

Sodium reduction and health policy

Adapted from:

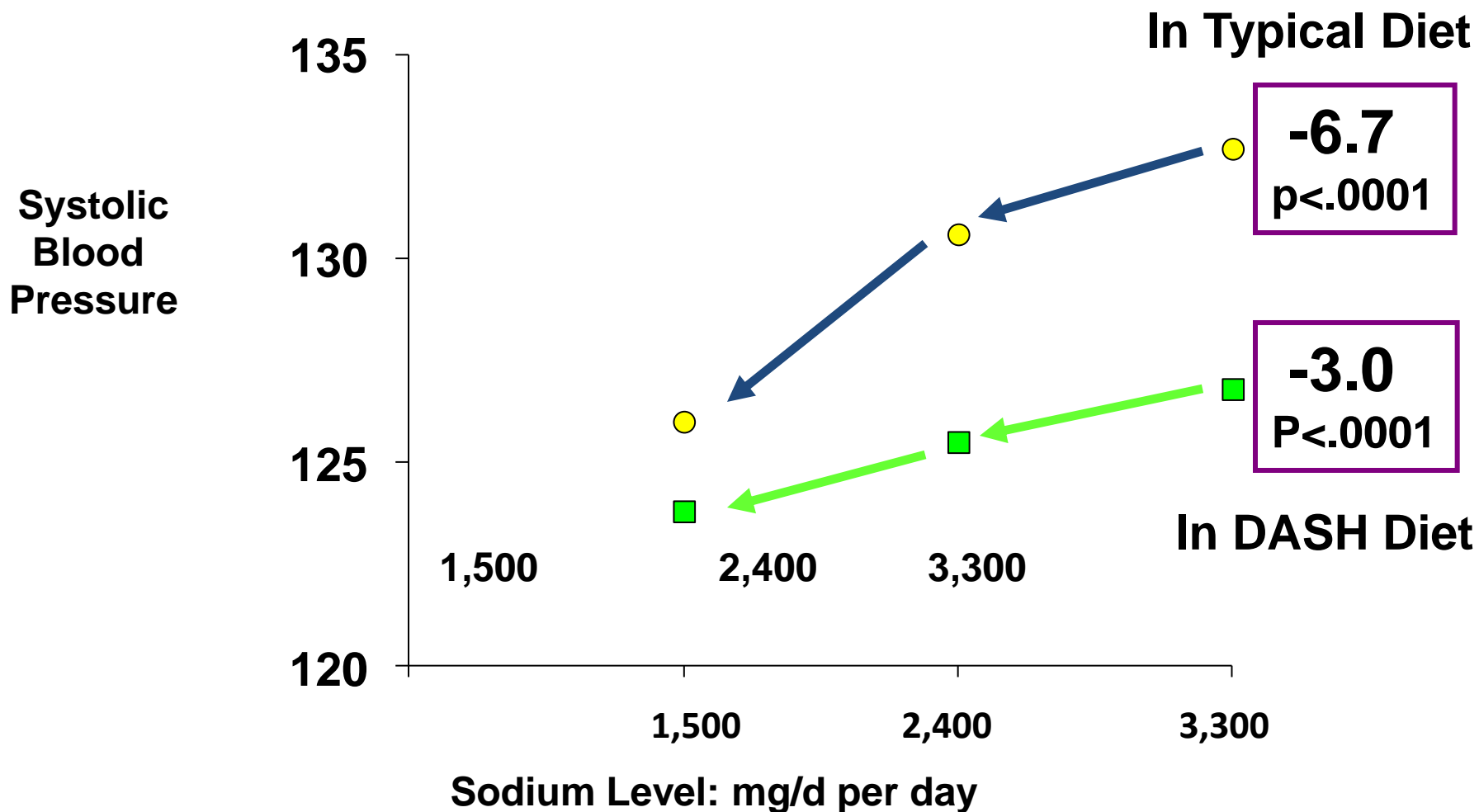
Appel LJ, Angell SY, Cobb LK, et al. Population-wide sodium reduction: the bumpy road from evidence to policy. *Ann Epidemiol. Jun;22(6):417-425.*

