5 Cases of Polio in Amish Group Raise New Fears

By GARDINER HARRIS

LONG PRAIRIE, Minn. - Polio was pronounced dead in the Western Hemisphere years ago, after one of the most successful public health campaigns in history. But now it is stealing through a tiny Amish community here in central Minnesota, spreading from an 8-month-old girl to four children on two neighboring farms.

So far, no one has been crippled by the disease; only 1 in 200 cases of polio results in paralysis. But worried public health officials say it may be only a matter of time.

The story of how polio came to this dairy farming community of 24 families, with 19th-century ways that include a deep-rooted suspicion of vaccination, is both a medical whodunit and a cautionary tale, suggesting that eradicating polio may prove far harder than anyone thought, even in the developed world.

No one expects that the United States will be visited by the kind of outbreaks that recently flared up in Africa and Asia, frustrating the longstanding goal of eliminating polio for good by the end of this year. But the Long Prairie cases highlight a weakness in the worldwide campaign.

The 8-month-old Amish girl, whose name has been withheld by health officials, has an immune deficiency that makes her unable to rid her body of the virus.

How she contracted the virus remains a mystery. She may have been infected in a hospital by another immune-deficient patient who nursed it for years. A doctor or nurse may have served as a go-between. Or there may have been a chain of carriers in the Amish community. The virus is spread from stool to mouth, a surprisingly efficient form of transmission.

Regardless, the girl is now a wellspring for polio, a modern-day Typhoid Mary who can pass it along to others. Anyone who has not been vaccinated is vulnerable. And though vaccination rates in the United States are at historic highs, an increasing number of parents are resisting inoculations for their children, fearing that they may cause disorders like autism, a connection scientists have almost universally discounted.

So health authorities are keeping a watchful eye on the girl and her neighbors.

"If that child is a message in a bottle," said Bruce Aylward, coordinator of the global polio eradication initiative at the World Health Organization, "it has just washed up on shore."

The 24 families moved to this windswept stretch of prairie from Wisconsin about three years ago. An Amish community generally includes only as many families as can fit into one house for church services, and each community must come to a consensus on what to accept from modernity.

This one allows windshields for its horse buggies, kitchen cupboards that are attached to walls and some upholstered furniture - all somewhat unusual for the Amish, said Dr. Susan Rutten, a physician from nearby Sauk Centre who makes house calls in four Amish communities. Men can wear dark green shirts, not just navy blue and black.

The farms could have come straight out of children's books. There are ducks and chickens, cattle and hogs. Fence posts are columns of stones enclosed by wire mesh. Lacking electricity, the farms are remarkably quiet. At one, the children rarely yelled or even spoke in the presence of a stranger. The air smelled of turned earth, manure and wood smoke.

The threat of polio seemed remote here - until this summer. That was when the baby was hospitalized with an immune-system disorder.

As her care became increasingly complex, she was shuttled through four hospitals. At the third, she developed diarrhea. On Aug. 27, doctors sent a stool sample to the hospital's laboratory, which determined that the girl had an intestinal virus. In many states, nothing more would have been done.

But in Minnesota, hospitals send such samples to a sophisticated state laboratory. On Sept. 29, the tests matured. A laboratory supervisor called Dr. Harry Hull, the state epidemiologist, to say they had isolated a polio virus.

Dr. Hull was stunned. "I said, 'You have made a mistake,' " he recalled.

Tall and thin, with glasses and bushy eyebrows, Dr. Hull is one of the world's foremost polio experts. Before coming to Minnesota, he worked...
for 10 years in the World Health Organization's global polio eradication effort. In an interview, he scrawled circles and arrows on a sheet of paper as he described the search for the virus.

The state laboratory redid the tests. The results were identical. Then it sequenced the virus's genomic code. A supervisor plugged the code into a national genomic database, comparing it with the genes of a polio virus.

"Bingo," said Dr. Norman Crouch, the laboratory's director. "It was a 98 percent match. We knew we had nailed it."

The Minnesota laboratory sent the sample to the Centers for Disease Control and Prevention in Atlanta, which confirmed the results. Officials were immediately concerned about where the virus originated and where it might have spread.

Confirming the presence of polio in a city with even one infected person is not impossible, said Dr. Mark D. Sobsey, a professor of environmental microbiology at the University of North Carolina. The stool of an infected person contains so many viral particles that tests at a sewage treatment plant can reveal it. Such tests helped track outbreaks in the Gaza Strip and Haiti in recent years.

