DOWNLOAD PDF THE POLIO EPIDEMIC

Chapter 1 : Poliomyelitis - Wikipedia

The history of poliomyelitis (polio) infections extends into prehistory. Although major polio epidemics were unknown before the 20th century, [1] the disease has caused paralysis and death for much of human history.

An epidemic is when an infectious disease spreads within a community or area during a specific time period. Learn about the biggest outbreaks to spread across the United States, and where we are now. People had symptoms of high fever, chills, severe back pain, and rashes. Starting from the Northeast, smallpox wiped out entire Native American tribes. Over 70 percent of the Native American population dropped. In , of the 5, Bostonians who had smallpox died from it. In , Edward Jenner developed a vaccine from cow pox. It helps the body become immune to smallpox without causing the disease. After a large vaccination initiative in , smallpox is gone from the United States. In fact, vaccines are no longer necessary. One humid summer, refugees leaving a yellow fever epidemic in the Caribbean Islands sailed in, carrying the virus with them. Yellow fever causes yellowing of the skin, fever, and bloody vomiting. Five thousand people died, and 17, fled the city. The vaccine was developed and then licensed in One vaccine is enough for life. Mosquitoes are key to how this disease spreads, especially in countries like Central and South America and Africa. Eliminating them has been successful in controlling yellow fever. While yellow fever has no cure, someone who does recover from the illness becomes immune for the rest of their life. Cholera in three waves Share on Pinterest The United States had three serious waves of cholera , an infection of the intestine, between and The pandemic began in India, and swiftly spread across the globe through trade routes. New York City was usually the first city to feel the impact. An estimated two to six Americans died per day during the outbreak. The last documented outbreak in the United States was in Immediate cholera treatment is crucial, as it can cause death. Treatment includes antibiotics, zinc supplementation, and rehydration. Cholera still causes nearly , deaths a year worldwide, according to the CDC. Modern sewage and water treatment have helped eradicated cholera in some countries, but the virus is still present elsewhere. The best way to prevent cholera is to wash hands regularly with soap and water, and avoid drinking contaminated water. Scarlet fever also came in waves Scarlet fever is a bacterial infection that can occur after strep throat. Like cholera, scarlet fever epidemics came in waves. During the epidemic, 95 percent of people who caught the virus were children. Older studies argue that scarlet fever declined due to improved nutrition, but research shows that improvements in public health were more likely the cause. There is no vaccine to prevent strep throat or scarlet fever. Your doctor will typically treat scarlet fever with antibiotics. About five of those New Yorkers passed away from the virus. Annually, 10, people passed away from typhoid fever. Medical testing showed that Mallon was a healthy carrier for typhoid fever. Typhoid fever causes sickness and red spots to form on the chest and abdomen. A vaccine was developed in , and an antibiotic treatment for typhoid fever became available in Today typhoid fever is rare. But it can spread through direct contact with infected people, as well as consumption of contaminated food or water. It circulates the globe annually, but seriously affected the United States in After the end of World War I, cases of the flu slowly declined. None of the suggestions provided at the time, from wearing masks to drinking coal oil, were effective cures. Diphtheria epidemic Diphtheria peaked in , with , cases. Diphtheria causes swelling of the mucous membranes, including in your throat, that can obstruct breathing and swallowing. Sometimes a bacterial toxin can enter the bloodstream and cause fatal heart and nerve damage. By the mids, researchers licensed a vaccine against the bacterial disease. Infection rates plummeted in the United States. Today more than 80 percent of children in the United States are vaccinated. Those who contract the disease are treated with antibiotics. The peak of polio Polio is a viral disease that affects the nervous system, causing paralysis. It spreads through direct contact with people who have the infection. The first major polio epidemic in the United States occurred in and reached its peak in Of the 57, reported cases, there were 3, deaths. Three years later, Dr. Jonas Salk developed a vaccine. By , the average number of cases dropped to Getting vaccinated is very important before traveling. Treatment involves increasing comfort levels and preventing complications. Second measles outbreak Measles is a virus that causes a fever, runny nose, cough, red eyes, and sore throat, and later a rash that spreads over the whole body.

In the early 20th century, most cases involved children, due to inadequate vaccination coverage. Doctors began to recommend a second vaccine for everyone. Since then, each year has had fewer than 1, cases. The United States experienced another outbreak of measles in and The CDC reports that this outbreak was identical to the measles outbreak in the Philippines in Be sure to get all the vaccinations your doctor recommends. About , became ill, and more than people died, making it the largest waterborne outbreak in United States history. Most people recovered on their own. Of the people who passed, the majority had compromised immune systems. Improved water filtrations helped eradicate this disease, but an estimated , cases of cryptosporidium still occur each year. Cryptosporidium spreads through soil, food, water, or contact with infected feces. Be sure to practice personal hygiene, especially when camping. Whooping cough Pertussis , known as whooping cough, is highly contagious and one of the most commonly occurring diseases in the United States. These coughing attacks can last for months. Infants too young for vaccination have the highest risk for life-threatening cases. Ten infants died during the first outbreak. A whooping cough outbreak comes every three to five years. The occurrence of the disease is much less than it was. The CDC recommends that pregnant women get a vaccination during the third trimester to optimize protection at birth. The leading cause of early death First documented in , the epidemic we now know as HIV first appeared to be a rare lung infection. It can be transmitted from mother to unborn baby if not treated. While there is no cure for HIV, you can decrease your risk through safety measures like making sure your needles are sterilized and having protected sex. Safety measures can be taken during pregnancy to prevent the disease from being transmitted from an infected mother to child. For emergencies, PEP post-exposure prophylaxis is a new antiretroviral medicine that prevents HIV from developing within 72 hours. Stay updated Education Educating yourself about current disease outbreaks can help you understand what precautions you should take in order to keep you and your family safe and healthy. Protect yourself and your family The good news is that the outbreaks listed here are rare and, in some cases, preventable. Make sure your family is up to date on their vaccinations before traveling, and get the latest flu vaccination. Simple steps in the kitchen and food safety techniques can also prevent you and your family from contracting or transferring infections.

