

mission. Among the first concerns of environmental health managers are the existence of shelter and potable water, the burial of the dead and the disposal of excreta. Vector control, food protection and promoting personal hygiene are invariably assigned lower priority. These latter activities are, however, extremely important in terms of the transmission of communicable disease. In major disasters, particularly in poorer countries, the availability at all levels of persons trained and available to practice environmental health management is the factor which limits the promotion of these measures of high priority.

Human and animal carcasses have rarely, if ever, been associated with epidemics of communicable diseases, but even though the problems related to health are not at issue, in most societies the acceptable disposal of corpses is extremely important for cultural reasons. In most circumstances, the stench of unburied or improperly buried animal carcasses will not be tolerated for long.

Environmental intervention also frequently fails to prevent the transmission of communicable disease because of limitations in existing techniques and/or misapplication. Chlorination and/or filtration of water, for example, may not destroy protozoa such as *Giardia lamblia*. Water disinfection tablets (such as Globaline and Halazone) will destroy enteric bacteria, amoebae, and some, but not all, enteric viruses. Massive distribution of water purification tablets following disasters has not been effective in poorly educated populations unfamiliar with proper usage and thus is not a recommended routine measure. Indeed, if such tablets are ingested whole like pills, fatality may result. The tablets may be useful, however, among well educated and motivated groups such as relief workers, military, civil servants, and so forth.

Such measures as vector control are too often directed at nuisance insects rather than vectors of human disease. Pesticides may be applied to outdoor vegetation in order to reduce populations of biting mosquitoes (e.g., *Culex*), instead of the vectors of malaria (*Anopheles*) or dengue and yellow fever (*Aedes aegypti*). Resistant housefly populations may also be treated with excessive amounts of pesticides when improved excreta and solid waste collection and disposal would be much more effective.

The Pan American Health Organization's manual, *Emergency Vector Control after Natural Disaster* (53), and the World Health Organization's *Guide to Sanitation in Natural Disasters* (22) provide a thorough review of the principles of environmental health management.

Immunization

Historically, health authorities frequently advocated and carried out improvised emergency vaccination of the general population against typhoid fever, tetanus and cholera on a massive scale following disasters. Responsible disaster and relief agencies now recognize that these measures are unnecessary and counterproductive. At the base of the change in attitude are both scientific and practical considerations. Despite the compelling reasons to the contrary, though, mass immunization remains strongly linked with disaster in the psyches of the public and politicians. It may thus be extremely difficult to overcome demands for immediate vaccination campaigns.

The scientific factors which contribute to the inadvisability of massive vaccination have been reviewed by members of the Pan American Health Organization (see Annex 5). Considerations include the fact that epidemics of these diseases rarely occur, even in previously unvaccinated populations, after disaster; with presently available vaccines primary immunization requires two or three injections given at two-



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Emergency mass vaccination programs are a waste of resources. The best protection against communicable disease outbreaks following natural disaster is to maintain good health coverage before the disaster.
