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The hidden threat that could prevent Polio's global eradication

Polio could soon be wiped out—but only if scientists can track down the last carriers

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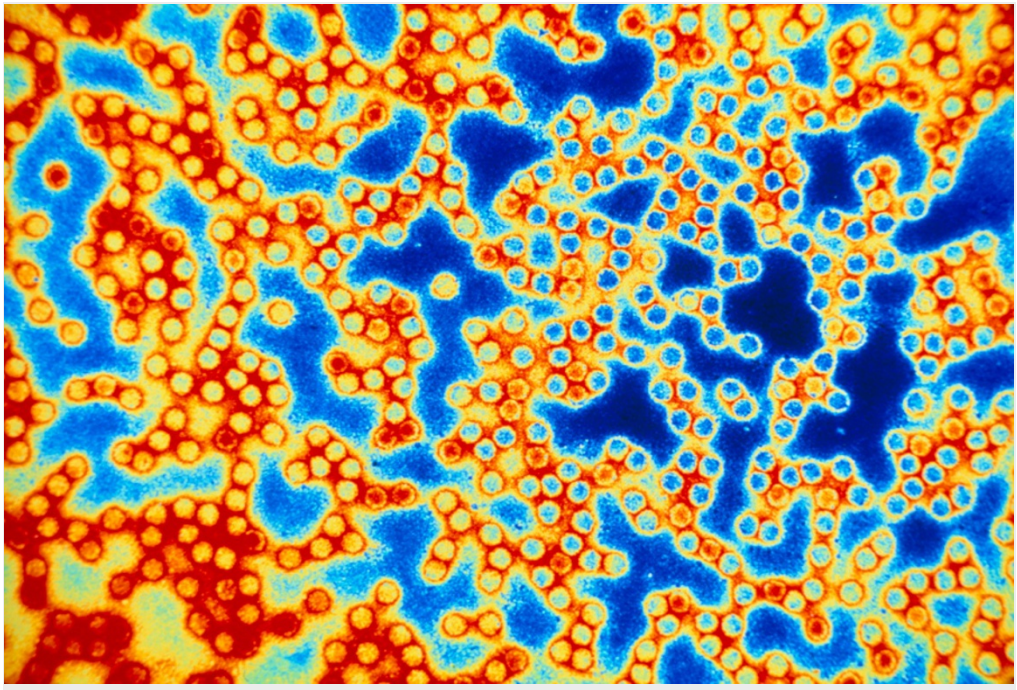

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The replication of the Polio viris is not shut down by chronic extreters.

An article by Scientific American.

Global eradication of polio has been the ultimate game of Whack-a-Mole for the past decade; when it seems the virus has been beaten into submission in a final refuge, up it pops in a new region. Now, as vanquishing polio worldwide appears again within reach, another insidious threat may be in store from infection sources hidden in plain view.

Polio's latest redoubts are "chronic excreters," people with compromised immune systems who, having swallowed weakened polioviruses in an oral vaccine as children, generate and shed live viruses from their intestines and upper respiratory tracts for years. Healthy children react to the vaccine by developing antibodies that shut down viral replication, thus gaining immunity to infection. But chronic excreters cannot quite complete that process and instead churn out a steady supply of viruses. The oral vaccine's weakened viruses can mutate and regain wild polio's hallmark ability to paralyze the people it infects. After coming into wider awareness in the mid-1990s, the condition shocked researchers.

Philip Minor, deputy director of the U.K.'s National Institute for Biological Standards and Control, describes the biomedical nightmare: Wild polioviruses stop circulating. Countries cut back on vaccination efforts. A chronic excreter kisses an unvaccinated baby, and the baby goes to day care. "And zappo," he adds, "it's all over the place, with babies drooling all over each other. So you could see a scenario where polio would come back from a developed country." It could happen in the developing world as well. Although it was once thought that immunocompromised individuals could not survive for long in lower-income countries, circumstances are changing as those countries improve their health care systems. In 2009 an immunodeficient 11-year-old Indian boy was paralyzed by polio, five years after swallowing a dose of oral vaccine. It was only then that researchers recognized him as a chronic excreter.

Chronic excreters are generally only discovered when they develop polio after years of surreptitiously spreading the virus. Thankfully, such cases are rare. According to Roland W. Sutter, the World Health Organization scientist who heads research policy for the Global Polio Eradication Initiative, the initiative is pushing for the development of drugs that could turn off vaccine virus shedding. A few promising options are in the pipeline.

Drugs can only solve the problem if chronic excreters are identified, and that's no easy task. For years scientists in Finland, Estonia and Israel monitored city sewers, watching for signs of shedders' presence. In many samples, they have found the telltale viruses from chronic excreters, but they have failed to locate any of the individuals. These stealthy shedders may not be classic immunodeficient patients traceable through visits to immunologists. Instead they may be people who do not know they have an immunity problem at all and are under no specialized medical care. “We know that there's really a Damocles sword hanging over them,” Sutter says. It hangs over the rest of us as well.

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