Guest Essay by Kip Hansen

Prologue: This is the first in a series of several essays that will discuss ongoing scientific controversies, a specific type of which are often referred to in the science press and elsewhere as “Wars” – for instance, this essay covers the Salt Wars¹. The purpose of the series to illuminate the similarities and differences involved in each.

Warning: This is not a short essay. Dig in when you have time to read a longer piece.

From the New York Times, Wednesday, June 1 2016, “F.D.A. Proposes Guidelines for Salt Added to Food”:

“The Food and Drug Administration proposed voluntary guidelines for the food industry to reduce salt on Wednesday [1 June 2016], a move long sought by consumer and public health advocates who said the standards could eventually help save thousands of American lives.”

....

“Americans eat almost 50 percent more sodium than what most experts recommend. High-sodium diets have been linked to high blood pressure, which is a major risk factor for heart disease and stroke.”

...

“While there has been some scientific controversy over how much to reduce sodium, scientists at the F.D.A. said the health advantages are beyond dispute.”

If one follows the offered link to “some scientific controversy” one finds this report in the New York Times piece No Benefit Seen in Sharp Limits on Salt in Diet, by Gina Kolata, May 2013, regarding the Institute Of Medicine of the National Academies booklet-sized review of the entirety of modern science on salt intake and health titled “SODIUM INTAKE IN POPULATIONS: ASSESSMENT OF EVIDENCE” written by its Committee on the Consequences of Sodium Reduction in Populations issued in 2013 [free pdf].

Among the several findings and conclusions of this massive review is:
“Finding 2: The committee found that the evidence from studies on direct health outcomes was insufficient and inconsistent regarding an association between sodium intake below 2,300 mg per day and benefit or risk of CVD outcomes (including stroke and CVD mortality) or all-cause mortality in the general U.S. population.”

And further:

“...the committee found that the available evidence on associations between sodium intake and direct health outcomes is consistent with population-based efforts to lower excessive dietary sodium intakes, but it is not consistent with recommendations that encourage lowering of dietary sodium in the general population to 1,500 mg per day.”

Gina Kolata, the long-time NY Times Health journalist, summarized is this way:

“In a report that undercuts years of public health warnings, a prestigious group convened by the government says there is no good reason based on health outcomes for many Americans to drive their sodium consumption down to the very low levels recommended in national dietary guidelines.”

The American Journal of Hypertension, October 2013 issue, covered the topic extensively in this issue largely dedicated to the Salt Wars following on the Institute of Medicine’s 2013 report (mentioned and linked above). The INTRODUCTION: The Salt Discourse in 2013, written by Theodore A. Kotchen, characterizes the findings of the IOM report as:

The IOM report concluded the following:

1. “The evidence supports a positive relationship between higher levels of sodium intake and risk for CVD.”
2. “The evidence on health outcomes is not consistent with efforts that encourage lowering of dietary sodium in the general population to 1,500 mg/day.”
3. “There is no evidence on health outcomes to support treating population subgroups differently than the general US population.”

Yet, as we see reported on the first of June 2016, The Food and Drug Administration just issued guidelines to the processed food industry based on the assumption that “the health advantages [of population-wide dietary salt reduction] are beyond dispute”.

Are the health advantages of population-wide dietary salt reduction beyond dispute?

Hardly. The latest salvo fired in what has long been called The Salt Wars was published last month, on 20 May 2016. A huge international review study [paywalled] led by Professor Andrew Mente, PhD, the title of which begins with “Associations of urinary sodium excretion with cardiovascular events...”, in one of the world’s leading medical journals, The Lancet. The study had a cohort of 133,000 individuals across 49 countries and was undertaken
and written by 29 internationally recognized researchers, all PhDs and/or MDs. Their published interpretation of its findings is:

**Interpretation:** Compared with moderate sodium intake, high sodium intake is associated with an increased risk of cardiovascular events and death in hypertensive populations (no association in normotensive population), while the association of low sodium intake with increased risk of cardiovascular events and death is observed in those with or without hypertension. These data suggest that lowering sodium intake is best targeted at populations with hypertension who consume high sodium diets.” [emphasis mine – kh]

In an accompanying Comment [also paywalled] in the same issue of *The Lancet*, Professor Dr. Eoin O’Brien of the Professor of Molecular Pharmacology, Conway Institute of Biomolecular and Biomedical Research, University College Dublin, and past President of the Irish Heart Foundation writes:

“When apparent dogma is challenged, we should speak not of controversy but rather accede to the all-encompassing expression of so-called scientific uncertainty, so as to avoid unbecoming rhetoric. The issue of population strategies for salt consumption is a good case in point. There is no argument other than “excessive salt in the diet raises blood pressure”, and that strategies to reduce salt in individuals with hypertension prevent the cardiovascular consequences of the disease. However, the corollary that reducing sodium intake across populations will be beneficial to all, has been challenged with the assertion that doing so might indeed be harmful.”