Chapter 2 : New York City Polio Epidemic | History of Vaccines

Epidemics struck other countries, but never as heavily as here. America was the center of polio, and the place where people knew they must work first, and fastest, to end it. They gave their time and money to help the growing swell of victims and to find a way to stem the rising tide of injury.

Price Foundation , with additional material and the editorship of Sally Fallon. This is a 3rd edition, August 14, Warning It has been alleged that DDT causes or contributes to a wide variety of diseases of humans and animals not previously recognized as associated with any chemical. Laws, Hayes and Laws were informing their readers about the heretic, Dr. The entire public was steeped in dramatic images â€" a predatory poliovirus, nearly a million dead and paralyzed children, iron lungs, struggling doctors and dedicated nurses. The late president Franklin D. Roosevelt had been memorialized as a polio victim who was infected with the deadly poliovirus near the beautiful and remote island of Campobello. The media was saturated with positive images of scientific progress and the marvels of DDT to kill disease-carrying mosquitoes. Jonas Salk was in the wings, preparing to be moved center stage. Through this intellectually paralyzing atmosphere, Dr. Biskind had the composure to argue what he thought was the most obvious explanation for the polio epidemic: Biskind had the audacity to write about human damage. Such offerings, commonly written into the final paragraphs of scientific articles, are usually done with an appearance of impartiality. In , against the advice of investigators who had studied the pharmacology of the compound and found it dangerous for all forms of life, DDT chlorophenoethane, dichlorodiphenyl-trichloroethane was released in the United States and other countries for general use by the public as an insecticide. A most significant feature of this situation is that both man and all his domestic animals have simultaneously been affected. In man, the incidence of poliomyelitis has risen sharply; [With this foreknowledge the series of catastrophic events that followed the most intensive campaign of mass poisoning in known human history, should not have surprised the experts. Yet, far from admitting a causal relationship so obvious that in any other field of biology it would be instantly accepted, virtually the entire apparatus of communication, lay and scientific alike, has been devoted to denying, concealing, suppressing, distorting and attempts to convert into its opposite, the overwhelming evidence. Libel, slander and economic boycott have not been overlooked in this campaign. We have described the syndrome as follows: In acute exacerbations, mild clonic convulsions involving mainly the legs, have been observed. Several young children exposed to DDT developed a limp lasting from 2 or 3 days to a week or more. The most striking of these is poliomyelitis. In the United States the incidence of polio had been increasing prior to at a fairly constant rate, but its epidemiologic characteristics remained unchanged. Since then remarkable changes in the character of the disease have been noted. Contrary to all past experience, the disease has remained epidemic year after year. All graphs refer to paralytic polio. Physiological Evidence Biskind also describes physiological evidence of DDT poisoning that resembles polio physiology: Particularly relevant to recent aspects of this problem are neglected studies by Lillie and his collaborators of the National Institutes of Health, published in and respectively, which showed that DDT may produce degeneration of the anterior horn cells of the spinal cord in animals. These changes do not occur regularly in exposed animals any more than they do in human beings, but they do appear often enough to be significant. He continues, bearing his exasperation in trying to make the obvious plain. When the population is exposed to a chemical agent known to produce in animals lesions in the spinal cord resembling those in human polio, and thereafter the latter disease increases sharply in incidence and maintains its epidemic character year after year, is it unreasonable to suspect an etiologic relationship? I began to sense that American DDT literature as a whole intends to convey that DDT is not dangerous except with regard to its general environmental effects due to persistent bioaccumulation, and that the physiology of acute DDT poisoning is therefore trivial. DDT literature uniformly jumps from descriptions of symptoms, over physiology, to the biochemistry of DDT-caused dysfunction in nerve tissue. It was as though detectives had come upon a mass-murder scene and immediately became obsessed with the biochemistry of dying cells around bullet holes, while ignoring the bullet holes. Conspicuous histological degeneration was, however, often found in the central nervous system. The most

striking ones were found in the cerebellum, mainly in the nucleus dentatus and the cortex cells. Among other things an increase of the neuroglia and a necrotic degeneration and resorption of ganglionic cells was found. The Purkinje cells were less seriously affected than the other neurons. Also in the spinal cord abnormalities of a degenerative nature were found. So we find that especially the cerebellum and the spinal cord are histologically affected by DDT. And more recently, in the works of Ralph Scobey, MD, I found that from ancient times to the early 20th century, the symptoms and physiology of paralytic poliomyelitis were often described as the results of poisoning. Biskind had the courage to write about humans. By October, , Biskind, whose works had been published in established medical journals and who testified before the Senate on the dangers of pesticides, was forced to self-publish his writings, one of which I found while browsing through an old card catalog. He died not long thereafter, in his late 60s. A Contemporary Study Below are three graphs that confirm Biskind, utilizing data that spans far beyond his observations. Due to the paucity of data regarding pesticide exposure and locale, these findings of production data are presented as an indication of exposure, keeping in mind the great changes in public awareness and legislation beginning circa , which also served to reduce DDT exposure. Pesticide production data comes from Hayes and Laws. Governmental hearings, including those with Biskind, Scobey and others, brought about greater awareness of DDT dangers, as well as better labeling and handling methods. The advertisement on the right is from an unknown source, though it appears to be circa This promotion of highly questionable products is reflected in present-day genetically engineered food campaigns. DDT after Governmental hearings, including Biskind and Scobey, and others, eventually brought about greater awareness of the dangers, better labeling and handling methods. After , DDT production increased tremendously, but mainly as an export product. Due to public governmental debate in and numerous policy and legislative changes afterward, its production figures thereon do not at all correlate with U. As many studies demonstrate, DDT exposure after declined sharply, and this decline is represented in the following graph, along with supporting data. DDT production is not shown, post DDT was incriminated from until its registration cancelation in and ban in Thus, represents a point of increased public awareness, changes in legislation and policy, voluntary phase-out, and labeling requirements. It is significant for this comparison of DDT against infantile paralysis, that before the period of increased awareness, DDT was mandated on dairies, yet afterward, ruled out of dairies. Much of the domestic usage was shifted to forestry applications, placing less DDT directly into the food chain. The visual impact of all the persistent pesticide graphs rests upon the assumption that production correlated with human exposure. Given the lack of regulation and the extreme media hype surrounding DDT before , this is not an unrealistic assumption. It is clear that post DDT production did not correlate with human exposure. Yet, it is possible to estimate relative values for exposure post Note that no scale is provided for "relative DDT exposure". The Survey values are presented without distortion, linearly, with the starting point at , and values for are estimates based on the Survey and DDT ingestion data. Error is limited by two boundaries, for the estimated values of DDT exposure. Hayes and Laws also used a secondary evaluation, DDT intake per day, to explain that from to , DDT ingestion decreased by an approximate factor of five. Significantly, the Salk vaccine program began in The observed decrease in the concentration of DDT in food Walker et al. The chlorinated cyclodiene insecticides are among the most toxic and environmentally persistent pesticides known. It is still used in developing nations. Polio After viewing the DDT and BHC graphs above, note that the period of is unaccounted for in terms of polio-pesticide correlation. The missing piece of the puzzle for this six-year period is supplied by the lead and arsenic compounds. These types of central nervous system "CNS" poisons have been the central component of pesticides since their widespread use beginning approximately until the advent of the organochlorine pesticides in the early s. For those who have thought that " organic " food was the norm before the release of DDT to the civilian sector in , the immense production of lead-arsenic compounds presented in this graph is disappointing. This data requires a reconsideration of any perception regarding "natural" quantities of arsenic found in apple seeds, apricots, or almonds, where pesticides can accumulate systemically from contaminated earth. Summary Just over three billion pounds of persistent pesticides are represented in the graph below. Virtually all peaks and valleys correlate with a direct one-to-one relationship with each pesticide as it enters and leaves the US market. Generally, pesticide production precedes polio

