

Community & Hospital Letter

“Water — Two Billion People are Dying for It”

On Monday, the 15th of December 2003, the water level of the Missouri River in Kansas City dropped to a record low stage of 4.24 feet as measured on a fixed marker (Jefferson City News Tribune 12/16/03). The previous low, based on records kept since 1931, was 4.31 feet. According to river hydrologists, this is a reflection of the long-term effects of the drought. Last winter, record low levels on the Missouri River caused problems for some communities, including Kansas City, that rely on the river for drinking water (Jefferson City News Tribune 1/25/03).

Despite this noticeable local decline in water, Kansas Citians are not experiencing a water shortage or health threats due to a lack of clean, drinkable water. Yet many people across the globe are not in such an envious position. According to the United Nations, a third of humanity is experiencing a water crisis. Under the slogan “*Water — Two Billion People are Dying for It*”, the United Nations is trying to get governments to address water issues.

Water related issues often are major public health issues. For example, waterborne infectious diseases cause billions of diarrheal illnesses worldwide and more than 2 million diarrhea related deaths each year. The United Nations estimates

that these diseases kill a child every 8 seconds. In Pacific Rim countries, the lack of safe drinking water is the main cause of infectious diseases (AFP 12/15/03).

Worldwide, 1 person in 6 lives without regular access to safe drinking water. Approximately 1.1 billion people rely on ponds, streams, and other exposed and untreated sources for their drinking water. And, 1 billion or more people, with access to pumps, wells, or municipal water works, also frequently drink microbe contaminated water (Science News, 3/1/03). Further, 2.4 billion people lack access to adequate sanitation, often resulting in further contamination of water that is then used for agriculture, drinking, and food preparation (J Food Protect 65:378, 2002). Although 85% of India’s population, for example, is covered by a water infrastructure, the burden of waterborne diseases has not declined proportionately largely due to deficiencies in sanitation coverage (Brit Med J 326:1284, 2003).

As a result, public health workers in countries, such as Kenya, promote the use of do-it-yourself water treatment chlorine solutions. In Zambia, households equipped with chlorine solution and a good storage vessel had significantly less *Escherichia coli* bacteria in their water and 48% less diarrhea (Amer

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J Trop Med Hyg 66:584, 2002).

Ideally, everyone would have the same high quality, abundant quantity water supply that people in the developed world take for granted, but usually it is a trade-off between quality and quantity (Br Med J 327:1416, 2003). The quantity of surface water is variable, depending on rainfall, and is poor quality, whereas groundwater is usually high quality but variable in quantity. Groundwater, generally, is safer although in some areas it is naturally contaminated by minerals such as arsenic and fluoride, which are harmful to health. For example, in Bangladesh 80 million people out of the population 130 million are affected by arsenic contamination of drinking water supplies.

By far the biggest threat to providing the world with safe water is water quantity. Fresh water is a finite source, making up less than 1% of the earth's total water and when it is groundwater it is often inaccessible to local populations. Yet, engineering schemes to re-plumb the world and to make water more available to more people often exacerbate water quality and quantity issues. There is a growing list of these projects that have resulted in

environmental and public health disasters, yet such projects keep being proposed (New Scientist 6/7/03). For example, the Great Lakes contain more than 90% of the fresh water in the US and there have been proposals to pipe water from Lake Michigan to Mexico and the desert Southwest and to divert Great Lake water into the Missouri River for use by many states (USA Today 6/23/03).

Water is crucial to health and to life itself. Its quantity and sustainability has always been a problem but is predicted to get much worse as a result of depleted resources, mismanagement, and poor governance. Groundwater is being depleted globally and by 2025, two thirds of the world's population will live in water stressed countries. One only has to look to the west of Kansas City at the problems Kansas and other states already are experiencing as groundwater aquifers are being depleted as a result of agricultural practices or population growth. There is no guarantee that much of the US will not be in the water stressed category in the very near future. And, if that occurs, the associated public health problems will escalate along with accompanying economic and environmental problems.

Potpourri

The recognition of two cases of SARS coronavirus infection in laboratory workers in Southeast Asia during recent months illustrates the potential for another SARS outbreak in 2004. In addition, a new study indicates that the SARS virus is a recombinant agent derived from mammalian and avian sources. Researchers found a mammalian-like origin for the replicase protein, an avian-like origin for the matrix and nucleocapsid proteins, and a mammalian-avian mosaic origin for the spike protein (J Virol 78:76, 2004). It is the spike protein that is believed to be the host-determining component controlling the virus' ability to infect cells.

Another SARS related finding was that cats and ferrets could be infected with virus and develop illness and transmit the virus to healthy animals (Nature 425:915, 2003). During the Amoy Gardens outbreak of SARS in Hong Kong, cats were found to be infected. The new study confirms that observation and demonstrates the zoonotic potential of transmission from cats.

And from Toronto's SARS outbreak comes a report of post-traumatic stress disorder in 58% of infected patients and 43% of their health care providers (Intern Med News 36:11/1/03).

Compared with other parts of the hand, the area beneath fingernails harbors the most microorganisms and is most difficult to clean. Artificial fingernails, which are usually long and polished, reportedly harbor higher microbial populations than natural nails. A study comparing handwashing techniques to remove *Escherichia coli* and caliciviruses found that bacterial and viral numbers correlated with fingernail length, with greater numbers beneath fingernails with longer nails (J Food Protect 66:2296, 2003). The results indicated that best practices for fingernail sanitation of food handlers were to maintain short fingernails and scrub fingernails with soap and a nailbrush when washing hands.

