Once the data are collected and analyzed, scientists hope they will point the way to new policies. But even if China is found to be the culprit in most of the airborne pollution, it will probably need help from its neighbors in addressing the problem. "Unfortunately, China is not a rich country," says Park Chul Jin of Korea's National Institute of Environmental Research in Seoul. Instead, Park and others foresee Korea and Japan providing money for technical fixes and other steps aimed at curbing the problem. **–MICHAEL BAKER**

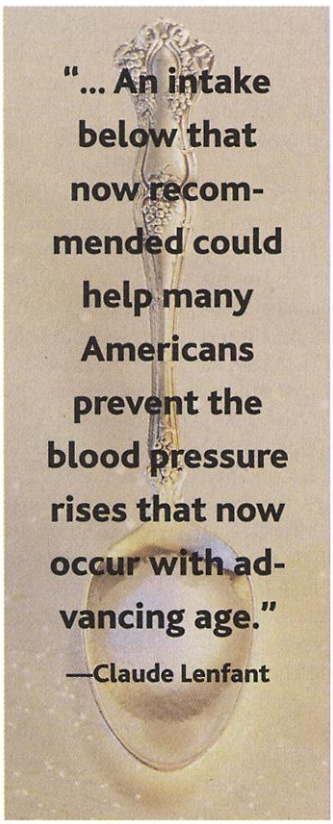
Michael Baker is based in Seoul.

HYPERTENSION

A DASH of Data in The Salt Debate

The controversy over salt, blood pressure, and public health has seemed endless and intractable. The National Heart, Lung, and Blood Institute (NHLBI) and the National High Blood Pressure Education Program, among other august bodies, recommend that all individuals, not just those with hypertension, reduce the amount of salt in their diets to lower their blood pressure and improve their health, while a good proportion of the researchers in the field believes such recommendations have not been supported by the data. As a result, an entire field has been mired in acrimony for 4 decades.

On 17 May, Claude Lenfant, director of NHLBI, declared the controversy over. The results of DASH-Sodium, a new NHLBI-funded study to be presented the next day at the annual meeting of the American Society of Hypertension (ASH), had made the health benefits of salt reduction unambiguous, Lenfant said. After the meeting, the controversy showed little sign of abating, however.



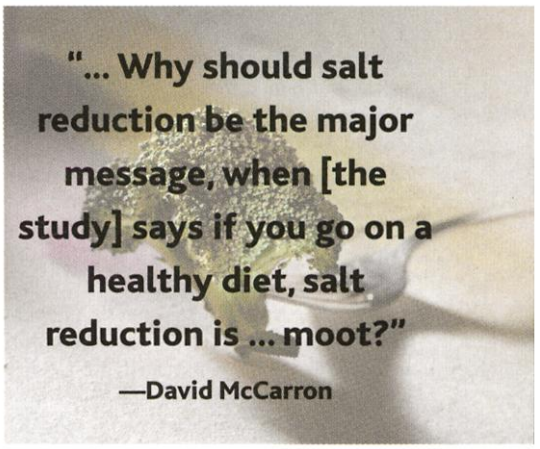
DASH stands for Dietary Approaches to Stop Hypertension. DASH-Sodium is the sequel to the original DASH study published in April 1997, which suggested that blood pressure could be reduced dramatically by eating a diet rich in fruits, vegetables, and low-fat dairy products. Salt was not a factor in the original DASH study, which made the blood pressure reductions that much more noteworthy.

In DASH-Sodium, a collaboration of five institutions, investigators tested both the DASH diet and a control diet, similar to that of the average American, at three levels of salt intake—8 grams a day, which is slightly less than the average American's intake; 6 grams, equivalent to the current government recommendations; and 4 grams. The investigators randomly assigned 412 subjects with either hypertension or high normal blood pressure to either the control diet or the DASH diet for 90 days. They fed them all their meals—assuring that subjects were eating their assigned diets, no more, no less—and changed the sodium level every 30 days.

The results were impressive. The DASH diet alone reduced blood pressure as dramatically as before. And the reductions in blood pressure by decreasing salt, whether on the DASH diet or the control diet, while not quite as impressive, were still substantial. When hypertensives, for instance, went from the high-salt to the low-salt control diet, their systolic blood pressure fell 8.3 millimeters of mercury (mmHg) and diastolic fell 4.4 mmHg (8.3/4.4 mmHg). This drop is comparable to that achieved by blood pressure–reducing drugs. In those with high normal blood pressure, going from high sodium to low sodium on the control diet reduced blood pressure by 5.6/2.8 mmHg, a drop almost five times greater than recent meta-analyses might have predicted. The better part of these blood pressure reductions came when the subjects went from the government-recommended levels of 6 grams of salt a day to the lowest level of 4 grams. "The finding suggests that an intake below that now recommended could help many Americans prevent the blood pressure rises that now occur with advancing age," said Lenfant in a press release.

Protracted controversies, however, can be remarkably resistant to new data, even good data. After hearing the DASH-Sodium results at the ASH meeting, those who were skeptical of the wisdom of recommending that an entire nation eat less salt remained resolutely skeptical. David McCarron, for instance, of the Oregon Health Sciences University in Portland, pointed out that for those with normal blood pressure eating the healthy DASH diet, reducing salt from 8 grams to 4 grams a day made little difference in blood pressure (1.7/1.1 mmHg). "If you are eating the healthy DASH diet and you have normal blood pressure, sodium restriction has almost no effect. ... So why should salt reduction be the major message, when it says if you go on a healthy diet, salt reduction is a moot point?"

A stickier issue speaks to the nature of public health recommendations. The better part of the salt controversy centered not on the size of the blood pressure reductions that could be achieved by eating less salt, but on whether it would improve our health to do so. Over the years, researchers have been unable to demonstrate that reducing salt improves health. The authors of a 1998 comprehensive meta-analysis on salt reduction published in *The Journal of the American Medical Association* concluded that "The optimum solution to the controversy are long-term trials with hard end points, such as stroke, acute myocardial infarction, and survival."



This conclusion was echoed after the ASH meeting by Micky Alderman, a hypertension specialist at Albert Einstein College of Medicine in New York City and a past president of ASH. "They're suggesting as a remedy for 250 million people that they cut sodium intake in a half," says Alderman, "and to do so solely on the basis of showing you can change blood pressure for a 30-day period, without even assessing any other potentially adverse consequences. It seems to me it's a leap of faith."

Although DASH-sodium investigators were much more sanguine about the health benefits of salt reduction, at least one agreed that Alderman's point was reasonable. Biostatistician William Vollmer of the Kaiser Permanente Center for Health Research in Portland told *Science* that he believes DASH-Sodium provides good evidence for recommending lower levels of salt intake. Nonetheless, he added, "it would be nice to see a good, controlled study that shows the long-term effects of a low-sodium diet. The issue has been raised. We can sit here and say it hasn't, or we can do a study that settles it once and for all." **–GARY TAUBES**