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Commentary

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Commentary: Accepting what we don't know will lead to progress

Martin O'Donnell,[1,2]* Andrew Mente[2] and Salim Yusuf[2]

[1]Clinical Research Facility, NUI Galway, Galway, Ireland and [2]Population Health Research Institute, McMaster University, Hamilton, ON, Canada

*Corresponding author. HRB-Clinical Research Facility, Newcastle Rd, NUI Galway, Galway, Ireland. E-mail: martin.odonnell@nuigalway.ie

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Sodium intake in most Western countries is a mean of about 4 g/day (equivalent to 10 g salt/day) with regional variations in mean intake.[1] Lowering sodium intake to < 2.0–2.4 g/day in the entire population is recommended by some, but not all, guidelines.[2,3] The World Health Organization (WHO) recommends a 30% reduction in salt intake in all adult populations, with a target sodium intake of < 2 g/day (5 g/day salt).[3] These recommendations do not take into account the marked variations in the mean intakes between populations and that within each population there are also variations. The controversy about sodium intake arises from the disconnection between objective evaluation of the evidence and the pressures to advocate for public health interventions, even when key data are lacking.[4] It also stems from differences in the emphasis given to short-term studies of the impact of sodium reduction on lowering blood pressure vs the long-term associations of sodium intake and cardiovascular disease, and the lack of reliable randomized trials evaluating the effect of low sodium intake on clinical events.[5] Whereas short-term trials report lowering of blood pressure with reductions in sodium intake from moderate (average) to low intake,[6] prospective cohort studies collectively report a higher risk of cardiovascular events and mortality for low vs moderate sodium intake.[7,8] Several short-term studies also demonstrate activation of the renin-aldosterone-angiotensin system with low sodium intake, which provides a biological rationale[9] for the higher rates of cardiovascular events reported in several prospective cohort studies.[7,8] Reducing sodium intake in those consuming high sodium intake (>5 g/day), to moderate intake levels (3–5 g/day) is not controversial, as there is general consensus based on the consistency of blood pressure and cardiovascular data. The controversy resides in whether sodium intake should be further restricted to very low levels (< 2.4 g/day), which has yet to be sustainably achieved in any population, which is a range where the effects on blood pressure are modest and there are additional concerns about safety.

Anecdotally, it appears that the controversy is being driven by small groups of advocates on either extreme of the debate. On one side, a group who believe firmly that the currently available evidence is sufficient to support the ongoing adoption of recommending very low sodium intake for all, while systematically ignoring or attacking studies that do not support this conclusions. Another view is an emphasis on the absence of reliable randomized controlled trials demonstrating that very low sodium intake is safe and reduces cardiovascular disease and mortality, which is the usual standard for most strategies recommended for cardiovascular prevention. Implementing ambitious strategies for salt reduction that are of unproven feasibility, efficacy and safety for cardiovascular prevention will result in diversion of resources from interventions of proven efficacy (e.g. smoking cessation, lipid management or blood pressure control in those with hypertension). There are few areas in public health that elicit more strident, polemic interpretations of the research literature.

In an innovative and intriguing meta-analysis, Trinquart *et al.*[10] provide quantitative data to measure diversity of opinions. In a metaknowledge analysis of the literature on sodium intake and health, including 269 reports (68 primary research studies, 10 systematic reviews, 9 clinical practice guidelines and 176 comments), 54% recommended population-wide reduction of sodium intake, 33% were contradictory and 13% were inconclusive. Subdividing the studies according to whether the studies were original, meta-analysis, guidelines or commentaries, the pattern becomes more revealing. Whereas the majority of original papers (60%) reported contradictory or inconclusive data, the majority of guidelines (73%) and commentaries (60%) were supportive of low sodium intake. They also found evidence of citation bias, with preferential citation of studies that supported their own particular position. Among systematic reviews of the topic (of 14 studies, 5 were supportive, and 9 were contradictory or inconclusive), they found evidence of selection bias whereby studies were more likely to be included if their conclusions were consistent with those of the systematic review (which automatically implies that studies which contradicted their position are more often excluded).

So how do we make progress?

First, we need to objectively report what the science actually shows in a systematic and unbiased manner. We need to identify, and accept, the areas of uncertainty and where there is lack of reliable information.We need to distinguish between areas where the data are consistent (e.g. reducing sodium intake in those individuals or populations with high intake, >5–6 g/day, to moderate levels of 3.0–5.0 g/day) vs areas where the data are inconsistent, especially where these is any concern that there may be harm [e.g. reducing sodium intake in those with moderate intake (3–5 g/day to below 2.0 g/day), or sodium restriction in patients with heart failure]. This should inform and stimulate the necessary research, and temper current guideline recommendations. Beyond the need for clinical trials, we have much to learn about many aspects of dietary sodium, including measurement, storage and kinetics of sodium, physiological effects on multiple systems (e.g. neuroendocrine, inflammatory and immune) and genetic determinants of salt sensitivity. Promoting a message of certainty, despite unclear evidence, creates obstacles to research and may lead to ill-informed policies.

Second, given the debate in the field, guideline committees should exclude those who have advocated a particular position and, instead, only include independent methodologists and scientists in relevant fields (e.g. nutritional and/or cardiovascular epidemiology). The guidelines committees should also exclude advocates or policy makers, as the science needs to be evaluated without pressures and biases to endorse particular positions. Such an approach is supported by findings from the current study, and suggests that we need an objective process in identifying committee members who do not have intellectual and/or material conflicts of interests. Another approach is to have a balance of people who have conducted research and have diverse perspectives on the topic, but a majority of independent guideline methodologists and scientists. Insisting on an objective process in developing the guidelines will more likely lead to policies that are truly evidence-based. We need to avoid continuing to make guidelines and public health policy that ignore emerging evidence which challenges existing beliefs.

Recognizing what we know, and perhaps more importantly, what we don't know, is the first step towards progress. The public and our patients deserve a rational, balanced and unbiased approach to resolving the salt controversy. The scientific community should not fail them.

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