



Arsenic-Laced Water in Chile

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flect vested interests and the bureaucratic dealings of Indians with the West, I should not conclude that Western society has a poor image of India. I respect and appreciate these sentiments and wish they were the reality. Most of these individuals cannot reconcile themselves with the nuclear tests.

I believe that the purpose of the nuclear tests is to remind the world that India is not a pushover. At times, force is the only language that is taken note of. But most intellectuals in India would like to put the tests behind them, and the general feeling (to the extent I can gauge) is that India cannot afford an arms race or nuclear stockpiling and that it should get on with its other priorities.

My letter does seem to have touched a sensitive chord among intellectuals concerned about India. Can this be put to a positive use? May I suggest an international conference in India with nonresident and resident Indians as well as other intellectuals who have a concern for India to set an agenda for the 21st century?

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Arsenic-Laced Water in Chile

We read with interest the Meeting Brief "Toxicologists shed new light on old poisons" by Jocelyn Kaiser (20 Mar., p. 1850). The section on arsenic was accompanied by a photo captioned, "Picture of health. These Chilean villagers drink arsenic-laced water, yet don't have elevated cancer rates," which raised serious concerns among us. An anecdotal claim such as this appearing in *Science* could result in the villagers continuing to drink water containing dangerously high levels of arsenic and could thwart efforts to provide the town with an alternative water supply.

We have been conducting arsenic studies in the same village since 1992. Those with serious illnesses often move to the cities for treatment. To determine actual cancer rates, a cohort study with carefully designed case ascertainment methods would be needed, and even then, precision would be poor because of small numbers. Nevertheless, a recent case-control study of lung and bladder cancer conducted by one of us (C.F.) identified two patients with bladder cancer and six with lung cancer in individuals who had lived in the village, about twice as many of these cancers combined as would be expected. In fact, both lung and bladder cancer mortality are markedly elevated as a result of arsenic in drinking water in Chile's Region II, which includes the village in question (1).

In reference to the suggestion that the villagers metabolize arsenic differently from others, our studies of urinary methylation patterns found minor differences, but suggested that, overall, arsenic metabolism is similar to that of other populations (2). We also found an increased frequency of micronuclei in exfoliated bladder cells, providing evidence of arsenic-induced genetic damage (3).

While it remains possible that these villagers are less susceptible to some arsenic effects, such as skin lesions, it should be assumed that they have the same cancer risks as other arsenic-exposed populations studied unless evidence to the contrary becomes available. High priority should be given to providing the village with low-arsenic water.

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Household Antibiotic Storage

In their commentary "Containment of antibiotic resistance" (*Science's Compass*, 20 Feb., p. 1153), Rosamund J. Williams and David L. Heymann rightly state that a comprehensive implementation of a strategy for containment of antibiotic resistance is lacking not only in developing countries but also in developed ones. They point out that implementation of strategic elements should be aimed at promoting rational use of antibiotics through treatment guidelines and lists of essential drugs along with a better education of prescribers, pharmacists, health care workers, and the public.

A good example of antibiotic misuse and potential resistance development can be found in a recent study from Spain, the goal of which was to determine the storage of antibiotics in Spanish households and their sources (1). A quantitative survey carried out with housewives or family heads from 1000 randomly selected households revealed that one (88%) or more antibiotic bottles were present in 42% of

households. In two-thirds (64%) of the cases, a physician's prescription from the primary care network constituted the primary source of the drug. Amoxicillin accounted for most cases (72%), followed by amoxicillin with clavulanic acid (17%), a macrolide (6%), a cephalosporin (2.5%), and others (2.5%). Only oral prescriptions were found.

In only 19% of households containing antibiotic bottles (8% of the total) was there a family member under treatment. The major reason suggested (1) for such antibiotic storage was underuse or nonfulfillment, mainly as a result of early withdrawal, and the patient thinking about a forthcoming reuse. Self-perceived clinical improvement, commonly occurring within the first 5 days of therapy, accounts for many cases of early antibiotic withdrawal (2). Also, people in Spain appear to have a rather unworried attitude toward antibiotic use (3).

Potential consequences of widespread household antibiotic storages are protean. For instance, if one of the parameters defining drug quality is efficiency, then storage of antibiotic bottles in households is an important factor in decreasing it through increasing costs and reduction of therapeutic effectiveness in the larger community. As Williams and Heymann mention, antibiotics should be available only when prescribed by a trained and registered health care professional. Finally, as suggested, studies of behaviors that encourage misuse of antibiotics, such as the aforementioned, should be encouraged at the same time that ways to modify these behaviors are proposed.

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Response

The study Bosch describes (1) provides an excellent example of practices known to be widespread, which leads us to conclude that there has not been an adequate effort to educate the consumer about the use, value, and potential dangers of antibiotics.

Rosamund J. Williams

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