Todd Neale reports bluntly on the study for tctmd.com (an industry supported news aggregator covering interventional cardiology news and education):

”Consuming less than 3 grams of sodium per day is associated with a greater risk of all-cause death or major cardiovascular events compared with more moderate intake in both hypertensive and normotensive individuals, an observational study of more than 130,000 participants has shown. In contrast, consuming 7 grams or more per day is tied to worse outcomes in hypertensive patients only.

The findings conflict with advice by the American Heart Association (AHA) to consume no more than 1.5 grams of sodium per day.”

The Neale article continues with:

But Daniel Jones, MD [past President of the American Heart Association] (University of Mississippi Medical Center, Jackson, MS), speaking to TCTMD on behalf of the AHA, which issued a public statement refuting the study, strongly disputed its results.

“This is a flawed study, and no health policy should be based on this study,” he said. It’s “difficult to do good studies, but the preponderance of the evidence is that most people eat too much sodium and that people’s general health will be improved by eating less sodium. This
message that people should be concerned about eating too little sodium is just something that should not be taken seriously.”

Indeed, the American Heart Association fired back with a press release and web page titled “Experts criticize new study about salt consumption”. Two experts, the current and immediately-past President of the AHA, are quoted:

Mark Creager, M.D., president of the American Heart Association.....“The link is proven between excess sodium and high blood pressure, and I find it worrisome that adoption of the authors’ recommendations may reverse the progress that has occurred in modifying dietary sodium intake and reducing the risk of high blood pressure and its effect on heart disease and stroke,” Creager said. “Today’s widely accepted sodium recommendations are based on well-founded scientific research – and that’s what people should understand.”

Elliott Antman, M.D., associate dean for clinical/translational research at Harvard Medical School and senior physician in the Cardiovascular Division of Brigham and Women’s Hospital in Boston, said the findings of the new study should be disregarded.

“This is a flawed study and you shouldn’t use it to inform yourself about how you’re going to eat,” said Antman, immediate past president of the AHA. “The AHA has reviewed the totality of the evidence and we continue to maintain that no more than 1,500 milligrams of sodium a day is best for ideal heart health.”

So far, that’s three American Heart Association Presidents trotted out to attack the new study and its findings, which agree with and expand on the findings of the National Academies’ Institute of Medicine from 2013.

What in the world is going on here?

* * * * *

Let’s roll the clock back 15 years, to the turn of the century and look at this article from the New York Times Science section:  With Dietary Salt, What ‘Everyone Knows’ Is in Dispute by Abigail Zuger (NY Times, January 9, 2001). Zuger leads with this:

“Diet fads may come and go, but low salt is forever. Or so, at least, any reasonable person might conclude from the consistent message in most guidelines over the last two decades: eat less salt.
But behind the official pronouncements rages one of the longest, most vituperative battles in medicine. It has continued despite a decades-long procession of “landmark” studies, each designed to end the debate, and each only provoking more disagreement.

Already, in 2001, the Salt Wars have been raging for decades. Zuger outlines the battle lines for us:

“One set of scientists, backed by most of the country’s major health organizations, maintains that cutting back on salt is good for people, whether they have high blood pressure or not.

"Salt matters,” said Dr. Frank Sacks, an associate professor of nutrition and medicine at Harvard, who led the most recent study. "The results are so clear-cut, there’s just not much controversy left.”

Dr. Jeremiah Stamler, an emeritus professor of preventive medicine at Northwestern University Medical School in Chicago, who has spearheaded the anti-salt forces for decades, said that he himself stopped eating most salt in 1948.

"The question of salt is settled,” Dr. Stamler said. "It’s a food additive we don’t need.”

And on the proverbial other hand:

“But other equally respected scientists still rally firmly behind the salted pretzel, maintaining that there are better tools for controlling blood pressure than salt reduction, and that low-salt eating may actually be harmful to health. [emphasis mine – kh]

"The problem is not so much whether we have too much salt in our diet as it is the deterioration of the American diet,” said Dr. David McCarron, a professor of medicine at Oregon Health Sciences University in Portland, who argues that salt makes little difference in blood pressure control when people eat balanced diets that emphasize fruits, vegetables and low-fat dairy products. "That’s really the issue.”

