

Short AZT course can protect fetuses

Treatment with AZT (zidovudine) during the last few weeks of pregnancy cuts mother-to-fetus transmission of HIV by half, a study in Thailand shows. Based on these results, U.S. and United Nations researchers have stopped giving pregnant women an inactive drug, or placebo, in worldwide studies of HIV transmission, a research protocol that some critics had called unethical. All of the women are now receiving AZT.

Tests have shown that roughly one child in five born to HIV-positive women who are not receiving medication becomes infected with the virus before or during birth. In a study of 397 women in Thailand, a 3- to 4-week course of AZT cut HIV transmission from 18.6 percent to 9.2 percent. The women began getting the drug in the 36th week of pregnancy and continued until childbirth, the federal Centers for Disease Control and Prevention (CDC) in Atlanta reports.

The Thai women were taking AZT orally, and their infants received no medication after birth. The regimen costs about \$80 per pregnancy, much less than the longer, slightly more effective \$800 treatment typically prescribed in the United States and other industrialized countries. The more expensive course, which starts in the 26th week of pregnancy, cuts transmission rates to about 7 percent, says Jack Killen, a physician at the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, Md.

U.S. agencies are funding studies on mother-to-infant HIV transmission in 10 African countries and the Dominican Republic. A study in Uganda will include some women who receive another antiviral drug along with AZT during late pregnancy, Killen said.

The Thai study prohibited breast-feeding because HIV might be transmitted that way. In forthcoming studies, researchers plan to study the risks of breast milk, a key source of nutrition for infants in developing countries, Killen says. —N.S.

Papillomavirus common in college women

A sexually transmitted disease sometimes associated with cervical cancer is common among sexually active college-age women but is usually cleared from their systems within 8 months, a study in New Jersey has found. As a result, doctors should reconsider surgery or other invasive treatments to remove cervical growths that result from human papillomavirus (HPV) in adolescent and young women, says study coauthor Robert D. Burk, a physician at Albert Einstein College of Medicine in New York.

The virus, which is spread by sexual intercourse, was present at some time in 60 percent of 608 college women studied by the researchers over 3 years. At the start of the study, 27 percent had the virus; some other studies have seen an initial rate of 40 percent, Burk said.

The women were examined for HPV and filled out lifestyle questionnaires every 6 months. They underwent Pap smears annually to test for abnormal cell growth, the researchers reported in the Feb. 12 *NEW ENGLAND JOURNAL OF MEDICINE*.

Some HPV strains cause external genital warts, but the strains that cause vaginal or cervical infections pose the greatest risk of developing into cancer. Of the 35 HPV strains that infect the cervix, the two most closely associated with cervical cancer were among the most frequent of all new HPV cases reported in the new study. Those strains also took longer to clear up than many other types.

When Pap smears reveal abnormal cervical growths caused by HPV, many doctors remove them by burning or freezing. The new study adds to evidence indicating that HPV is largely self-limiting and that such treatments might not be needed, Burk said. Instead, he notes, careful monitoring of Pap tests may be a preferred treatment for young women. —N.S.

Self-disinfecting surfaces

For years, researchers have been exploring the many wonders of titanium dioxide. Long used to whiten paints, puddings, and paper used for U.S. currency, this powerful catalyst is being developed to decompose crude oil (SN: 5/22/93, p. 332), strip away organic debris from treated windows (SN: 9/2/95, p. 157), and defog mirrors (SN: 8/2/97, p. 70). Japanese chemists now believe they have identified what may prove to be an even more important role for this agent—to kill germs and disarm their poisons.

Akira Fujishima of the University of Tokyo and his colleagues coated a plate of glass with a 0.4-micrometer film of titanium dioxide, then placed water harboring *Escherichia coli* bacteria on the top of the glass. When they illuminated the underside with a 15-watt black light, its ultraviolet (UV) radiation triggered a catalytic reaction between the coating and the bacteria.

Though UV radiation killed *E. coli* placed on an untreated glass, it did nothing to endotoxin, a poison spewed by the dying bacteria that can prove dangerous at concentrations of just a few nanograms per liter of blood. Germs on the coated glass disappeared more quickly when irradiated, and their poison vanished too, Fujishima's team reports in the March 1 *ENVIRONMENTAL SCIENCE & TECHNOLOGY*. This shows that the light-activated coating "can kill bacteria and simultaneously degrade the toxic compounds . . . from the bacteria," they say.

Ordinarily, the scientists note, eliminating endotoxins requires caustic chemicals or heating to 250°C for at least 30 minutes. The low-cost, light-driven process holds out the promise of disinfecting and detoxifying at room temperature these surfaces carrying all but the heaviest bacterial contamination—probably "in less than 1 hour," Fujishima told *SCIENCE NEWS*.

At present, he says, 20 Japanese hospital operating rooms are testing ceramic tiles coated with titanium dioxide. The tiles "work well in terms of self-disinfection and also disinfection of the air in a room," Fujishima says, and "are also now becoming extremely popular for use in public rest rooms, where they can help to control both bacteria and noxious odors." —J.R.

When sewage is recycled for drinking

Regulations covering drinking water were developed largely to deal with traditional contaminants, such as the fecal coliform and other germs from human wastes. Today, most municipal and industrial wastewater is tainted by a broad spectrum of industrial chemicals and other pathogens—contaminants that may not be filtered out by treatment plants before the water enters the kitchen faucet.

As a result, drinking water regulations may need revising, concludes a new report from the National Research Council in Washington, D.C.

More than 2 dozen major utilities release so much wastewater effluent into drinking water supplies that when natural waterways are low, the treated sewage makes up more than 50 percent of the water. Although most of this treated water meets federal standards, the report notes that regulators scout for less than the full spectrum of toxicants now present in that water. As a result, the report argues, recycling sewage for drinking water should be "an option of last resort"—and when it is selected, more stringent regulations should be applied.

At a minimum, the new report recommends, programs that recycle wastewater into drinking water sources should "conduct continuous toxicological monitoring" if that wastewater introduces significant amounts of organic chemicals. When the risks posed by such contaminants are unknown—as is the case with low concentrations of excreted drugs (see p. 187)—the report recommends the development of a program of toxicological studies. —J.R.