HealthRisk Strategies Gail Charnley, Ph.D.

17 September 2012

Stephen M. Roberts PhD
Chair, Perchlorate Advisory Panel
Science Advisory Board
US Environmental Protection Agency
Washington, DC

Dear Dr. Roberts:

At the last meeting of your committee some members expressed concern about the effectiveness of regulating perchlorate only in drinking water without contemplating the larger public health problem of low iodine status. As EPA's perchlorate life stage white paper points out, while the adverse effects of perchlorate are inferential, the adverse effects of inadequate iodine are clear. Most perchlorate exposure usually comes from food and, in addition to perchlorate, we are routinely exposed to other common goitrogens at levels generally much higher than those of perchlorate.[1] Against that background, regulating only perchlorate in drinking water seems unlikely to address the underlying susceptibility issue of inadequate dietary iodine. I would like to propose a possible solution.

According to the endocrinologist Dr. Gregory Brent, "[T]he most direct approach to reducing risk of perchlorate exposure in an individual is to ensure adequate iodine intake, especially in the reproductive years for women. This has been advocated in recommendations from the American Thyroid Association and The Endocrine Society."[2] Why wouldn't it make sense to take advantage of the regulatory constraints of the Safe Drinking Water Act and use perchlorate regulation to supply enough iodine in drinking water to offset potential risk? For example, why couldn't the perchlorate regulation include an exemption for drinking water supplies with a naturally occurring iodine concentration above a certain level but also allow municipalities to add trace levels of iodine to compensate for any perchlorate exceeding the MCL?

Preliminary calculations using NHANES data suggest that the normal goitrogen:iodine ratio in healthy people is about 2:1,[3] indicating that if a water supply exceeded the MCL by 4 ppb, for example, 2 ppb iodine would be needed to neutralize any potential goitrogenic effects. (Both perchlorate and iodine are completely absorbed.) The validity of those preliminary estimates requires strengthening, of course, but they illustrate the general idea. Also, to eliminate the possibility of iodo-disinfection byproduct formation, iodine would have to be supplied in its most oxidized form, as iodate. It may be worth noting that FDA requires iodine supplementation for baby formula (3-7 µg iodine/30 ml formula).[4]

The Safe Drinking Water Act provides for the inclusion of risk management solutions in contaminant regulations. An example of a drinking water regulation that includes an alternative risk

[1] Charnley G (2008). Food Chem. Toxicol. 46:2307
[2] Brent R (2010). J. Clin. Endocrinol. Metab. 95:3154
[3] Voogt W, Jackson WA (2010). J. Ag. Food Chem. 58:12192
[4] 21CFR 107.100; FDA's requirement is expressed in µg/Kcal, which results in 3-7 µg iodine/30 ml for a typical commercial formula

management approach is that for lead, which requires adjustments in drinking water quality parameters such as pH to prevent its leaching from plumbing fixtures. Furthermore, EPA is committed to implementing innovative, sustainable, and cost-saving risk management solutions where possible. Not only would adding iodate to drinking water provide significant benefits by addressing the true underlying public health problem, it would cost municipalities one thousand times less than the alternative means of removing perchlorate, which requires ion-exchange treatment.

I respectfully submit these thoughts for your consideration.

Sincerely,

Gail Charnley, PhD