incidence by 1 to 2 years. I assume that this variation is due to variations in reporting methods and the time it takes to move pesticides from factory to warehouse, through distribution channels, onto the food crops and to the dinner table. A composite of the three previous graphs, of the persistent pesticides â€" lead, arsenic, and the dominant organochlorines DDT and BHC â€" is represented in the following: These four chemicals were not selected arbitrarily. These are representative of the major pesticides in use during the last major polio epidemic. They persist in the environment as neurotoxins that cause polio-like symptoms, polio-like physiology, and were dumped onto and into human food at dosage levels far above that approved by the FDA. They directly correlate with the incidence of various neurological diseases called "polio" before They were utilized, according to Biskind, in the "most intensive campaign of mass poisoning in known human history. Polio shows no movement independent from pesticide movement as one would expect for the virus model. Medical propagandists promote images of a predatory, infectious virus, invading the body and quickly replicating to a level that causes disease, however, in the laboratory, poliovirus does not easily behave in such a predatory manner. Attempts to demonstrate virus causation are performed under extremely artificial and aberrant conditions. Poliovirus causation was first established in the mainstream mind by publications of an experiment by Landsteiner and Popper in Germany, One monkey died after six days and the other was sickened. This, however, was an assumption â€" not a proof â€" of virus causation. The weakness of this method is obvious to everyone except certain viropathologists and has recently been criticized by the molecular biologist Peter Duesberg regarding a modern-day attempt to establish virus causation for kuru, another CNS disease. However, a crucial weakness exists â€" polio epidemics do not occur via injections of poliovirus isolate into the brains of the victims through a hole drilled in their skull â€" except, of course, in laboratories and hospitals. If injection into the brain is really a valid test for causation then it should serve especially well as a proof for pesticide causation. I propose that pesticides be injected directly into the brains of test animals. If paralysis and nerve degeneration subsequently occur, we then would have proved that pesticides cause polio. Going further, towards much higher standards of proof than those used to prove virus causation, pesticides could be fed to animals and found to cause CNS disease.

Chapter 3 : History of Polio (Poliomyelitis) | History of Vaccines

The first major polio epidemic in the United States occurred in and reached its peak in Of the 57, reported cases, there were 3, deaths. End: Three years later, Dr. Jonas Salk.

Decisions had to be made regarding suctioning, postural drainage, giving oxygen, and the need for emergency tracheostomy, and nurses had to make these minute-to-minute decisions. Polio cases peaked in the state in , with 2, cases and deaths. Because there was no way to prevent or cure polio these epidemics created medical emergencies in stricken communities. In responding to the polio epidemics of the s, many North Carolina communities abandoned their racist, segregationist policies in emergency and open air polio hospitals. In , Hickory was the hardest hit town in North Carolina. Families with stricken children left the mountains and northern foothills heading toward Charlotte Memorial Hospital and the polio ward of that large institution. Charlotte Memorial Hospital was quickly overcrowded and closed its doors to new patients. Many of the families from the Catawba River valley made it no further than Hickory before they learned there was no room in Charlotte for their children. In less than three days they turned a local camp for underprivileged children into an emergency hospital. The first patients were admitted within 54 hours of the decision to create a polio hospital. For nine months, regardless of race, hometown, or ability to pay, the hospital received hundreds of young people whose lives were disrupted by this disease. Greensboro area citizens suffered from a polio epidemic in The community came together to confront this acute crisis, and the custom of racial segregation was temporarily set aside to provide emergency care to all affected children. While healthcare facilities in Greensboro would remain officially segregated for another 15 years, during the summer of in the emergency polio hospital, white and black patients shared wards, and nurses of both races worked side by side to treat the sick. In response to the urgent need for nurses in sections of North Carolina seriously affected by infantile paralysis, Negro nurses in scattered localities throughout the country are following the lead of twelve Southern Negro nurses volunteering for polio duty, the American Red Cross reported this week. All Negro nurses available for service are urged to register as soon as possible with their Red Cross chapter. The Red Cross functions as a recruiting agency when local nursing resources are depleted; salaries and transportation of nurses assigned are paid by the National Foundation for Infantile Paralysis. Three Negro nurses recruited through Red Cross national headquarters during the past few days are among those who will serve on polio duty in N. Gladys Johnson of Fort Worth, Tex. Earlier in the week Manna Beaman, Richmond, volunteered for service and was assigned to St. She was a public health nurse during the polio epidemic, Here is her story: Since I was the only public health nurse, the job seemed insurmountable. They wanted one special person rather than several, so the specimens would be collected in a uniform manner and their research would be scientific. I was selected to do this. Hahn were the front line directors. Each home was to be visited to collect specimens when a new patient was admitted. I was given a carrying bag with dry ice, so the specimens could be preserved. Two visits had to be made-the first to leave specimen containers and instruct family members on how to collect specimens, and the second visit to collect the specimens and take it back to the researchers. I recall one visit in Watauga County that took me up a small unpaved road. I then had to park my car and walk about one-fourth mile to the house. Of course, there were dogs to combat, but luckily no dog bites. The family proved to be very cooperative, and I collected-and put on ice-their specimens to take back to researchers. I do not recall visiting any black families because few black families lived in those areas. Schools were closed, and children were asked to stay home rather than be in crowds. In fact, the whole town was somewhat quarantined for a time. Later, as the number of cases became fewer, the worst cases were transferred to Charlotte Memorial Hospital. These clinics were run by public health nurses, other nurses, physicians, and volunteers and required a large number of personnel who gave of their time. Not every school was a site for a clinic, but children, along with the teacher, were bused to the clinic site. Parents were required to sign a permission slip, and most parents signed for the shots.