Dr. Michael Alderman, a professor of medicine and epidemiology at Albert Einstein College of Medicine in the Bronx and past president of the American Society of Hypertension, said: ”I don’t believe there is any basis whatsoever for a public health recommendation for eating any particular sodium content diet. A scientific problem ought to be solved by data. And there is no data.”
Fifteen years ago, the then-recent dual studies undertaken by the National Institutes of Health – called “Dietary Approaches to Stop Hypertension” or the DASH studies – had shown that blood pressure could be better controlled by eating a well-rounded diet high in fruits, vegetables, and dairy. This so-called DASH diet produced blood pressure reductions on the same level as blood pressure medications. The second DASH study seemed to show that the DASH diet coupled with salt reduction produced even better results. Both studies have been challenged by both sides of the Salt Wars, both sides interpreting the results in favor of their viewpoints.

“….Dr. Stamler of Northwestern said…. [regarding] the findings of the second DASH study, ”there is no question that for everyone else [those who do not already have optimal blood pressure] there is a significant effect from lowering salt.”

however

“Not so, Dr. McCarron said. ”The most important finding in the second DASH study is the unequivocal evidence that the first step in blood pressure control should be adding things missing from the diet: the fruits, vegetables and low-fat dairy products,” he said. ”If people have to put their money down on a dietary intervention, the blood pressure response they will get from that is far better than from worrying about salt.”

[all quotes immediately above are from the Zugger NY Times piece – kh]

On a pragmatic level, the DASH studies found that “cutting back on sodium from 3,300 milligrams a day to 2,400 milligrams [note: this recommendation has since been dropped even further to 1,500 mgs/day – kh] lowered blood pressure in the study by an average of 2.1/1.1 for people who ate a normal diet. Changing to a DASH diet lowered their pressure substantially more, by 5.9/2.8, without any salt restriction at all.” [included quote from the Zugger NY Times piece – kh]

Let’s look at that more closely. A salt reduction diet, cutting back to 2,400 mg/day, for people with a normal diet, resulted in an average lowering of blood pressure (BP) of 2.1/1.1 (mmHg). If your blood pressure (BP) was 150/95 (which was and is considered high), then, on average, salt reduction to 2,400 mm/day would lower your BP to 147.9/93.9. That amount of improvement does not stand up as a Minimal Clinically Important Difference – “The MCID defines the smallest amount an outcome must change to be meaningful to patients.” In other words, no one’s high BP is cured by a reduction of 2.1/1.1, such a small reduction doesn’t improve a patient’s well-being or general state of health. In fact, that is a fraction of the “white coat effect” which raises some people’s BP by 10 to 30 mmHg simply because their BP is being measured by a doctor – “The term white coat hypertension may be used if you have high blood pressure readings (i.e. readings that are consistently 140/90mmHg or above) only when you are in a medical setting. Your blood pressure readings may be normal when they are taken at home.”
This brings us full circle back to the most recent Salt Wars salvo, the Mente et al. study in the latest issue of *The Lancet, “Associations of urinary sodium excretion with cardiovascular events....”* [paywalled], which, 18 years later, confirms the findings of Alderman: “Compared with moderate sodium intake, high sodium intake is associated with an increased risk of cardiovascular [CV] events and death in hypertensive populations (no association in normotensive population), while the association of low sodium intake with increased risk of cardiovascular events and death is observed in those with or without hypertension.” In other words, while high sodium (salt) intake does increase the risk of CV or death in those who are already hypertensive (have high BP), enforced low sodium diets, population wide, will have overall negative health effects – increasing risk of CV events and increasing risk of all-cause death – for everyone, without respect to BP – the most optimum health outcomes are found with moderate salt intake regardless of BP status.

For the American Heart Association, and its allies who share its long-term anti-salt stance, these findings — no matter how scientifically sound, no matter how robust, no matter that they replicate and confirm earlier findings – are simply unacceptable. The AHA has publicly stated that these findings should be “disregarded”.

Let’s take a break for a minute. The information discussed so far represents a only a tiny bit of the vast literature involved in the Salt Wars. I have purposefully steered clear of science journalist Gary Taubes and his work in the *NY Times* and in *Science* magazine, which together comprise the best summary of the Salt Wars up to mid-1998. Taubes had written about the Salt Wars for more than two decades. [He is perhaps more well-known for his efforts in the Obesity Wars.] His work – on the pragmatic salt-is-salt side of the Wars – is legendary. I have also avoided the opinions of and work by “The Salt Guru”, Morton Satin, who came out of retirement to be the Vice President of Science and Research at The Salt Institute, a non-profit trade association based in Alexandria, Virginia, an association that taints his work in the eyes of many. (Before that, Satin spent sixteen years as the Director of the United Nations Food and Agriculture Organization’s Agribusiness Program.) Satin’s general view is that the salt debate is filled with shoddy science and outright misinformation.

