, Harvard School of Public Health.

‡Assistant professor of nutrition, Harvard School of Public Health.

¶Professor of nutrition, Harvard School of Public Health.

¶Professor of nutrition and chairman, Department of Nutrition, Harvard School of Public Health.

able diversity in the chemical makeup of each. The degree of saturation and the cholesterol content of dietary fats, the content of simple (monosaccharides and disaccharides) and so-called complex carbohydrates are the qualities of great current interest. The ratio of fat to carbohydrate calories can be varied widely. Although it is clearly important that specific dietary alterations be as effective as possible, a consideration of the long-term practicality of a dietary program must not be neglected, such a consideration must often limits the results achieved with dietary management.

One objective of this review is to consider some of the pertinent literature in this area and to interpret apparent dietary influences in a practical perspective.

Undoubtedly, the least controversial concept of atherosclerotic vascular disease is that a number of environmental factors act and interact with host factors in determining its inception, its progression and the ultimate clinical manifestations. Any reasonable weighing of the evidence from clinical, pathological, epidemiological and animal studies leads to this concept of multifactorial causation. Equally clear is the certainty that the disease is not an inevitable consequence of aging though its presence and severity differ widely from one population to another and between individuals within populations. A successful resolution and understanding of the independent contribution of each of the factors associated with the frequency of atherosclerotic vascular disease has been retarded and confounded by many problems, including the following: the apparent complexity of the tissue and hemodynamical factors influencing the location and the evolution of the pathological lesion; the still imperfectly understood relation between the underlying atherosclerosis and the subsequent clinical manifestations; the inability to assess conveniently the presence and extent of atherosclerosis in vivo, especially in the coronary and cerebral circulation (thus, in population studies it is difficult to know whether one is investigating the epidemiology of atherosclerosis or of thrombotic events; and the lack of an adequate experimental animal model either for atherosclerosis or for its clinical sequelae in man.

That diet, at least so far as it may influence the levels of blood lipids, is involved in the pathogenesis of atherosclerotic vascular disease is related to the following knowledge:

The elevation of blood lipids—in particular, the
Research Questions Addressed in Review

1. Does the high sucrose content of the American diet cause CHD?

2. What is the most effective dietary intervention to prevent and control CHD?

**eTable 1.** Summary of evidence reported in review related to the question: is the high sucrose content of the American diet causally related to CHD?

**eTable 2.** Studies described in the review by investigators considered threatening by SRF

**eTable 3.** Arguments that classes of evidence were irrelevant to determining if the high sucrose content of the American diet was a cause of CHD

**eTable 4.** Summary of evidence reported in the review related to the question: what is the comparative effectiveness of dietary interventions for the prevention of CHD?

**eTable 5.** Randomized controlled trials of dietary interventions substituting fat or complex carbohydrates for sucrose reported in the review

**eTable 6.** Randomized controlled trials of dietary interventions reducing dietary cholesterol and substituting polyunsaturated fat for saturated fat reported in the review

**eReferences**

This supplementary material has been provided by the authors to give readers additional information about their work.
**Question 1: Does Sucrose Cause CHD?**

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>RESULTS</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population Studies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sucrose and CHD morbidity/mortality</td>
<td>+</td>
<td>Individual Studies</td>
</tr>
<tr>
<td>outcomes</td>
<td></td>
<td>Investigator incompetence</td>
</tr>
<tr>
<td><strong>Experimental Studies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humans</td>
<td>+SC</td>
<td>Poor methodology, data quality</td>
</tr>
<tr>
<td>Animal</td>
<td>+TG</td>
<td></td>
</tr>
<tr>
<td><strong>Mechanistic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bile acid metabolism</td>
<td>+</td>
<td>Inadequate interpretation</td>
</tr>
<tr>
<td>Endogenous lipogenesis</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Politization of Sugar Science
Strategy #1: Cast Doubt

• Accentuated inherent uncertainty of sucrose studies
  – Individual Studies
  – Evidence Modalities

• Ignored overall consistency and coherence of epidemiologic, experimental, and mechanistic evidence
What is the most effective dietary intervention to prevent and control CHD?

- Question 2a: Effectiveness of Modifying Sucrose Content of American Diet?
- Question 2b: Effectiveness of Modifying Fat Content of American Diet?
### Question 2a: Effectiveness of Modifying Sucrose Content of American Diet

<table>
<thead>
<tr>
<th>Population</th>
<th>Intervention</th>
<th>Results</th>
<th>Interpretation</th>
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</thead>
<tbody>
<tr>
<td>Healthy</td>
<td>Fat</td>
<td>TG</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Irrelevant Biomarker</td>
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<tr>
<td>High TG</td>
<td>Starch</td>
<td>TG</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not Generalizable</td>
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<tr>
<td>Healthy</td>
<td>Vegetables</td>
<td>SC</td>
<td>X</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Not feasible</td>
</tr>
<tr>
<td>Healthy</td>
<td>Starch</td>
<td>SC</td>
<td>X</td>
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<tr>
<td></td>
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<td>Small effect, low coherence</td>
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Question 2b: Effectiveness of Modifying Fat Content of American Diet

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<th>Population</th>
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<th>Results</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy</td>
<td>Polyunsaturated fats; reduce dietary cholesterol</td>
<td>SC</td>
<td>Only Relevant Biomarker</td>
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<tr>
<td></td>
<td></td>
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<td>Highly feasible</td>
</tr>
<tr>
<td></td>
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<td>Overstated coherence</td>
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After paper-strip electrophoresis facilitates a diagnosis by pinpointing condition (above), diet and drugs can control it. But does this cut atherosclerosis short?
Politics of Sugar Science
Strategy #2: Issue Framing

• Research question: What is the effect of dietary factors on serum cholesterol?

• Evidence modality: RCTs only

• Population: general ‘healthy’ population
Policy Implications for Sucrose

• Health claims for artificial sweeteners

• Clinical dietary guidance
Regulatory Synergies

• Bolster scientific substantiation for health claims for corn and cottonseed oils

• Bolster scientific substantiation of pharmaceuticals targeting serum cholesterol
Relevance to 2016

- Risk assessments of sugar consumption inconsistently cite CHD risk
Relevance to 2016

• Risk assessments of sugar consumption inconsistently cite CHD risk
Relevance to 2016

• Absent industry efforts, would the unique CHD risk of added sugars be more widely accepted?
Quiz Time:

What year was this article published?