Chapter 4 : CDC Global Health - Polio - What Is Polio?

Five years before year-old Franklin Delano Roosevelt was diagnosed with polio, the paralyzing disease struck thousands in the U.S., killing some 6, During the epidemic, 9, cases occurred in New York City, which called for quarantines.

Early history[edit] Ancient Egyptian paintings and carvings depict otherwise healthy people with withered limbs, and children walking with canes at a young age. In Scott was said to have developed "a severe teething fever which deprived him of the power of his right leg". A retrospective diagnosis of polio is considered to be strong due to the detailed account Scott later made, [7] and the resultant lameness of his right leg had an important effect on his life and writing. In the early nineteenth century the disease was known variously as: Epidemics[edit] Major polio epidemics were unknown before the 20th century; localized paralytic polio epidemics began to appear in Europe and the United States around A fifty-year gap occurs before the next U. Polio was a plague. One day you had a headache and an hour later you were paralyzed. How far the virus crept up your spine determined whether you could walk afterward or even breathe. Parents waited fearfully every summer to see if it would strike. One case turned up and then another. The count began to climb. The city closed the swimming pools and we all stayed home, cooped indoors, shunning other children. Summer seemed like winter then. That year, there were over 27, cases and more than 6, deaths due to polio in the United States, with over 2, deaths in New York City alone. The epidemic caused widespread panic and thousands fled the city to nearby mountain resorts; movie theaters were closed, meetings were canceled, public gatherings were almost nonexistent, and children were warned not to drink from water fountains, and told to avoid amusement parks, swimming pools, and beaches. Better hygiene meant that infants and young children had fewer opportunities to encounter and develop immunity to polio. Exposure to poliovirus was therefore delayed until late childhood or adult life, when it was more likely to take the paralytic form. Frequent baths using almond meal , or oxidising the water. Applications of poultices of Roman chamomile , slippery elm , arnica , mustard , cantharis , amygdalae dulcis oil, and of special merit, spikenard oil and Xanthoxolinum. Internally use caffeine , Fl. Kola , dry muriate of quinine , elixir of cinchone , radium water, chloride of gold , liquor calcis and wine of pepsin. Between and the early s several therapies were explored in an effort to prevent deformities including hydrotherapy and electrotherapy. Cliver inactivated Poliovirus type 1 by sodium bisulfite and ascorbic acid in an experiment. Klenner published his own clinical experience with vitamin C in the treatment of polio, [35] [36] [37] [38] however his work was not well received[citation needed] and no large clinical trials were ever performed. Surgical treatments such as nerve grafting , tendon lengthening, tendon transfers, and limb lengthening and shortening were used extensively during this time. The use of devices such as rigid braces and body casts, which tended to cause muscle atrophy due to the limited movement of the user, were also touted as effective treatments. When the pressure is lowered, the chest cavity expands, trying to fill this partial vacuum. When the pressure is raised the chest cavity contracts. This expansion and contraction mimics the physiology of normal breathing. The design of the iron lung was subsequently improved by using a bellows attached directly to the machine, and John Haven Emerson modified the design to make production less expensive. Many paralyzed polio patients lay in plaster body casts for months at a time. This prolonged casting often resulted in atrophy of both affected and unaffected muscles. In treating polio cases in rural Australia between and , Kenny had developed a form of physical therapy thatâ€”instead of immobilizing afflicted limbsâ€”aimed to relieve pain and spasms in polio patients through the use of hot, moist packs to relieve muscle spasm and early activity and exercise to maximize the strength of unaffected muscle fibers and promote the neuroplastic recruitment of remaining nerve cells that had not been killed by the virus. In as part of the Q celebrations, the Kenny regimen for polio treatment was announced as one of the Q Icons of Queensland for its role as an iconic "innovation and invention". Polio vaccine People in Columbus, Georgia , awaiting polio vaccination during the early days of the National Polio Immunization Program. In Maurice Brodie , a research assistant at New York University , attempted to produce a polio vaccine, procured from virus in ground up monkey spinal cords, and killed by formaldehyde. Brodie first tested the vaccine on himself

