Controversies in Epidemiology and Policy: Salt Reduction and Prevention of Heart Disease

ROBERTA B. NESS, MD, MPH

INTRODUCTION

For over 25 years, a scientific debate has raged about the import and impact of dietary salt consumption on hypertension and heart disease. Now, most major professional scientific organizations agree that 1) the American diet contains excessive amounts of salt (sodium), and 2) high levels of sodium consumption in a population lead to hypertension, heart attacks, and strokes.

Yet, there has been no policy action. What is the evidence? What are the policy options? What is the role of the epidemiology community in promoting policies that advance public health?

THE EVIDENCE

The American Diet is High in Salt

Americans eat 55% more salt than they did a generation ago (1). The U.S. Department of Agriculture 2005 dietary guidelines call for consumption of sodium that is no more than 2300 mg/d (2). Yet, the average American consumes more than 4000 mg/d (3).

Seventy-seven percent of salt in the diet is found in processed and restaurant foods (4). For example, the amount of sodium is 650 to 1500 mg in frozen macaroni and cheese, 580 to 760 mg in vegetable soup, and 710 to 1050 mg in frozen pizza (5). Restaurant foods are often higher: 4000 mg in cheese fries; 3500 mg in chicken fajitas, 2700 mg in a ham and cheese sandwich.

High Blood Pressure Is an Important Cause of Heart Disease

Heart disease is the most common killer of Americans. High blood pressure (defined as >140/90 mm Hg) is the number one contributor to heart disease–related death in the world; it is involved in 49% of heart attacks and 62% of strokes (6).

By the age of 65, two thirds of Americans will be hypertensive (7). Rates of hypertension in African Americans are about 50% higher than in whites. Only 29% of American adults with hypertension have their blood pressure under control, and the rate of blood pressure control is particularly poor among Mexican Americans (17%).

Lowering blood pressure in the population, even by small amounts, is likely to have a large benefit in preventing heart attacks and strokes. Years ago, an eminent cardiologist calculated that even a 2-point (millimeters of mercury) reduction in blood pressure in the whole population would have more benefit than all of the blood pressure medication currently being given (8).

High Salt Consumption Is Linked to Blood Pressure and Heart Disease

In many population-based studies around the world, as salt intake rises, so does blood pressure (9). Similarly, higher salt intake is directly related to heart disease and stroke (10). Native populations with very low salt diets do not have higher blood pressure as they age (11).

Chimpanzees, close cousins to humans, that are fed high-salt diets have marked elevations in blood pressure (12). Rats on a high-salt diet develop enlarged hearts and heart failure (13).

Numerous clinical trials in humans have shown that modest reductions in salt will lower systolic blood pressure by about 2 mm Hg systolic in non-hypertensive individuals and by more in hypertensive individuals (14). That is, dietary salt reduction can achieve at least an overall 2 mm Hg lowering of blood pressure in the general population. A recent trial (Trials of Hypertension Prevention) followed over 3000 persons for 15 years after an 18-month intervention of salt lowering; it showed a 30% reduction in heart disease events and a 20% overall reduction in mortality (15). Older people and African Americans gain the greatest health advantage from salt lowering, likely because they are more salt sensitive. However, even in children, 10 clinical trials have shown that salt lowering reduces blood pressure (16).

The World Health Organization estimates that salt reduction by 15% will save 8.5 million lives over 10 years (17). In the United States, 150,000 stroke and heart attack deaths per year could be averted by reducing salt in processed foods (18).

There is no known health risk associated with modest reduction of sodium intake.
POLICY OPTIONS

Models of National Salt Reduction Strategies

Several countries have implemented strategies to reduce sodium intake. Examples (8) are:

- **England**: Since 2003, food manufacturers have been encouraged to incrementally reduce added sodium. The Department of Health has worked with food manufacturers to work toward targets in specific food categories. The goal is for individuals to consume no more than 2400 mg/d by 2010. To date, salt levels in the general population have fallen by 10%, leading to an estimated 6,000 lives saved.

- **New Zealand/Australia**: The National Heart Foundation has developed a “Pick the Tick” labeling program, which identifies foods that meet strict standards for sodium, as well as fat, fiber, and calories. This encourages food manufacturers to create lower sodium items.

- **Finland**: Since the 1970’s, the government requires that foods that exceed specific limits be labeled as “high salt”. During this time, Finland has seen a 30% decline in average sodium consumption, a 10 mm Hg decrease in overall average blood pressure, and a 60% reduction in heart attack and stroke in 30- to 59-year-olds.

- **Cost**: The World Health Organization estimates that lowering salt in processed/restaurant foods in developed nations costs approximately $1 per person per year.

Calls for Action and Emerging Legislation in the United States

Many U.S. organizations, including the American Medical Association, American Heart Association, American Public Health Association, and Centers for Disease Control and Prevention, have called for urgent action to reduce sodium content in the American diet. Municipalities, including Baltimore, Chicago, and New York City, are actively considering ways to work with manufacturers on voluntary reductions to reduce levels of salt in processed foods. The Institute of Medicine, the nation’s most respected advisory organization on health, has organized a committee to consider policy options.

The Food and Drug Administration is currently considering a petition by the Center for Science in the Public Interest (CSPI) to alter the regulatory status of salt (currently considered to be Generally Recognized as Safe) and enforce food labeling provisions that will allow the public to recognize products with high salt content (19). In response to the CSPI petition, state and local health officials from around the country (including the National Association of City and County Health Officials, representing 2850 municipalities) have called for voluntary or regulatory reductions in the salt content of processed foods.

What Might Epidemiologists Do?

What is the role of the epidemiology community in promoting policies that advance public health? For many scientists, the answer to this question is: there is no role—we are here to generate evidence and the rest is up to the politicians. However, epidemiologists who made great triumphs in our field followed a more applied path. To take but a few examples, Godfrey Oakley, convinced by emerging clinical trial data that folate prevented neural tube defects, pushed for national fortification of the wheat supply. Herb Needleman tirelessly pursued policies to eliminate lead from the environment. Palmer Beasley demonstrated the link between hepatitis B and liver cancer but then went on to lead the World Health Organization’s worldwide vaccination effort. The list goes on.

What could we do (if we so desired)? Epidemiologists play key roles in professional groups such as the American Heart Association, American Public Health Association, and Centers for Disease Control and Prevention, that could educate the public about the population effects of high dietary salt. Epidemiologists are on advisory panels that work with the food industry. Many believe that voluntary, incremental reduction in salt by food manufacturers is the best starting point for reducing the population’s exposure to salt. As a group, our combined organizations, through the Joint Policy Committee, Societies of Epidemiology, could focus on this and/or other specific topics with public health relevance. To date, our societies have not worked to translate epidemiologic evidence into public health policy. Has the time come to do so?

REFERENCES