Since many Amish use outhouses, however, state officials geared up to go door to door. They unearthed a public health form explaining how to collect stool samples. The form had pictures of a flush toilet and a garbage can with a plastic liner - things foreign to many Amish communities. Officials changed the form.

Gary Wax, an epidemiologist for the Minnesota Department of Health, contacted the leader of the Amish community where the child lives and asked for his permission to seek stool samples from those in his community. The leader gave his blessing, Mr. Wax said.

"We really tried to do it in a respectful way rather than just barge right in there," Mr. Wax said.

Since the Amish have no phones, he could not call for appointments. He and his colleagues knocked on doors. They had been warned against speaking directly to Amish women without their husbands present, Mr. Wax said, and the men were "running all over the place, helping each other with harvesting and construction." So if the man was not at home, they left.

"We came back many times to some places," Mr. Wax said. After weeks of effort, just 5 of 24 families in the community agreed to cooperate. Three of the five, including the family of the 8-month-old, proved to have infected children.

"I would be surprised if we don't get a paralytic case someplace," Dr. Hull said.

In a neighboring community, a 38-year-old farmer who is also a sawyer agreed to speak with a reporter only if his name would not be used, saying Amish people avoided calling attention to themselves.

The farmer, who has seven children, explained that nothing in Amish law forbade vaccinations, but that many Amish believed that vaccines weakened the immune system. He added that as a result of the infections, he planned to have his children vaccinated against polio, measles, mumps and rubella, and that most of the families in his community were doing the same. "We'll get vaccinated if we feel it's necessary," he said. "But our definition of necessary may be very different from yours."

A further challenge for public health officials is that their surveillance efforts cannot be confined to a few remote farming communities.

"My mental image of the Amish was that they don't travel at all because they don't drive cars," Dr. Hull said. "That's not true."

The Amish commonly take buses and trains, and occasionally even planes. Families from the baby girl's community recently attended a wedding in Ontario, Canada, that health officials said drew more than 1,000 guests. Some have visited Wisconsin in recent weeks.

Polio experts have long feared that an immune-deficient person could cause an outbreak of paralytic polio. That is a particular hazard in poorer countries.

In much of the developing world, children are given an oral vaccine made of a live, nonparalytic polio virus. Two drops confer partial immunity, making mass vaccination campaigns achievable in poor countries. To become fully immunized, a child must be vaccinated several times. The vaccine causes an infection that usually lasts a few weeks. The infection can spread to others and immunize them, too.

But if the virus spreads too far among previously unvaccinated people, its genes will change and the virus will regain its ability to cripple and kill. Such a virus caused an outbreak of paralytic polio in Haiti and the Dominican Republic in 2000 and 2001, crippling 21. (The outbreaks in Africa and Asia began after many Nigerians refused vaccinations in 2003, suspecting they were a Western plot to sterilize Muslim girls.)

The United States and much of the developed world used live-virus vaccinations for decades, but switched in recent years to a dead virus that is injected. The dead virus does not cause an infection or paralysis.

In people with poor immune systems like the 8-month-old Amish child, the live polio vaccine can change to a paralytic form without being passed to anyone else, since such people can nurse a mutating virus for years.

In most of the world, such patients die quickly because of poor medical care. In the West, they can live for years, with a few of them shedding polio viruses all the while. Among experts, these patients are called "chronic excreters." That such a polio wellspring would be born among a
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largely unvaccinated population like the Amish, Dr. Hull said, was a "random unlucky event."

"It's a model of what might happen if we stop vaccinating too soon," he said.

The Amish girl remains hospitalized in strict isolation. Health officials will not say where. And they are still trying to figure out where she contracted the virus.

Genetic testing showed that the virus was almost identical to that of the oral polio vaccine given in much of the rest of the world but not in the United States. The slight changes to the virus from that of the vaccine suggested that it had been circulating for at least two years. The girl has never traveled abroad.

A fear is that such a person could unwittingly incubate a polio infection for a decade or more and then accidentally reintroduce it - years after experts have declared it eliminated from the world and vaccinations have stopped.

That prospect has long seemed remote, because such children are so rare, Dr. Aylward of the World Health Organization said. But an outbreak of paralytic disease in Minnesota would prove that it was more likely than many had believed, and it would demonstrate that work now under way to better understand the risks posed by chronic excreters would have to be intensified.

"Or we may need to revisit the strategy and time frame for stopping the use of the oral polio vaccine," Dr. Aylward said. "It's a tiny chance, but it's something we need to keep an eye on."