and several of his assistants. He then gave the vaccine to three thousand children. Many developed allergic reactions, but none of the children developed an immunity to polio. This significant breakthrough ultimately allowed for the development of the polio vaccines. Enders and his colleagues, Thomas H. Weller and Frederick C. Robbins , were recognized for their labors with the Nobel Prize in The first was developed by Jonas Salk , first tested in , and announced to the world by Salk on April 12, In , the vaccine was tested for its ability to prevent polio; the field trials involving the Salk vaccine would grow to be the largest medical experiment in history. Immediately following licensing, vaccination campaigns were launched, by , following mass immunizations promoted by the March of Dimes the annual number of polio cases in the United States was reduced, from a peak of nearly 58, cases, to 5, cases. Following the development of oral polio vaccine, a second wave of mass immunizations led to a further decline in the number of cases: However, polio changed not only the lives of those who survived it, but also affected profound cultural changes: In addition, the occurrence of polio epidemics led to a number of public health innovations. One of the most widespread was the proliferation of "no spitting" ordinances in the United States and elsewhere. Roosevelt became totally and permanently paralyzed from the waist down. He tried a wide range of therapies, including hydrotherapy in Warm Springs, Georgia see below. In Roosevelt helped to found the National Foundation for Infantile Paralysis now known as the March of Dimes , that raised money for the rehabilitation of victims of paralytic polio, and was instrumental in funding the development of polio vaccines. The March of Dimes changed the way it approached fund-raising. Rather than soliciting large contributions from a few wealthy individuals, the March of Dimes sought small donations from millions of individuals. Its hugely successful fund-raising campaigns collected hundreds of millions of dollarsâ€”more than all of the U. The March of Dimes refused to partner with other charity organizations like the United Way. Prior to the polio scares of the twentieth century, most rehabilitation therapy was focused on treating injured soldiers returning from war. The crippling effects of polio led to heightened awareness and public support of physical rehabilitation, and in response a number of rehabilitation centers specifically aimed at treating polio patients were opened, with the task of restoring and building the remaining strength of polio victims and teaching new, compensatory skills to large numbers of newly paralyzed individuals. In the early 20th century the use of a wheelchair at home or out in public was a daunting prospect as no public transportation system accommodated wheelchairs and most public buildings including schools, were inaccessible to those with disabilities. Many children left disabled by polio were forced to attend separate institutions for "crippled children" or had to be carried up and down stairs. Polio survivors were often in the forefront of the disability rights movement that emerged in the United States during the s, and pushed legislation such as the Rehabilitation Act of which protected qualified individuals from discrimination based on their disability, and the Americans with Disabilities Act of The World Health Organization estimates that there are 10 to 20 million polio survivors worldwide.

Chapter 5 : Fear of Polio in the s

In fact, the polio outbreak in became the worst epidemic in our nation's history. 58, cases were reported that year. Of those, 3, died and 21, were left with mild to disabling.

Page 1 Page 2 Page 3 The first summer when I was home in Minnesota was that gosh-awful polio epidemic they had there. We admitted proven cases of polio just at the University Hospital, which is unbelievable. And this was a very severe paralytic form. It was just loads of people that came in, sometimes with only a fever but usually a headache and a little stiffness in the neck. And just absolutely terrified. At the height of the epidemic, the people in Minneapolis were so frightened that there was nobody in the restaurants. There was practically no traffic, the stores were empty. It just was considered a feat of bravado almost to go out and mingle in public. A lot of people just took up and moved away, went to another city. It took control of the war against this disease out of the hands of a few researchers and doctors and placed it in the hands of the people. Just as Victory Gardens and scrap drives and paper drives and civilian air wardens gave individual Americans the power to fight the war against the axis on the home front, so donating dimes and soliciting for dimes and walking the neighbourhood collecting dimes empowered the average American to fight the war against polio personally. The war against polio looked like the war against the Germans, too. It had its general staff, the central organization of the National Foundation for Infantile Paralysis. It had its soldiers in the trenches, the doctors and nurses in the polio wards. It had its USO, the volunteers on the home front. It even had its celebrity promoters, who now lent their names to the drive to support research as easily as they had once lent their name to war bond sales. An even more powerful weapon was Sister Elizabeth Kenny. She arrived in the U. Polio patients experienced deep and painful muscle spasms. Doctors of the time believed that the stronger muscles would pull bones out of alignment when they were in spasm, and that this produced permanent deformity. As a solution, they encased patients in rigid casts. Kenny believed that the casts were a large contributor to the deformity, and advocated hot packs to relieve the spasms and a program of assisted exercise, whereby a nurse or technician would move the paralyzed patient through a series of exercises designed to retrain the muscles. Polio had always seemed cruel in the way that it targeted children. Now it seemed hostile. For every action of the March of Dimes that empowered the populace, for every champion of the children like Sister Kenny, the disease seemed to gain strength to meet them. In the early s, polio epidemics were rising even faster than the population, and this was the height of the baby boom.

Chapter 6 : Polio History Timeline

When polio struck, movie theaters were shut, camps and schools were closed, drinking fountains were abandoned, draft inductions suspended, and nonessential meetings were canceled until the epidemic appeared to be over for the time being.

But unless you were born before , polio may seem to be just another ephemeral disease that has been nonexistent for years. Those born before remember having a great fear of this horrible disease which crippled thousands of once active, healthy children. This disease had no cure and no identified causes, which made it all the more terrifying. People did everything that they had done in the past to prevent the spread of disease, such as quarantining areas, but these tactics never seemed to work. Polio could not be contained. Many people did not have the money to care for a family member with polio. This was one of the reasons the National Foundation for Infantile Paralysis was organized. The March of Dimes, the fund raiser headed by the National Foundation for Infantile Paralysis, raised thousands and thousands of dollars to help people care for their polio stricken family members and to aid in the cost of research for a vaccine that would put an end to this misery that affected the lives of so many people. Poliomyelitis was the term used by doctors to describe the condition in which the gray polios anterior matter of the spinal chord myelos was inflamed -itis. Until a cure was discovered, no one had the slightest idea where "polio" had come from or why it paralyzed so many children. People learned later that, oddly enough, it was the improved sanitary conditions which caused children to be attacked by the virus. Since people were no longer in contact with open sewers and other unsanitary conditions which had exposed them to small amounts of the polio virus as infants, when paralysis is rare, the disease grew from a very mild, uncommon occurrence to a terrifying epidemic. This was now the second generation to deal with the fear of this crippling disease. In an attempt to control the disease, bewildered health officials reinstituted the usual rules of sanitation which they would later learn had worsened the threat of polio. They advised against open drains and unscreened windows. Parents were instructed to keep their children well bathed, well rested, well fed, and away from crowds. Bathing suits were locked away in closets, and nobody went to the public pools. When polio struck, movie theaters were shut, camps and schools were closed, drinking fountains were abandoned, draft inductions suspended, and nonessential meetings were canceled until the epidemic appeared to be over for the time being. In the past, these precautions proved very effective in stopping the spread of diseases such as influenza and plague. For three decades now, people still did not know why they were getting their disease. And for three decades now, doctors, epidemiologists, and laboratory researchers were trying to figure out how the disease was spread. The best evidence suggests that the virus is excreted in the stool and passed through hand to hand or hand to mouth contact by people who do not wash their hands properly or often enough. Although keeping track of this contagious disease continued to be of great concern throughout this time, the many health inspectors and visiting nurses could not help but admit that they really did not know exactly what they were looking for or where they might find it. The majority of people who had polio never even knew it. Of those who were diagnosed, most recovered with little or no disability. In , the worst epidemic year, three thousand people died from polio, while in , thirty-four thousand died of tuberculosis. But this line of thinking misses the mark. Epidemic diseases which strike a community at one time are far more alarming than chronic diseases that kill individuals over a number of years. Diseases whose causes are 5 understood are much less frightening than diseases whose origins are unknown. Diseases which attack the young and active are more horrible than ones which strike the weak and old. To many people, there was only one thing worse than dying of paralytic poliomyelitis. One could get the disease and live. They had no paralysis or respiratory difficulty once they had recovered. Regarding tuberculosis, recovery took much longer than with influenza. In fact, treatment with medication lasted up to a year. But with proper care and effective drug therapy, a person did fully recover. Interestingly enough, it was in that a drug called Isoniazid was used in treatment of tuberculosis. Some survivors of polio contracted this disease, recovered from the actual illness itself, and continued on with their lives. It was not the disease itself that horrified people; it was what the disease left behind for its victims to cope with in their lives that was so terrifying. Well, many cases

