Institute of Medicine. 2013. *Sodium Intake in Populations: Assessment of Evidence.* Washington, DC: The National Academies Press, 2013

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Background

Physicians, public health agencies, and medical organizations have for decades recommended that Americans lower their sodium intakes. These recommendations are based in large part on a body of evidence from epidemiologic and intervention studies showing a relation between sodium consumption and risk factors for cardiovascular disease such as blood pressure. For instance, the 2010 *Dietary Guidelines for Americans*, the nation's policy-driving dietary guidance document, recommends that most Americans strive to consume <2300 mg sodium each day and that the elderly, African Americans, and individuals who have hypertension, diabetes, or chronic kidney disease further reduce their daily sodium intake to 1500 mg. Nonetheless, the average U.S. adult still consumes ~3400 mg of sodium on a daily basis.

In contrast to older studies, however, some recent evidence suggests that very low sodium intake may actually have adverse effects on cardiovascular health. These unintended consequences may include unfavorable blood lipids and insulin resistance. In addition, a relation between sodium intake and actual cardiovascular events (rather than risk factors for them) has not been consistently shown in published reports. As a result, the CDC of the U.S. Department of Health and Human Services asked the Institute of Medicine (IOM) to take a fresh look at the evidence supporting the current sodium intake recommendations. In addition, the IOM was asked to specifically focus on high-risk groups such as older Americans (≥51 y of age), African Americans, and individuals with diabetes, kidney disease, and congestive heart failure. They were also asked to assess potential implications for currently suggested strategies to reduce sodium intake in the U.S. population such as those published in the IOM's 2010 publication *Strategies to Reduce Sodium Intake in the United States.*

Methods and Process

In response to this request, the IOM appointed a panel of distinguished experts to constitute the Committee on the Consequences of Sodium Reduction in Populations, chaired by Dr. Brian Strom (University of Pennsylvania School of Medicine). Their process of reviewing the literature and the resulting report entitled *Sodium Intake in Populations; Assessment of Evidence* that was published in May 2013 are briefly described here.

Because of the extreme heterogeneity of the studies available, the committee decided against conducting a meta-analysis. Instead, they evaluated each study in terms of its design (with randomized, controlled intervention trials being the gold standard), quantitative measures of dietary sodium intake, and control for confounding factors. They were unable to establish low and high amounts of sodium intake within the U.S. population due to lack of consistency in terms of assessing sodium consumption among studies. Nonetheless, the committee was able to ascertain the following conclusions concerning the relation between sodium intake and health outcomes.

Major Conclusions

1 Overall, the collective data suggest an association between higher salt intake and greater risk for cardiovascular disease in the U.S. population. This supports many current recommendations concerning lowering salt consumption based on blood pressure data.
2 Existing evidence, however, does not support either a positive or negative effect of lowering sodium intake to <2300 mg/d in terms of cardiovascular risk or mortality in the general population.
3 The committee concluded that there is sufficient evidence to suggest a negative effect of low sodium intakes (<1840 mg/d) in mid- to late-stage coronary heart failure patients with low ejection rates and undergoing aggressive therapeutic interventions. However, they noted that these types of interventions are not typically used in the United States and that additional studies are needed to determine if these findings are generalizable.
4 For other at-risk populations (e.g., those with diabetes or prehypertension), the available data do not support additional benefits of lowering sodium intake to <2300 mg/d. Consequently, the committee concluded that theses subgroups should not receive different dietary sodium guidelines than the general U.S. population.

Identification of Research Needs and Chairman's Summary

Given the challenges the committee faced in evaluating and comparing the available studies to draw population- and subpopulation-wide conclusions, they identified several research needs that should be addressed prior to further attempts to set evidence-based sodium intake guidelines. These include the establishment and use of standardized methods of assessing sodium intake; the conduct of studies

specifically evaluating outcomes related to currently recommended sodium intake levels; and analyses that not only measure health outcomes (as opposed to surrogate measures such as blood pressure) but also other confounding factors such as potassium balance, energy intake, and use of antihypertensive medications. In particular, they strongly urged additional randomized, clinical intervention trials and additional research designed to better elucidate physiological mechanisms involved in modulating the potential role of sodium in health and disease.

In summary, chairman Strom concluded, "These new studies support previous findings that reducing sodium from very high intake levels to moderate levels improves health; but they also suggest that lowering sodium intake too much may actually increase a person's risk of some health problems." He continued, "These studies make clear that looking at sodium's effects on blood pressure is not enough to determine dietary sodium's ultimate impact on health. Changes in diet are more complex than simply changing a single mineral. More research is needed to understand these pathways."

For More Information

A free online version of this report and information concerning purchasing an electronic or paper copy are available at http://books.nap.edu/catalogue.php?record_id=18311. You can find the IOM's report entitled *Strategies to Reduce Sodium Intake in the United States* at http://www.nap.edu/catalogue.php?record_id=12818.