The Problem and The Evidence

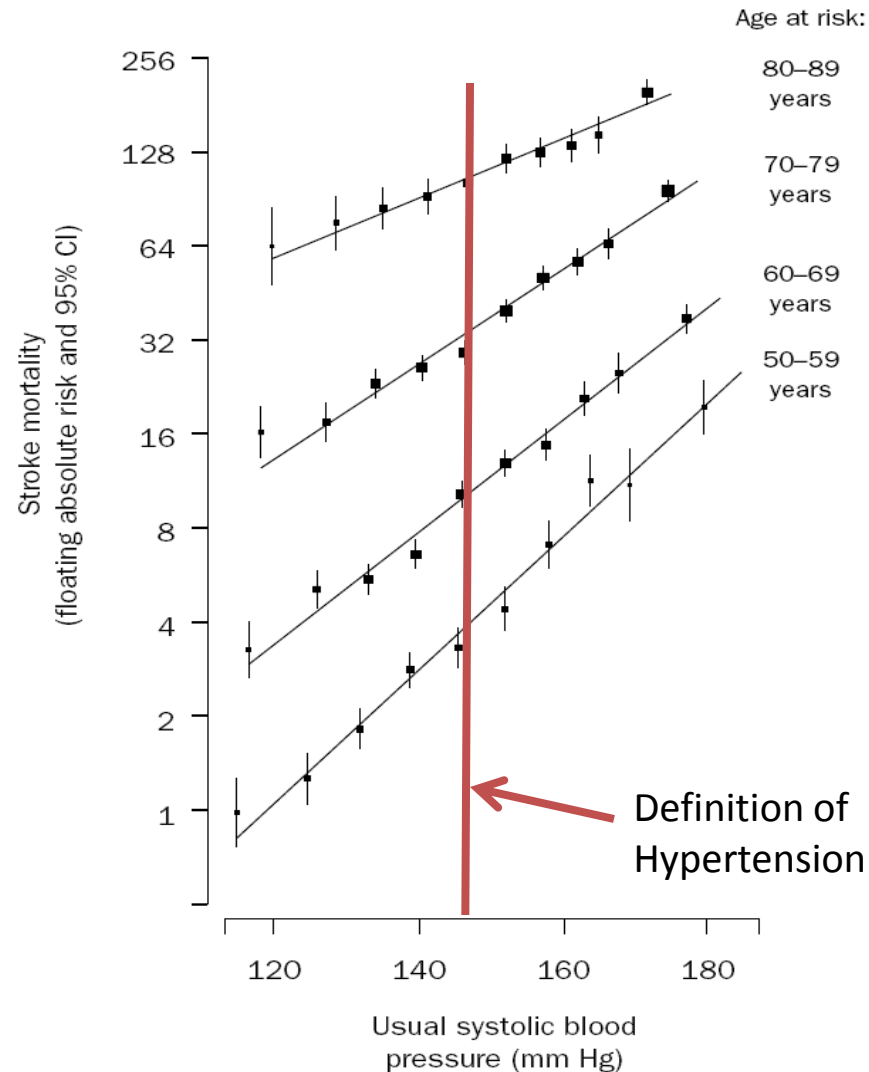
- Excess sodium intake has been convincingly linked to elevated blood pressure
- Blood pressure related diseases are leading causes of morbidity and mortality in the United States
 - Heart Disease
 - Stroke
 - End-Stage Renal Disease



As Sodium Intake Is Reduced, So is Blood Pressure



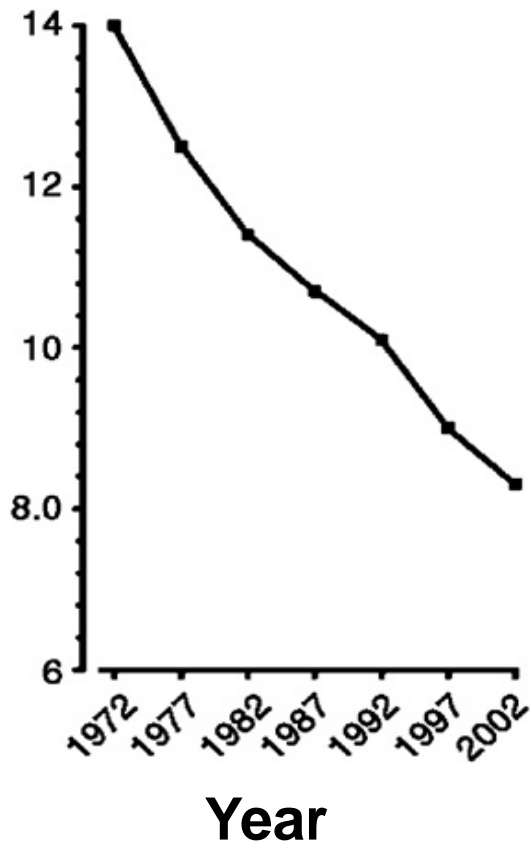
Stroke Mortality by Level of Usual Systolic BP*