have told a story of feeling a little badly for a day or two, but not so badly that they could not participate in their normal everyday activities. So, many of the infected had to make do with whatever care and equipment that they could find at home. Although many people who won their battle against polio had no after-effects, there were plenty of people who were left paralyzed with little to help them deal with their new lot in life. The sparse range of braces and crutches that existed were expensive, heavy, and quite often painful to use. Even the wheelchairs at this time were difficult in which to get around. Elevators were rare and ramps did not exist nor did the idea of rights for the handicapped. If a patient remained in the iron lung for several days, often he began to have hallucinations that, ironically, they were moving in a car, a train, or an airplane. Even after they recovered and realized that these were only hallucinations, they often remembered their "travels" quite vividly. It was these dreams that they grasped onto tightly in a time that they feared they might never be able to leave the iron lung. This tilted a patient up and down so that gravity would help force air in and out of the weakened lungs. After all, this machine presented these people with a sense of security, an assurance that they would continue to breathe and remain alive. The lucky majority survived with little or no residual damage. Those who were not as fortunate remained in the hospital, struggling to breathe in the iron lung, trying to wiggle a finger or toe, learning therapy routines, and being fitted for orthopedic devices. Regardless of whether they survived and became "lame or limber", they were always going to be "polios. The NFIP could be found everywhere from the mothers who went from house to house collecting money to the White House introduction of the new poster child for the year. Many people gave this organization their complete approval and saw the NFIP as a public institution. This organization raised enough money each year to pay for hospital and rehabilitation costs of any polio patient in need of help, while at the same time sponsoring training programs for nurses and physical therapists and supporting the laboratory research that led to both the Salk and Sabin vaccines. But, as with every issue involving money, there were a few who condemned the National Foundation as an instrument used by powerful men and women to establish ongoing, elaborate, and expensive publicity campaigns to incite fear into the hearts of the American people. Hence, the people would be terrified into contributing money. One thing was certain, and that was the fact that the National Foundation and its efforts were a very visible part of American life in the s. For example, the NFIP was the first nationwide charitable organization to successfully operate only asking for a small amount of money -- dimes, not dollars. This seemed so little to give that people could not help but donate to this cause. In the early s, the privately supported NFIP spent ten times as much money on polio research as the National Institutes of Health, which were tax supported. Another aspect that NFIP was famous for was that it collected the money from people who had never been a part of groups such as the Junior League or the American Red Cross. The NFIP was the first national charity in that it went directly to the "middle" of the middle class to recruit its volunteer workers. The NFIP appealed to small business men and young parents, to local citizens who had yet to become leaders, and to the great number of people the NFIP wanted to fight for its cause and not so much the politicians and other prominent political figures who were already too much involved in other affairs. The structure of the NFIP was straightforward and unlike many other organizations of the era. Where most organizations were commandeered by financially and socially powerful volunteers directing the activities of subordinate professional staff, the NFIP had all of its power located in its National Headquarters, a suite of offices in one building. There were three thousand local chapters, which were staffed by about ninety thousand year-round volunteers. But at all times, the major decisions made regarding each field that the NFIP granted money to were made by National Headquarters. They were accused of overstating the perils of polio and the progress the sufferers could possibly make, for the sole purpose of increasing their funds. Many of the accusations were veritable. Whether the fund-raiser was a citizen who had been transformed into a promoter by his position as chapter chairman or a famous entertainer auctioning off his shirt off to the highest bidder, it was common knowledge that dignity had very little to do with the matter at hand. The project that it spawned, "The March of Dimes", held many banquets and had many women collecting money to contribute to its cause. The March of Dimes was not just about solemn research. It was about money and sick little children. Some accused the NFIP of being manipulative, "money-grubbing", and exploitative of the poor diseased children. Professional training and research were not the kinds of things that got people to donate. It was the cute little children on

crutches and children from your home town that convinced people to give money to this cause. First, there was a steady, visible rise in the number of polio cases. The second was the "baby boom", during which the population increased more than it had in three decades from to The goals of the NFIP seemed more worthwhile and urgent than ever to a group of people who were having more babies. And after all, there is nothing like the entering into parenthood to make one focus their attention on childhood disease. Whether it was a child with a new pair of crutches or a hospital with another iron lung, a photograph was sure to be in the local newspaper along with a story reminding people that these purchases were possible because of their donations to the March of Dimes. Whenever a polio scientist found something promising, the NFIP publicists made sure that it was printed not only in the scientific journals but also in the popular press. Even more notable was the first sentence of every article which stated that the research had been paid for by the NFIP. Today when famous doctors appear on the evening news, it seems ordinary to hold a special press conference to report results of a nationwide medical experiment that had already been greatly focused on by the media. The polio vaccine trial set the precedent for this. In order to develop a vaccine that protected against polio, Jonas Salk had combined existing theories and techniques like those developed by a man named Thomas Francis. Francis had developed a new standard for the size, speed, and rigor of field trials combining basic principles of epidemiology with unique public interest. This interview in which Salk described his discovery of the polio vaccine was broadcast by CBS. The NFIP planned to print ten thousand copies of the report and a pharmaceutical company, Eli Lilly and Company, had offered to produce a closed-circuit telecast shown in hotels and movie theaters in sixty-one cities on the night of the announcement, to an invited audience of fifty-four thousand doctors, in hopes that the broadcast would be centered on introducing the new product that they would all be buying and using soon. Further contributing to publicizing the new vaccine, the NFIP began printing their informational pamphlets to parents, this time with the reminder that the free vaccination program plans for the schoolchildren who had not already been vaccinated in the field trial would only take place if the vaccine was licensed. It became a time of standardization of criteria and methods. The experimental disease was studied intensively in one particular manner. One strain of poliomyelitis was studied in one species of monkey, the rhesus. One or at the most, two route of inoculation, the intercerebral route, was the standard procedure to be followed. John Enders and Dr. Thomas Weller, with their assistants, began carrying out an experiment in that won them the Nobel Prize in In this experiment, Enders succeeded in growing poliovirus outside the body in laboratory cultures of non-nervous-system human tissue.