In a funny aside – and many reading here will recognize this situation — it has been reported that Satin has claimed Taubes won’t even take his phone calls for fear of becoming tainted by contact. Taubes denies this. But, I mention it because, as in other modern scientific controversies, “guilt-by-association” is rampant – a modus operandi practiced by all factions.
What We Know About Dietary Salt:

1. Salt is an absolutely necessary element of the human diet – humans die without adequate salt intake.
2. For most people, consuming a moderate amount of salt daily (2,500-5000 mgs) has no adverse effects.
3. High blood pressure (BP) is associated with cardiovascular disease and risk of premature death.
4. For almost everyone, eating more salt causes an increase in BP, but the increase is not clinically important, averaging around 2.1/1.1 mmHg.
5. For a certain percentage of people, believed to be in the 10-15% range, who can be labeled “salt sensitive”, dietary salt causes higher BP and for those already suffering high BP and who have a high salt intake, dietary salt reduction combined with improved diet (the DASH diet – more fruits, vegetables, and low-fat dairy, specifically) can help reduce BP to healthier levels.
6. For most people, a diet too low in salt increases risk of cardiovascular events and increase risk of all-cause death.
7. The science to quantify what constitutes “too low”, “moderate”, and “too high” regarding salt intake is best characterized as “somewhat uncertain”.

What We Know About Salt Politics:

1. The Salt Wars have been raging for 30 years, at least.
2. One side of the Salt Wars believes that because dietary salt increases BP (in most people just by a small amount) and causes a big increase BP in some people, coupled to the idea that high BP is associated with increased heart disease and risk of death, that governments should take action to reduce the salt intake of everyone – population wide – through regulation of the food industry, setting dietary guidelines, etc. Arrayed on this side we find the American Heart Association, United Nations’ World Health Organization, and the US FDA. Many food and diet advocacy groups stand with the AHA against salt. Taken together, these groups represent a view that consists of a “bureaucratically entrenched hypothesis advocating an enforced solution”.
3. The opposition believes that the science is not adequate to mandate a population-wide reduction of salt intake, maintaining that, in addition to being not necessary, it will cause harm instead of good, increasing cardiovascular events and premature death among all groups. The majority of scientists on this side of the issue also hold that the DASH diet is far more effective in reducing high BP than salt reduction.
4. Despite the mounting evidence of harm from population-wide enforced salt reduction, various government agencies have been passing rules, regulations, and guidelines to force
the food processing industry and, most recently, in New York City, mandatory labeling of highly salted foods by chain restaurants.

5. As in all modern scientific controversies, the faction occupying a societal Bully Pulpit, in this case the AHA, FDA, and WHO, has a huge advantage, even when the hard scientific facts are not on their side. [“A bully pulpit is a sufficiently conspicuous position that provides an opportunity to speak out and be listened to…. a terrific platform from which to advocate an agenda.”]

6. The Salt Wars are an exemplar of what can happen when a hypothesis is scientifically correct but its real-world overall effect becomes grossly exaggerated. This can lead to a “mandated solution” which is then sold as a cure-all for some existing problem. As the underlying science is in fact uncertain, scientists in support of this view must turn themselves into advocates to make their case. Political advocates in turn pretend to be scientists, advising governments to enforce a “one-size-fits-all” solution on the whole society – even though it is probable that the claims of benefit range from uncertain, at best, to nonsensical [see footnote 2 for the my rationalization for this statement in the Salt Wars].

Modern scientific controversies, sub-category Science Wars, all follow a similar pattern and have common features. As this series progresses, it will become obvious what these features are and the harm they cause to the reputation of Science and Scientists.

###

Footnotes:

1. Please note that in all instances, the word salt in this essay, and in all included quotes, refers to common table salt, sodium chloride, in all of its customary forms found in kitchens, restaurants, grocery stores and food processing plants. The use of the term “Salt Wars” does not originate with me but has been in common usage in science journalism for some time. I offer this link: Scientific American – Health – The Salt Wars Rage On: A Chat with Nutrition Professor Marion Nestle in support of its use. (Nestle is pronounced like the action “to nestle”, Dr. Nestle is not related to the famous chocolate fortune family). The term’s use in this essay (and SA) is not to be confused with the many actual armed conflicts over the ages and around the world that have shared the title Salt War.

2. From the same source as Footnote 1, I quote Marion Nestle “I was once at a sodium meeting at which there were a bunch of statisticians. And I left with the statisticians and they said that “anyone who thinks that salt has anything to do with hypertension is delusional.” And that was on the basis on the clinical trials that show so little. And yet
every single committee that has dealt with this question says, ‘We really need to lower the sodium in the food supply.’ Now either every single committee that has ever dealt with this issue is delusional, which I find hard to believe—I mean they can’t all be making this up—[or] there must be a clinical or rational basis for the unanimity of these decisions.” And “Everybody argues about every clinical trial no matter what the conclusion. So I find the whole thing completely fascinating.”

# # # # #