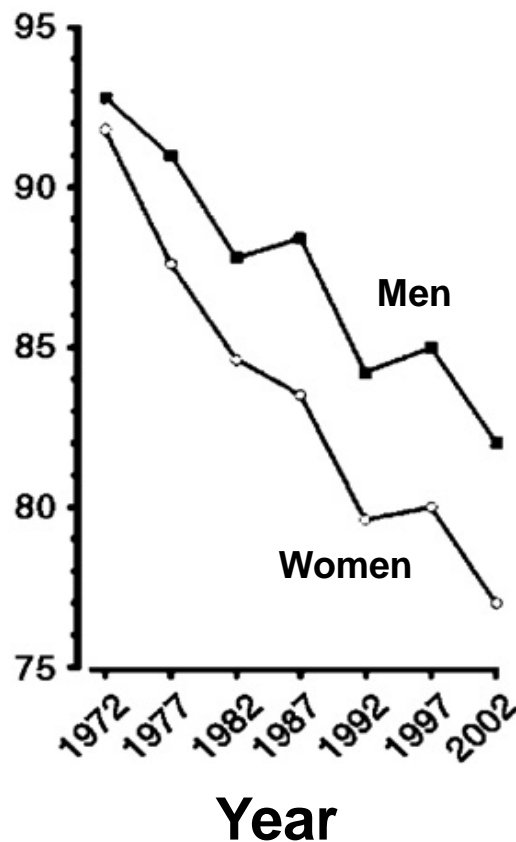
*Source: Prospective Studies Collaboration, Lancet, 2002: Meta-analysis of 61 prospective studies with 2.7m person-yrs, 11.9k deaths