Chapter 7 : Everything You Learned About The Cause of Polio Is Wrong

The first major polio epidemic in the United States hit Vermont in with cases. A larger outbreak struck New York City in , with more than 27, cases and 6, deaths.

Publicists contact us via email: This is such an important book to me, personally, because my mother is from that immediate area and was a victim of polio at that very time. She became paralysed on her left side, spent time in a tent, then an iron lung and remembers much of the scene and times. But for now, suffice it to say that she survived with relatively few crippling effects. These things have not kept my mother down, however! She was always and still is a Warrior Woman in spirit! Her name is Louise, which is an old family name. I do recall that Mom said she was about 13 years old when she contracted polio, it was the Summer, and that she had been swimming with her cousins in a pond on their farm in the country. That would have been in Catawba County in Hickory was about 30 minutes away at that time on what were probably just 2-way backroads. They either worked near their factory jobs, or were farmers with tractors and trucks. It was just such a weird feeling. It was just like it went through me, just a surge went through my body. I can feel it right now just thinking about it. But as early as , large outbreaks of poliomyelitis, or infantile paralysis, swept through cities and towns, crippling and killing thousands. The victims were mainly childrenâ€”but not always. In , at the age of 39, Franklin D. Roosevelt was left with severe paralysis from the disease and spent most of his presidency in a wheelchair. During his second term, he founded the National Foundation for Infantile Paralysis, known later as the March of Dimes. Polio is an infectious viral disease that enters through the mouth or nose, then travels to the spinal cord. There it attacks nerves that control muscle activity, causing temporary or permanent paralysis. Usually polio affects leg, arm, stomach and back muscles. But if it paralyzes chest muscles needed for breathing, it can be fatal. Just as World War II ended, the most severe epidemics hit the nation. Most polio outbreaks began in the summer. Since children were most frequently affected, communities reacted with dread, often closing down public swimming pools and movie theaters. The epidemic peaked in North Carolina and the United States in , when a record 57, cases were reported nationally. Jonas Salk and his associates developed an injectable polio vaccine made from inactivated virus. Schoolchildren by the thousands were vaccinated, reducing the incidence of polio by almost 90 percent within two years. Later, the Salk vaccine was replaced by the Sabin oral vaccine, which was easier and less expensive to administer. Worldwide, while vaccination campaigns continue, hundreds of new cases are still reported each year. North Carolina children wait in segregated lines for free Salk polio vaccinations. So they pushed their bodies, often beyond their limits. Many recovered to the point where they no longer needed crutches, braces, wheelchairs or iron lungs. But 30 to 40 years later, the disease took a second toll on some survivors. These former patients began experiencing new pain and muscle weakness, in some cases forcing them back into wheelchairs. Doctors now believe these symptoms result from overworked nerve cells, muscles and joints. But many more survived, thanks to a device invented in , the iron lung. The patient lay on a bed that could slide in and out of a large metal tank. When the pressure decreased, the chest expanded, taking air into the lungs. Some patients regained their ability to breathe on their own after a few weeks or months in an iron lung. Others remained dependent on the device for years. To help families afford respiratory treatment and medical equipment such as braces and crutches, North Carolina Blue Plans began offering additional coverage for polio. The iron lung saved many thousands of lives during the polio epidemic. An iron lung decorated with photos and cards. The mirror above the pillow let patients see visitors behind them. Extra healthcare coverage helped families pay the cost of polio treatment and equipment. Almost overnight, they turned a local camp into an emergency hospital. Afterward, they could have visitors only on Wednesdays and Sundays. But because of distance, lack of transportation or gasoline rationing, some families found it difficult to make the trip. Spending weeks or months away from their parents made the experience doubly traumatic for many young patients, who also had to cope with the boredom of passing the long hours between physical therapy sessions, unable to move. Some believed paralyzed limbs should be immobilized with plaster casts to keep them from growing crooked. Many patients slowly regained the use of leg muscles and began to walk again with the help of crutches, leg braces and even corsets to

straighten their spines. Polio victims often wore heavy braces to support weakened muscles. Because of distance, lack of transportation or gasoline rationing, some families found it difficult to visit their loved ones in quarantine. Photo courtesy of the Norfolk Public Library. And, if any of you are from this area of NC and remember these years Thanks so much for stopping by! Admitting a young woman at Hickory, NC With warmest regards,.

Chapter 8 : NMAH | Polio: Timeline

During the polio epidemic, people were really frightened. This was a disease they didn't understand, whose appearance they couldn't predict, and it had terrible effects on kids. Swimming pools.

