



CHOLERA AND CHLORINE:

Was the 1991 cholera outbreak in Peru the result of the discontinuation of chlorine disinfection of water supplies?

The 1991 cholera epidemic in Peru did not arise because the disinfection of water supplies with chlorine was discontinued.

Chlorine disinfection of the public water supplies of the affected areas in Peru had been non-existent, intermittent and/or insufficient long before the cholera outbreak.

The root cause of the epidemic was inadequate management of human wastes, compounded by lack of access to soap and water for handwashing after excretion and the lack of awareness of the need for such cleansing.

Cholera-causing organisms multiply in the bodies of those infected and are passed in their body wastes. Preventing cholera and similar diseases requires the isolation of body wastes until the disease-causing organisms die off or are killed.

With adequate waste management and sufficient resources for personal cleanliness, the cholera epidemic would never have occurred. Once water supplies are allowed to become contaminated by human and animal wastes, it

becomes necessary to remove or kill any pathogens carried by the wastes before the water can be safely used for drinking.

Well before the onset of the 1991 cholera epidemic, water from the wells supplying Trujillo, the largest city in Peru, was distributed to points of use without any treatment even though it commonly carried fecal contaminants. The municipal water *“had not been chlorinated because of cost, lack of chlorinators and chlorine, and the belief that deep well water would not require disinfection.”*

Scientists from the U.S. Centers for Disease Control found cholera was associated with drinking unboiled water or water from household containers and going to fiestas.¹ Disinfection with chlorine was initiated seven months after the cholera epidemic had begun according to an assessment by scientists from the University of California.²

In Iquito, river water was treated with irregular, manual applications of coagulants and chlorine prior to the epidemic. During early 1991, the water leaving the city’s treatment plant exceeded minimum drinking

water standards for microbiological quality.³

In a study carried out by scientists from the Ministerio de Salud in Lima, cholera was associated with eating unwashed fruits and vegetables and drinking untreated water. However, a drink made from an abundant, inexpensive citrus fruit – toronja -- protected against cholera.⁴

Municipal water supplies in Piura, a city of more than 350,000, showed either no or insufficient chlorination. Scientists from the U.S. Centers for Disease Control found that cholera was linked to drinking unboiled water, drinking beverages from street vendors, eating food from street vendors, and consuming beverages made with ice from municipal water.⁵

In Lima, a city with a population of seven million and a water supply built to serve 230,000, chlorination of the water was intermittent at best. After the epidemic, officials claimed their failure to chlorinate was the result of a report they had received from the U.S. Environmental Protection Agency that linked chlorination to a small risk of cancer. This was later described as *“a face-saving excuse to cover up their laxity – while the city of Lima seems to have had the resources to chlorinate its water, the bureaucrats in charge chose not to make the effort.”*⁶

The findings of these scientific reports and other publications stand in stark contrast to statements made by the Chlorine Chemistry Council

(CCC) and others. For example, CCC official, C.T. “Kip” Howlett, told the United Nations Economic Commission for Europe that the cholera epidemic in Peru occurred *“after the country stopped chlorinating its water out of concerns over exposures to Trihalomethanes (THMs.)”*⁷ In a speech before the American Legislative Council, Mr. Howlett said once again that the cholera epidemic in Peru *“broke out ... after that country stopped chlorinating its drinking water in a tragically mistaken response to EPA guidance on disinfection by-product levels.”*⁸

In summary, the 1991 cholera epidemic in Peru did not arise because the disinfection of water supplies with chlorine was discontinued. Its root causes were inadequate management of human excreta resulting in fecal contamination of water supplies, lack of the necessities for proper personal hygiene, and lack of education in personal hygiene.

Beyond these primary factors, secondary factors include the absence of water disinfection, intermittent or otherwise inadequate disinfection, and poorly constructed and/or maintained water distribution systems. These root causes and contributing factors were in evidence well before the cholera outbreak of 1991.

By Pat Costner
Senior Scientist
Greenpeace International
13 March 1998

References

¹ Swerdlow DL, Mintz ED, Rodriguez M, Tejada E, Ocampo C, Espejo L, Greene KD, Saldana W, Seminario L, Tauxe RV, et al. 1992. Waterborne transmission of epidemic cholera in Trujillo, Peru: lessons for a continent at risk. *Lancet* 1992 Jul 4;340(8810):28-33

² Besser RE, Moscoso Rojas B, Cabanillas Angulo O, Gonzalez Venero L, Minaya Leon P, Rodriguez Pajares M, Saldana Sevilla W, Seminario Carrasco JL, Highsmith AK, Tauxe RV. 1995. Prevention of cholera transmission: rapid evaluation of the quality of municipal water in Trujillo, Peru]. *Bol Oficina Sanit Panam* 119(3):189-194

³ Craun, G.F. (ed.), "Safety of Water Disinfection: Balancing Chemical & Microbial Risks," Washington, D.C.: International Life Sciences Institute, 1993.

⁴ Mujica OJ, Quick RE, Palacios AM, Beingolea L, Vargas R, Moreno D, Barrett TJ, Bean NH, Seminario L, Tauxe RV. 1994. Epidemic cholera in the Amazon: the role of produce in disease risk and prevention. *J Infect Dis* 169(6):1381-1384

⁵ Ries AA, Vugia DJ, Beingolea L, Palacios AM, Vasquez E, Wells JG, Garcia Baca N, Swerdlow DL, Pollack M, Bean NH, et al. 1992. Cholera in Piura, Peru: a modern urban epidemic. *J Infect Dis* 166(6):1429-1433

⁶ Wills, C. "Yellow Fever Black Goddess: The Coevolution of People and Plagues," New York, NY: Addison-Wesley Publishing Company, Inc., 1996.

⁷ Chlorine: Basic Benefits, Universal Uses
Chlorine: Basic Benefits, Universal Uses
Presentation Of C.T. Howlett, Vice President/Managing Director Chlorine Chemistry Council before the United Nations Economic Commission for Europe Working Party on the Chemical Industry September 27, 1995 Geneva, Switzerland.

⁸ C.T. Howlett, Vice President/Managing Director Chlorine Chemistry Council, Presentation before the American Legislative Exchange Council Washington, D.C. December 7, 1995