Finland: Salt Intake, BP and Stroke Mortality Over Three Decades

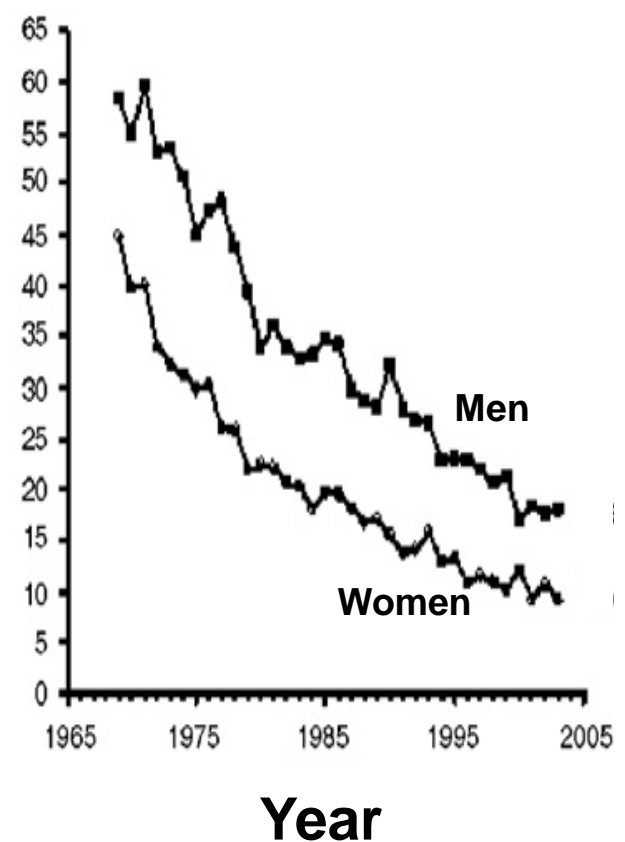
**Salt intake
(g/day)**



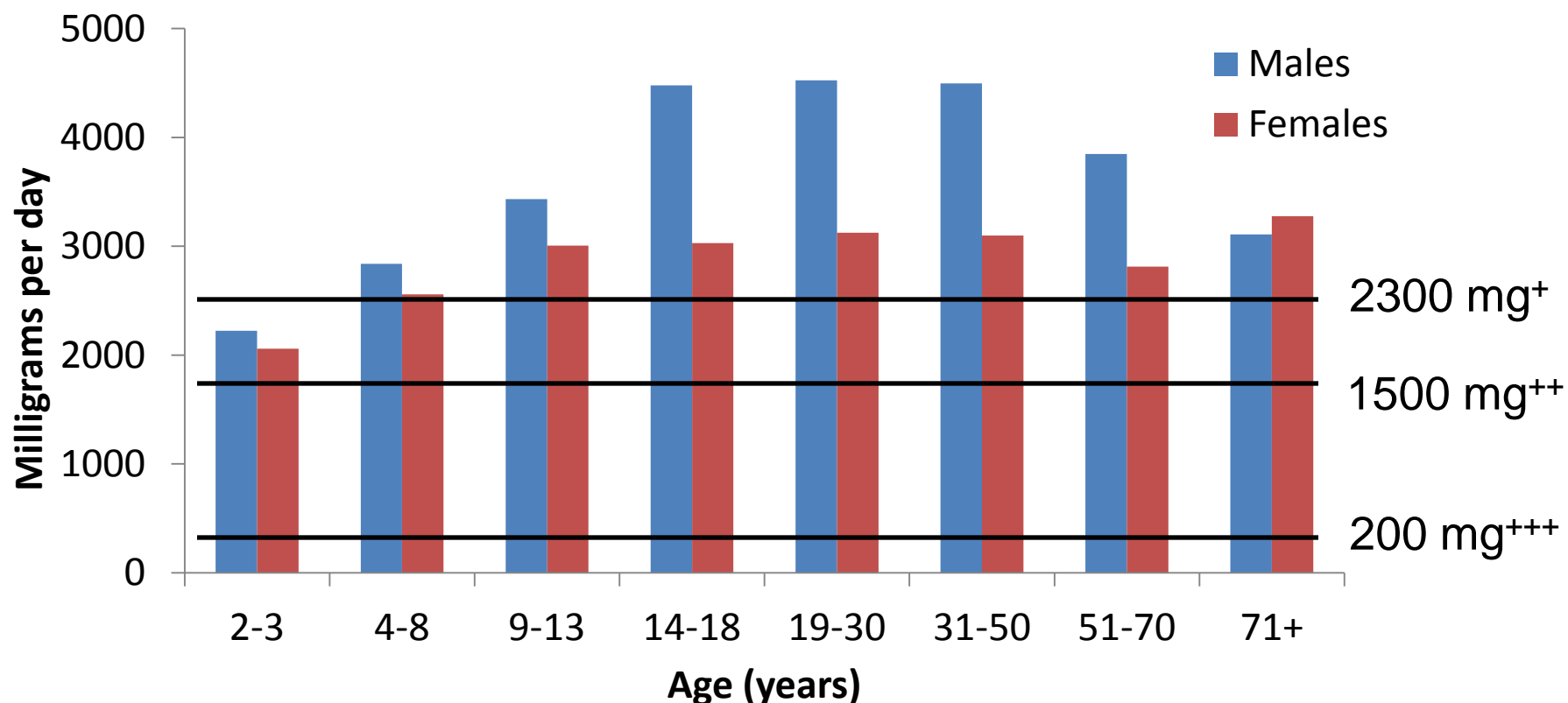
**Diastolic BP
(mmHg)**



**Stroke mortality
(1/100000)**



Estimated Mean Daily Sodium Intake in US, by age/sex Group, 2005-6



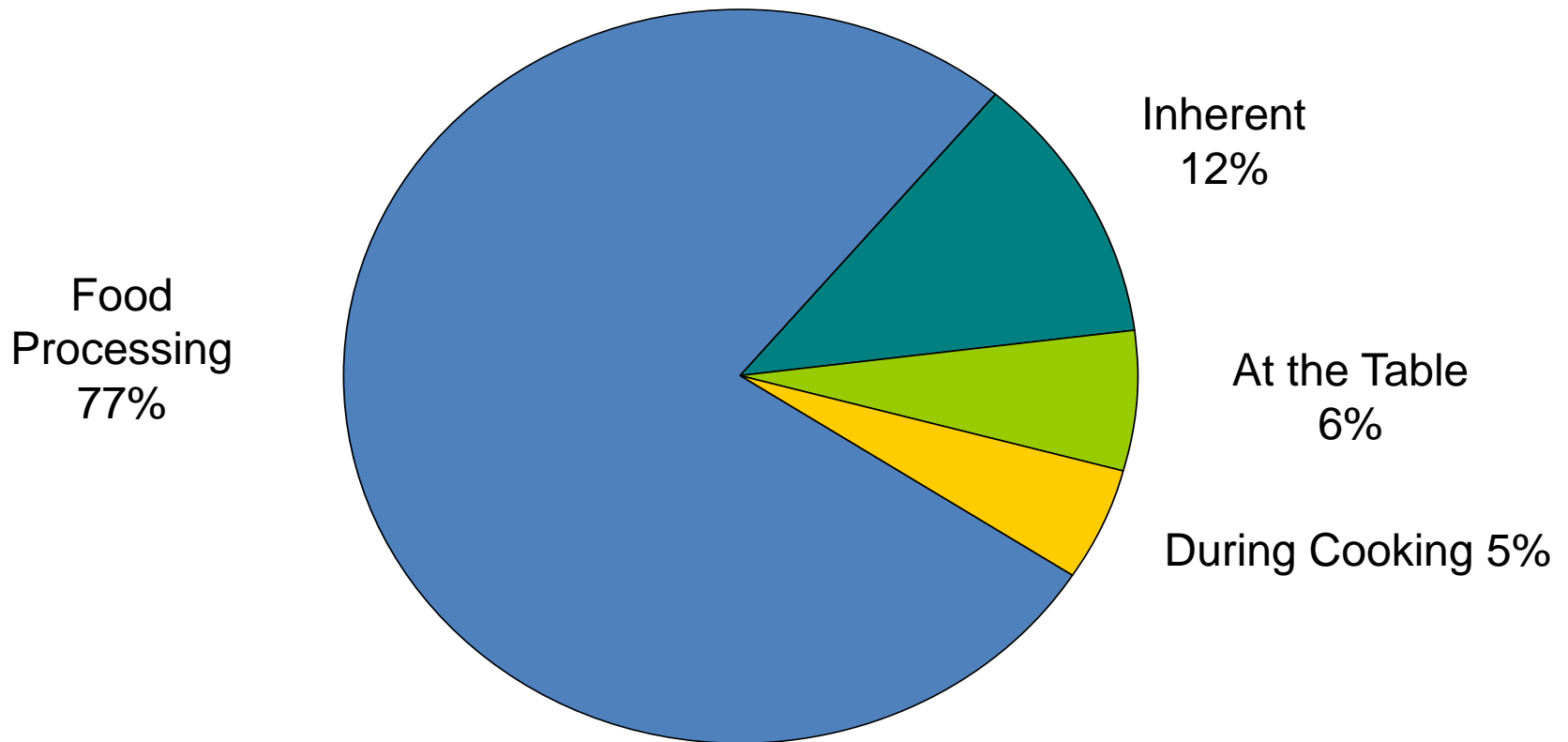
+ Recommended upper limit of intake for adults

++ Recommended intake for blacks, hypertensives, and middle- and older-aged adults

+++ Needed to replace obligatory losses (Dahl, 1958)

Sources of Dietary Sodium

(62 adults who completed 7 day dietary records)



The Stakeholders

- Professional Health-Related Organizations
- Scientists
- Government
- Commercial Interests
- Other Interest Groups
- The Public

Stakeholders

- Professional Health-Related Organizations
 - AMA, APHA, American Heart Association
 - Efforts include issuing guidelines and advocating for sodium reduction
 - Sodium is just one part of broader policy agendas
- Scientists
 - Advocate both sides of the sodium reduction issue
 - It is challenging for non-scientists to evaluate the validity of arguments and data
 - Eg. Policy makers, government officials, the general public

Stakeholders

- Government
 - Federal
 - National Heart, Lung, and Blood Institute (NHLBI) at NIH
 - USDA
 - DHHS
 - CDC
 - State and Local
 - Efforts focus on two areas
 - Consumer education
 - Changing the climate of consumer choice

