



By Bob Ferguson

Connecting the fight
against polio to
water & wastewater
management

Public Health Above All

This past August, in my column about the hunt for Osama bin Laden, I mentioned that Time magazine reported that Pakistani authorities arrested a doctor who was vaccinating children in the area of bin Laden's compound.

This story has continued to develop and receive widespread coverage throughout the world, including Pakistan, and now threatens to derail the effort to finally eradicate polio.

It has been reported since the time of the raid that a Pakistani physician, Dr. Shakil Afridi, working with the CIA, created a fake hepatitis B vaccination campaign to get access to children in bin Laden's Abbottabad compound. The idea was to retain the needles used for the vaccinations and extract any residual blood for DNA testing to determine whether the children in the compound were related to bin Laden, which would confirm the possibility he lived there. Afridi was arrested by Pakistani officials in the weeks after the bin Laden raid, and sentenced to 33 years of imprisonment. The U.S. has called his imprisonment unjust and called for his release.

The Threat of Polio

This political battle threatens to slow or stop the effort to eradicate polio in one of the last places on Earth where it still exists. In December 2012, seven workers involved in a U.N. anti-polio campaign were killed in gun attacks while they were delivering vaccinations. The Taliban in Pakistan have been criticizing and issuing threats against the U.N.'s anti-polio campaign in the aftermath of the CIA vaccination program. Various militant groups also have kidnapped and killed foreign nongovernmental organization workers in the past in an attempt to halt the immunization drives, which they say are part of efforts to spy on them.

This is unfortunate, because Pakistan is one of just three countries where polio is still endemic and is considered one of the key battlegrounds in the global fight against the disease, which attacks the nervous system and can cause permanent paralysis within hours of infection. Polio can strike at any age, but it mainly affects children less than five years old. There is no cure, but there are safe and effective vaccines. Almost 200 children were paralyzed in Pakistan in 2011—the worst figures in 15 years—and, by some reports, the country accounts for 60% of polio cases worldwide. Declaring polio a national emergency, the Pakistani government is targeting 33 million children for vaccination with some 88,000 health workers delivering vaccinations.

The threat of polio is serious. According to the World Health Organization (WHO), a failure to eradicate polio could lead to as many as 200,000 paralyzed children per year worldwide.

Polio is spread through person-to-person contact. When a child is infected with the polio virus, it enters the body through the mouth and multiplies in the intestines. It then is shed into the

environment through feces, where it can spread rapidly through a community, especially in situations of poor hygiene and sanitation. Young children who are not yet toilet trained are a ready source of transmission, and polio also can be spread if food, water or drink is contaminated by feces.

The strategy to eradicate polio is therefore based on preventing infection by immunizing every child and controlling hygiene and sanitation. If a sufficient number of children are fully immunized against polio, the virus will be unable to find a susceptible host to infect and will die out. Eradication efforts also include reducing means of transmission through improved domestic and public sanitation to limit the existence of prone environments such as still water, improving waste management methods and educating populations about the disease and risky practices.

The Role of Wastewater

In addition to counting the number and percentage of children vaccinated, progress in the eradication effort also is often measured through regular testing of wastewater for the polio virus. Additionally, because the virus is tracked by identifying particular genetic strains, the testing is conducted using reverse transcriptase polymerase chain reaction analysis (PCR) in approximately the same way that I described in my August article—detecting and amplifying a piece of DNA in a sample and generating thousands or even millions of copies of a particular target DNA sequence.

If violence directed at aid workers threatens to derail vaccination programs, might it also affect water, wastewater and other public health programs? There seems to be no logic in the effort of the Taliban and other militant groups to stop a program that offers vastly improved public health and elimination of one of the worst scourges of this and the last century, so why wouldn't water, wastewater and other sanitation programs also have reason for concern?

Negotiations are continuing between the U.N., WHO, the Pakistani government and militant groups to get the Pakistani polio program back on track.

Our business is public health. The eradication of polio would be one of the greatest public health victories of all time. Politics is a fact of life—it affects everything we do in our industry and our efforts to make the world a better place. Let's hope that we can rise above our politics in this case and save millions of children from the crippling impact of polio and rid ourselves of this disease once and for all. www.wwd

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