

Problems with cattle feeds containing nitrates have also been reported. Adult humans are not affected by nitrates occurring in vegetables, but reportedly they have caused illness in infants.

Methemoglobinemia has occurred in infants given water or formula made from water with a nitrate concentration greater than 45 ppm as nitrate. The Drinking Water Standards use this concentration as a recommended limit. These cases of methemoglobinemia have apparently been adequately explained by the nitrate concentration of the water, and the further complication of food intake has not been involved. The unresolved problem is why methemoglobinemia does not always occur from use of water high in nitrate. As only a select segment of the population is involved (infants less than 6 months), and then not always, there is agitation to raise the allowable concentration. Bottled or other water could be supplied for the bottle-fed infants. Cow's or mother's milk is reputed not to contain nitrates. In the foreign literature, studies of subclinical effects in older children have been reported, and we plan to conduct similar investigations.

Nitrate from natural causes is a problem in some groundwater, and the problem is increased where polluted water is used to recharge groundwater. Nitrate is a difficult contaminant to remove from waste water. It is possible that the nitrate concentration will be the controlling factor in some applications of waste water reuse. Any recommended limits in the Drinking Water Standards must, therefore, be justified on the basis of sound research because of the far reaching economic consequences of meeting this standard. In some cases, the most economical solution may be to supply special water to families with infants, unless research shows that a large portion of the population is effected.

Although the presence of nitrate in drinking water presents a problem, so many other contaminants, such as lead and arsenic, have a much more pronounced effect on human health that we lack sufficient knowledge of relative toxicities to establish a priority at this time.

*Question 3. Dr. Bernard B. Berger, Director of the Water Resources Research Center at the University of Massachusetts, has recently stated "While we must admit that health statistics do not support a claim that the polluted urban environment constitutes a clear and present public hazard, it must be emphasized that we have not looked hard and long enough to be absolutely certain of this claim." Do you agree with both parts of this statement?*

*He goes on to say: "The epidemiologist is not attracted by a challenge of this kind. He prefers to work with overt disease outbreaks." What is the portent of this statement for bringing greater confidence to decisions in pollution control that will be costly and disruptive to industry and to our mode of living?*

Answer. We agreed with both parts of Dr. Berger's statement. Health statistics are developed on the basis of the number of cases of deaths from reportable communicable disease in a community, as well as the number of deaths resulting from chronic diseases, accidents, and natural causes.

Geographic differences in mortality have long been noted. Infant mortality has been noted. Infant mortality has been a sensitive measure of sanitation, and rural death rates for a long time were higher than urban rates. A shift has occurred, however, that may be attributed to a deterioration of the quality of the urban environment as well as to improvements in rural living. The rural-urban differences are also noted for other disease death rates. The higher mortality in the central cities, as compared with the noncentral city counties, has been attributed to air pollution. Many causes of death are correlated with the population size of the metropolitan environment.

Some environmental contaminants may have such subtle long-term effects on human health that they would not be noticed as readily as the explosive epidemic of a communicable disease or the acute toxic effects of a poison.

Seldom is mild gastroenteritis or "stomach flu" from a water or food supply severe enough to require medical care; generally it goes unreported. The identification of many organic materials in drinking water has not been accomplished, and the correlation with any health effects of those that have been identified has been undertaken in only a modest and cursory fashion.

Morbidity may prove to be more sensitive to environmental differences, but the illness data necessary to make very detailed geographic comparisons are not available. Current sampling procedures only allow comparison of larger areas, such as regions of the country or, at best, the largest metropolitan areas. On a few occasions, special epidemiological studies have been conducted to evaluate the effect of the environment on morbidity. But these studies are costly.