Stakeholders

- Commercial Interests
 - The National Restaurant Association, the Grocery Manufacturers Association, the Chamber of Commerce, the Salt Institute
 - Represent a wide spectrum of industries that manufacture, prepare, and sell food
 - Various positions toward sodium reduction, from complete opposition to voluntary participation
- Other Interest Groups
 - Anti-sodium reduction: the Center for Consumer Freedom
 - Pro-sodium reduction: World Action on Salt and Health (WASH), the Center for Science in the Public Interest (CSPI)

Past Efforts

- Two major approaches:
 - Consumer Education and Individual Behavior Change
 - Changing the Context of Consumer Decision Making
- Efforts are mainly government led
- The White House Conference of Food and Nutrition in 1969 marked the start of U.S. sodium reduction efforts

Consumer Education Efforts

- 1972: NHLBI launches the National High Blood Pressure Education Program
- 1980: U.S. Dietary Guidelines for Americans recommends against excess sodium intake
- 1981: FDA launches a public education initiative and encourages manufacturers to list sodium content information on packaging

Voluntary Efforts to Change Consumer Context

- 1980: DHHS set national objective to decrease sodium in processed foods 20% by 1990
- 2000s: APHA and AMA appeal to food industry to reduce sodium 50% in 20 years
- 2008: the National Salt Reduction Initiative launches, focusing on voluntary commitments from industry

No monitoring, accountability, or evaluation plans were included with these efforts.

NSRI is emphasizing monitoring and evaluation

Mandatory Efforts to Change Consumer Context

- 1993: FDA included sodium on the list of nutrients mandatory on packaged food labels
- 1995: USDA set sodium content standards for food available in public schools
- Similar policy restrictions exist at all levels of government, as well as in private institutions such as hospitals and workplaces
- 2010: IOM issues report recommending regulatory approach
- 2011: FDA issued a public request for information concerning removing sodium from the GRAS list (Generally Regarded as Safe)

UK Salt Campaign

- Goal: Reduce salt intake by 1/3 from 2005 to 2010
 - More than 50 commitments from all sectors of the food industry
 - Gradual reductions across product categories
- Product salt reductions achieved
 - Heinz: 32% to 58% ↓ in some canned products
 - Nestle: 25% ↓ in soup mixes and bouillons
 - Kellogg's: 50% ↓ in some cereals
 - Kraft: 30% ↓ in cheese
- Population salt intake is encouraging: ~ 10% ↓

Barriers to Policy Making

- Opposition activities and arguments
- Challenges to conducting high quality research
- Sodium intake is not a discrete activity (like smoking)
 - There is an intermediate between consumers and sodium: their food
 - This does not exist for smoking, alcohol, etc

Opposition Activities

- 1) Call for more research, particularly research that can never be done
- 2) Focus on susceptible subgroups
- 3) Discredit scientists who receive funding from government
- 4) Create theater at high profile moments
- 5) Invoke tangential issues
 - “Nanny state”
 - “Harm from dehydration, iodine deficiency”

Measurement of Sodium Intake: A Nasty Problem

- High day-to-day variability within an individual
- High ratio of intra-person/inter-person variability
- Underreporting of salt intake
 - Incomplete urine collections and dietary recalls
 - Table salt not measured
- Diet assessment complicated by:
 - Incomplete food composition tables
 - High variability within products

Published Literature

- 1) Research with flawed methods is commonly published
- 2) Difficult for non-epidemiologists to critique publications
- 3) Unclear how to synthesize these results
- 4) Conflicting results from the same study (e.g. NHANES)
- 5) Conflicting meta-analyses

Lessons Learned

- Epidemiologists have a crucial role in evaluating and synthesizing evidence
- Evidence-based medicine creates unrealistic expectations for evaluating prevention strategies
- Multidisciplinary research is required
- Modeling, particularly cost-effectiveness analysis, often has a valuable role in policy-making

Lessons Learned

- Understand the opposition, their arguments, and their influence on policy makers
- There is a need for continues research
- Special training is extremely useful for epidemiologists who are interested in policy making
- Policy making is not for the faint of heart

Major Methodological Problems with Observational Studies that Relate Na Intake to CVD

- Random error in sodium assessment
- Systematic error in sodium assessment
- Major analytic issue, e.g. under-adjustment
- Potential for residual confounding
- Potential for reverse causality