The flu epidemic in the Kansas City metropolitan area, including the tragic deaths of several children, was merely reflective of the experience of much of the country. What this early flu season did illustrate however, was the need for high risk individuals to get vaccinated prior to the onset of the annual flu seasons. The state of Oregon has simplified the ability to deliver influenza and pneumococcal vaccinations to such groups by allowing appropriately trained pharmacists to administer the vaccines (Intern Med News 36:11/1/03). This practice allowed for an increase in vaccination rates that did not come at the expense of vaccinations provided by physicians.

The combination of signs and symptoms that is most helpful in the differential diagnosis of influenza consists of a temperature of 100.4 °F or more with chills, sweating, headache, and cough (Intern Med News 36:11/15/03). Patients who present with this constellation are 3 times more likely to have a positive result on a rapid test for influenza than those without this combination. A symptom outside this constellation — a runny, stuffy nose — was more predictive of the flu in patients 0-18 years old.

In November, a 5 year old boy in Hong Kong contracted and survived a H9N2 avian influenza virus infection (ProMED 12/9/03). In 2002, two girls who made a complete recovery also were infected with a H9N2 avian influenza strain. Other avian influenza viruses have been isolated from humans in recent years, H5N1 agents in 1997 and 2003 in Hong Kong and H7N7 virus in the Netherlands earlier in 2003. These latter agents were more pathogenic in humans than the H9N2 virus, and even fatal in some cases, but person-to-person transmission was limited. These events illustrate that the generation of pandemic influenza viruses requires more than the appearance of influenza viruses with novel combinations of hemagglutinin (H) and neuraminidase (N) antigens. Transmissibility in humans is required, a property which could arise either by mutation or reassortment of genes from different influenza A viruses.

Use of the varicella (chickenpox) vaccine in susceptible nursing mothers seems to be okay. The vaccine virus does not appear to enter a mother's breast milk or pass to feeding infants (Obstet Gynecol 102:970, 2003).

The Centers for Disease Control and Prevention (CDC) has announced that Prevnar (PCV7) vaccine used to protect children against invasive pneumococcal disease could be in short supply in 2004 due to production problems encountered by the manufacturer, Wyeth Vaccines.

An Australian research team recently reported on car color and the risk of car crash injury (Brit Med J 327:1455, 2003). Using the injury experience of persons in white cars as the comparison standard, the team found a significant reduction (50%) in serious injuries for persons in cars that were silver in color and a significant increased risk for persons in brown, black, and green cars. The risks of serious injury in white, yellow, grey, red, and blue cars were not significantly different from each other.

Conservationists are watching the outcome of a rabies epizootic among Ethiopian wolves, the most endangered member of the dog family in the world with only about 500 animals remaining. More than 30 wolves are known to have died and it is feared that up to 75% of the animals will eventually die from rabies. Authorities have begun capturing and vaccinating some of the wolves and hope prevent the wolves' extinction by vaccinating only 20-40% of the known population (ProMED 11/5/03).

Most human rabies deaths in the US can be attributed to unrecognized exposures to rabies viruses associated with bats (Emerg Infect Dis 9:151, 2003). And, worldwide, other lyssaviruses carried by bats also cause human rabies. Thus, the recognition of two new rabies-related viruses from bats in eastern Siberia during 2002 extend the known heterogeneity of the genus *Lyssavirus* and are further evidence that bats can serve as latent reservoirs of rabies-related disease for human and animal populations (ProMED 12/17/03).

Women who change partners between their first two births are at an increased risk of delivering a preterm, low birthweight baby with an increased risk of infant mortality compared with women who have the same partner for both births (Brit Med J 327:1138, 2003).

Black men do not survive as long as white men after treatment for localized prostate cancer (J

Natl Cancer Inst. 95:1702, 2003). The median survival time for black men was 1.7 years less than the survival time for white men.

Among men, black or Hispanic ethnicity is protective against depression (Ann Epidemiol 13:331, 2003). Factors of risk for men included victimization by female-to-male partner violence (FMPV), unemployment, and living in a high-unemployment neighborhood. Among women, the predictors are perpetration of moderate or severe FMPV and impulsivity. In the US, the rate of male-to female partner violence (MFPV) and FMPV is

13.6% and 21.4%, respectively. The rate of MFPV for black couples is 23%, for Hispanics, 17%, and for whites, 12%. The rate of FMPV for black couples is 30%, for Hispanics, 21%, and for whites, 16%.

E*scherichia coli* 026 could present a serious risk for public health according to British veterinary experts. This strain is as dangerous to human as *E coli* 0157. The 026 strain began to be reported from humans in 2003.

The World Health Organization has concluded that Denmark's termination of the use of antimicrobial growth promoters in 1998 seems to have achieved its desired public health goals. Through voluntary and regulatory action, antimicrobial growth promoters were withdrawn from use in cattle, chickens, and pigs. Virtually no antimicrobial growth promoters have been used since the end of 1999. Overall, the use of antimicrobials in food animals declined 54% with the withdrawal of the growth promoters. These antimicrobial growth promoters were active mainly against Gram-positive bacteria and, thus, there was

no effect on Gram-negative organisms such as *Salmonella* and *Escherichia coli*. For humans, there is sparse data on which to measure the effect of the termination of growth promoters. There is some indication that it may be associated with a decline in the prevalence of streptogramin resistance among *Enterococcus faecium*. Termination of antimicrobial growth promoters in pigs resulted in increases in therapeutic use of some antimicrobials that also are used in humans as there was a significant increase in diarrhea in the post-weaning period. There was a 1% increase in costs for raising pigs, but none for poultry.



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