

Dietary Sodium and Health - What is known, and not known

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Since antiquity, sodium has been a treasured essential nutrient and through much of history, salt (sodium chloride) has been a scarce and much sought-after commodity. Only in the relatively recent past, has it become universally accessible. Much is known about the uses, physiological effects, and the health outcomes associated with sodium intake. Sodium consumption around the globe has a sharp Gaussian distribution, with a mean of about 3600mg/day, and a range from 2600 – 5000mg/day. This mid-range describes about 90% of the world's population, and this has been true over time and space, and regardless of dietary customs. Finally, since life depends upon some sodium intake, there must be a level of deficiency, at which health is adversely affected.

Sodium intake naturally differs daily, complicating the estimation of an individual's usual intake. The study of large populations accounts for this difficulty because intakes are randomly distributed around each individual's mean. Thus, it has been possible to establish, for populations, both usual intakes and the association of these differences. Several randomized trials have established both the adverse physiological effects due to deficient sodium intake including: plasma renin, aldosterone, triglycerides, glucose; as well as the increase of blood pressure caused by its excessive intake.

Available randomized trials are insufficient to determine if there is a causal relation of sodium to health outcomes. At the same time, more than 30 studies, with more than 400,000 participants, have established a "U" or "J" shaped association of sodium intake to all-cause and cardiovascular mortality. Optimal survival is realized by those whose intake is between 2800 and 5000mg/day. At intakes, both deficient and excessive, mortality risk is greater. Specifically, there is no evidence of a superior health outcome at intakes <2000mg/day compared with those in the usual range. It is likely that the increased risk associated with excessive intake may be limited to those with high blood pressure.

The coincidence of optimal health outcomes associated with the intakes of the vast majority of the world's population precludes any recommendation for Public Health recommendation. Nevertheless, 10-15% of the world's population, with deficient or excessive intakes, may be at increased risk mortality and CVD morbidity. Because these may involve as many as 15 million Americans, (exceeding the number with diabetes), appropriate research is needed to determine if a causal relation exists, and/or if remediation is beneficial.

The implications of these facts are clear. There is no scientific justification for any effort to modify either current general clinical practice, or population sodium diet.