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Subject: Polio, Strains & History
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From: Larry White <lewhite@PIPELINE.COM>
To: POLIO@MAELSTROM.STJOHNS.EDU

POLIO, STRAINS & HISTORY

When vaccines against polio were developed in the mid-1950s, they spelled the end of a disease that became more disabling, deadly and feared as time went by.

Though polio was not unknown in ancient times, the disease wasn't mentioned much in the medical literature throughout the ages and did not occur in large epidemics until modern times. In fact, it was only in the late 18th century that the disease was first identified as polio.

Polio's Three Strains:

Thanks to an effective vaccination program, polio has been nearly eradicated in the United States. However, as recently as the 1950s, epidemics terrorized the nation, especially in the summer months, leading to the closing of public pools and other places where people congregated.

Polio is a highly contagious disease caused by a virus that has three distinct strains, called types I, II and III. Immunity to one type doesn't confer immunity to the other two.

Type I, the strain that causes the most paralysis, is also the cause of most epidemics. Polio epidemics in temperate climates occurred most frequently in the summer and early fall -- the poliovirus flourishes in warm weather. Children were more often affected than adults, which is why the disease was once known as
infantile paralysis.

Persons at greater risk for serious neurological damage during epidemics, due to lowered immunity, included those who had recent inoculations or recent operations, especially removal of tonsils and adenoids (because the virus enters through the mouth and multiplies in the throat). Pregnancy also predisposed to
paralytic polio infection.

The virus is found throughout the world, but primarily in undeveloped countries with insufficient immunization practices.

It is excreted in large amounts in the feces of someone who has polio or is recovering from it, and is probably spread through hand-to-hand or hand-to-mouth contact.

The poliovirus enters the mouth and multiplies in the throat and intestinal tract. Viruses may cross from the intestinal tract into the bloodstream.

They are carried to the spinal cord, where they may kill or transiently injure motor nerve cells that control skeletal muscles, causing paralysis.

Sometimes only a small group of muscles is affected, sometimes the paralysis is widespread. The legs are affected more often than the arms, but polio may partially or completely paralyze a single limb, one half of the body, even all four extremities.

If the virus gets into the brain stem (bulbar polio), it can paralyze muscles that control breathing, swallowing, and other bodily functions. Most fatalities occur among those with respiratory paralysis.

Today, polio is once more an insignificant disease in the United States and advanced Western societies. Most American doctors have never seen an active case of polio. But in the first half of this century, polio was called the last of the great childhood plagues.

How polio emerged from centuries of obscurity to becoming a killer just a few decades ago has to do with sanitation -- and the lack thereof -- and the fact that the poliovirus is excreted in the feces up to six weeks after infection.

In less hygienic times--when the contents of chamber pots were blithely tossed out of windows, open sewers fouled the street and outhouses stood in the backyard--there was plenty of opportunity to contract polio.

Polioviruses infected each new generation of babies, who were protected in part by antibodies passed on to them by their mothers.

These infections early in life were usually mild and non-paralytic, sometimes appearing with cold-like symptoms, sometimes with no symptoms at all. They were often indistinguishable from a host of other childhood diseases, and were rarely diagnosed as polio.

Ironically, cases of paralytic polio began to rise when improved public sanitation and other health measures, such as purification of the water supply and milk pasteurization, were put into effect in economically advanced countries.

With better hygiene, there was less chance for babies and young children to contract the mild form of the disease and acquire immunity. When the disease struck older children or adults, it was more likely to take the paralytic form.

In northern Europe and the United States, small epidemics of paralytic polio began to appear in the late 19th and early 20th centuries.

However, polio's full impact wasn't felt in the United States until the summer of 1916, when 27,000 people were paralyzed, with 6,000 deaths.

The Northeast was particularly hard hit -- in New York City and the surrounding suburbs, more than 9,000 cases were reported, with 2,448 deaths. Many attributed these cases to the large immigrant population.

The 1916 epidemic caused widespread panic. Thousands fled the city to nearby mountain resorts. Movie theaters were closed, meetings were cancelled, public gatherings were shunned.

Doctors postponed tonsillectomies (then a common operation for children) until cooler weather when the epidemic abated. Children were warned not to drink from water fountains; amusement parks and bathing beaches were off limits.

In some towns, visitors from the New York City area were turned away by armed citizens who feared the spread of contagion -- shades of the 14th century's Black Plague.

Compared to the flu epidemic that killed 500,000 Americans just two years later, the 1916 polio figures seem modest, but polio was especially frightening because it could cripple.

A life in a wheelchair, or in an "iron lung," was a fate to be feared. An epidemic appeared each summer thereafter in at least one part of the country, with the most serious occurring in the 1940s and 1950s.

The 1952 polio epidemic was the worst in our nation's history. Nearly 58,000 cases were reported that year; 3,145 Americans died and 21,269 were left with mild to disabling paralysis. More children died of polio in 1952 than of any other infectious disease.

Vaccines did for polio what they had done earlier for other childhood diseases, such as whooping cough and diphtheria.

The 1954 field trial sponsored by the National Foundation for Infantile Paralysis, in which 1.8 million children participated, proved that the polio killed virus vaccine developed by Jonas Salk, M.D., was highly effective in preventing polio. Americans were jubilant, and Dr. Salk became a national hero.

Following the licensing of the Salk vaccine in 1955, an intense public health campaign was mounted to inoculate all American children. Newsreels of the time show long lines of school children patiently waiting to get their shots.

Similar scenes were repeated in 1961 when the attenuated live virus vaccine developed by Albert Sabin, M.D., was licensed, only this time the children were given a sugar cube soaked in the liquid vaccine.

Polio was virtually eliminated in the United States in a few short years. Both vaccines contain all three virus strains and effectively prevent polio.

The last U.S. polio epidemic occurred in 1979, when 10 Amish children, whose parents had refused to have them vaccinated on religious grounds, came down with the disease. Worldwide, the World Health Organization estimates that 250,000 cases of paralytic polio occur each year.

Many health professionals believe polio can be completely eradicated through vaccination, as was smallpox in 1977.

The federal Centers for Disease Control in Atlanta recommends vaccination with the attenuated live virus vaccine for primary immunization of children in this country, because its liquid form is easy to administer and well accepted by children.

It is supplied to doctors in single dosage forms that can be administered in a number of ways, including directly into the mouth with a dropper (the most common way for infants); mixed with distilled or chlorine-free tap water, simple syrup, or milk; or placed in foods, most commonly sugar cubes.

It also blocks implantation of the virus in the intestines, where it multiplies. The killed virus vaccine requires a series of injections, which promotes more anxiety among youngsters.

However, many countries use the injectable vaccine with great success. On average, fewer than 10 cases of polio a year were reported from 1975 to 1990.

Some of these cases have been associated with the administration of the attenuated live virus vaccine, according to CDC. Other cases have been brought into the country by immigrants or visitors from abroad.

Recommended Polio Immunization for Infants Primary Series:

1. First dose: when baby is 6 to 12 weeks old (often given with first DTP inoculation at 2 months).

2. Second dose: not less than 6 and preferably 8 weeks after first dose (commonly given when baby is 4 months old).

3. (In areas where polio is common, an optional dose also may be given at 6 months of age).

4. Third dose: 8 to 12 months after second dose. Booster Upon entering elementary school.