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Dear Mr. Stockin,

Thank you for your interest in the recent National Research Council report on the toxicology of fluoride; as you know, I had the privilege of serving on the committee that prepared this report. As a resident of Tennessee for 25 years, I appreciate your concern regarding the significance of the NRC report for water districts in Tennessee that are evaluating the safety and desirability of starting or continuing water fluoridation.

As you are aware, the NRC report did not evaluate the safety or benefits of water fluoridation, which were outside the scope of our committee's assignment. However, we also did not say that the practice of fluoridation is safe or that fluoride concentrations in water of 0.7-1.2 mg/L are safe—we did not evaluate that. We did specifically address the safety of the Maximum Contaminant Level Goal (MCLG) of 4 mg/L, and we concluded, unanimously, that the MCLG is not protective of human health. We said that the MCLG should be lowered, but we did not derive or suggest a new value for the MCLG.

Our conclusion that the MCLG of 4 mg/L is not protective was based largely on health effects that have long been considered specific to fluoride and significant enough to warrant protection, namely dental fluorosis and skeletal fluorosis. We parted ways with previous reviews of fluoride by saying that severe dental fluorosis is an adverse health effect, not merely a cosmetic effect, that stage II as well as stage III skeletal fluorosis is an adverse health effect, and that a fluoride concentration of 4 mg/L is likely not protective with respect to an increased risk of bone fracture. We indicated that at 2 or 4 mg/L, bone fluoride concentrations can reach the ranges historically associated with stage II and III skeletal fluorosis. We were not able to rule out a carcinogenic effect of fluoride. We reported that fluoride exposure is plausibly associated with a number of other health effects, including neurotoxicity, gastrointestinal problems, and endocrine problems, and that even though these effects are not necessarily specific to fluoride exposure, the associations cannot be ruled out and need further study.

For dental fluorosis, skeletal fluorosis, and risk of bone fracture, the committee considered studies in which populations were exposed to concentrations of fluoride in drinking water of around 4 mg/L; because there were sufficient studies at the exposure level of interest, we did not

examine the whole range of possible fluoride exposures. From those studies we concluded that 4 mg/L is not protective of those effects; only when the fluoride concentration in water is below 2 mg/L does the prevalence of severe dental fluorosis approach zero. For some of the other health effects mentioned above, the committee examined studies over a wider range of exposures, depending on what information was available. Some of those studies do include exposure levels that would be associated with water fluoride concentrations of around 1 mg/L. The committee also provided a very thorough analysis of overall fluoride exposures in the U.S., which are largely driven by drinking water and beverages made with tap water. We identified population subgroups who are at higher risk than usual of problems due to fluoride exposure, due to factors such as very high water consumption rates or increased retention of fluoride in the body.

I personally feel that the NRC report is relevant to many aspects of the water fluoridation debate, even though the committee did not directly address water fluoridation, in terms of either risks or benefits. For instance, the report discusses the wide range of drinking water intake among members of the population, which means that groups with different fluoride concentrations in their drinking water may still have overlapping distributions of individual fluoride exposure. In other words, the range of individual fluoride exposures at 1 mg/L will overlap the range of individual exposures at 2 mg/L or even 4 mg/L. Thus, even without consideration of differences in individual susceptibility to various effects, the margin of safety between 1 and 4 mg/L is very low. The report also discusses a number of health effects plausibly associated with fluoride exposure that should be considered in any future risk assessment for fluoride, besides the effects that have historically been attributed to fluoride. Several issues pertaining to use of silicofluorides in municipal water are brought up, although it was outside the committee's scope to address them in detail. Recent information provided on the relationship between outdoor temperatures and drinking water consumption suggests that the historical guidelines for setting water fluoride levels should be revisited. The report attempts to draw together much of what is known about the effects of fluoride exposure on human health and to identify the sizeable areas that are still not fully understood, for example, the molecular mechanisms by which fluoride exerts its effects.

I encourage you to read the report yourself, and to encourage your contacts at the various water districts to read it. I hope that you and your contacts will feel free to call me or send me an e-mail if I can be of any further help to you.

Sincerely,



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