Two basic patterns of polio infection are described: Rarely, the infection produces minor symptoms; these may include upper respiratory tract infection sore throat and fever , gastrointestinal disturbances nausea, vomiting, abdominal pain , constipation or, rarely, diarrhea , and influenza-like illness. Most patients with CNS involvement develop nonparalytic aseptic meningitis , with symptoms of headache, neck, back, abdominal and extremity pain, fever, vomiting, lethargy , and irritability. Encephalitis , an infection of the brain tissue itself, can occur in rare cases, and is usually restricted to infants. It is characterized by confusion, changes in mental status, headaches, fever, and, less commonly, seizures and spastic paralysis. The incubation time to the first signs and symptoms ranges from three to 35 days, with a more common span of six to 20 days. In immune individuals, IgA antibodies against poliovirus are present in the tonsils and gastrointestinal tract, and are able to block virus replication; IgG and IgM antibodies against PV can prevent the spread of the virus to motor neurons of the central nervous system. It is occasionally transmitted via the oral-oral route, [21] a mode especially visible in areas with good sanitation and hygiene. It gains entry by binding to an immunoglobulin-like receptor, known as the poliovirus receptor or CD , on the cell membrane. The virus is subsequently absorbed into the bloodstream. Poliovirus can survive and multiply within the blood and lymphatics for long periods of time, sometimes as long as 17 weeks. Rarely, this may progress and the virus may invade the central nervous system, provoking a local inflammatory response. In most cases, this causes a self-limiting inflammation of the meninges , the layers of tissue surrounding the brain , which is known as nonparalytic aseptic meningitis. In around 1 percent of infections, poliovirus spreads along certain nerve fiber pathways, preferentially replicating in and destroying motor neurons within the spinal cord , brain stem , or motor cortex. This leads to the development of paralytic poliomyelitis, the various forms of which spinal, bulbar, and bulbospinal vary only with the amount of neuronal damage and inflammation that occurs, and the region of the CNS affected. The destruction of neuronal cells produces lesions within the spinal ganglia ; these may also occur in the reticular formation , vestibular nuclei , cerebellar vermis , and deep cerebellar nuclei. Early symptoms of paralytic polio include high fever, headache, stiffness in the back and neck, asymmetrical weakness of various muscles, sensitivity to touch, difficulty swallowing , muscle pain , loss of superficial and deep reflexes , paresthesia pins and needles , irritability, constipation, or difficulty urinating. Paralysis generally develops one to ten days after early symptoms begin, progresses for two to three days, and is usually complete by the time the fever breaks. In children, nonparalytic meningitis is the most likely consequence of CNS involvement, and paralysis occurs in only one in cases. In adults, paralysis occurs in one in 75 cases. When spinal neurons die, Wallerian degeneration takes place, leading to weakness of those muscles formerly innervated by the now-dead neurons. Deep tendon reflexes are also affected, and are typically absent or diminished; sensation the ability to feel in the paralyzed limbs, however, is not affected. Paralysis is often more severe proximally where the limb joins the body than distally the fingertips and toes. The destruction of these nerves weakens the muscles supplied by the cranial nerves , producing symptoms of encephalitis , and causes difficulty breathing , speaking and swallowing. Due to the effect on swallowing, secretions of mucus may build up in the airway, causing suffocation. Pulmonary edema and shock are also possible and may be fatal. The critical nerves affected are the phrenic nerve which drives the diaphragm to inflate the lungs and those that drive the muscles needed for swallowing. By destroying these nerves, this form of polio affects breathing, making it difficult or impossible for the patient to breathe without the support of a ventilator. It can lead to paralysis of the arms and legs and may also affect swallowing and heart functions. Antibodies to poliovirus can be diagnostic, and are generally detected in the blood of infected patients early in the course of infection. Detection of virus in the CSF is diagnostic of paralytic polio, but rarely occurs. The results of a large clinical trial were promising; the gamma globulin was shown to be about 80 percent effective in preventing the development of paralytic poliomyelitis. Polio vaccine A child receiving an oral polio vaccine Two types of

vaccine are used throughout the world to combat polio. Both types induce immunity to polio, efficiently blocking person-to-person transmission of wild poliovirus, thereby protecting both individual vaccine recipients and the wider community so-called herd immunity. It was produced by the repeated passage of the virus through nonhuman cells at sub physiological temperatures. Three doses of live-attenuated oral vaccine produce protective antibody to all three poliovirus types in more than 95 percent of recipients. The focus of modern treatment has been on providing relief of symptoms, speeding recovery and preventing complications. Supportive measures include antibiotics to prevent infections in weakened muscles, analgesics for pain, moderate exercise and a nutritious diet. Historically, a noninvasive, negative-pressure ventilator, more commonly called an iron lung , was used to artificially maintain respiration during an acute polio infection until a person could breathe independently generally about one to two weeks. Today, many polio survivors with permanent respiratory paralysis use modern jacket-type negative-pressure ventilators worn over the chest and abdomen. In those who develop only aseptic meningitis, the symptoms can be expected to persist for two to ten days, followed by complete recovery. The case fatality rate CFR varies by age: Once the muscles in the limb become flaccid, they may interfere with the function of other muscles. A typical manifestation of this problem is equinus foot similar to club foot. This deformity develops when the muscles that pull the toes downward are working, but those that pull it upward are not, and the foot naturally tends to drop toward the ground. If the problem is left untreated, the Achilles tendons at the back of the foot retract and the foot cannot take on a normal position. Polio victims that develop equinus foot cannot walk properly because they cannot put their heel on the ground. A similar situation can develop if the arms become paralyzed. The result is that one leg is shorter than the other and the person limps and leans to one side, in turn leading to deformities of the spine such as scoliosis. Alternatively, a person can be fitted with custom made footwear which corrects the difference in leg lengths. Extended use of braces or wheelchairs may cause compression neuropathy , as well as a loss of proper function of the veins in the legs, due to pooling of blood in paralyzed lower limbs. Post-polio syndrome Between 25 percent and 50 percent of individuals who have recovered from paralytic polio in childhood can develop additional symptoms decades after recovering from the acute infection, [75] notably new muscle weakness and extreme fatigue. This condition is known as post-polio syndrome PPS or post-polio sequelae. PPS is a slow, progressive disease, and there is no specific treatment for it.

Chapter 9 : Salk announces polio vaccine - HISTORY

The rest of polio cases can be divided into three types: abortive polio, non-paralytic polio, and paralytic polio. Abortive polio: In these cases, polio is a mild illness, with viral-like symptoms such as fever, fatigue, headache, sore throat, nausea, and diarrhea.

Contains 3 serotypes of vaccine virus Grown on monkey kidney Vero cells Inactivated with formaldehyde Contains 2-phenoxyethanol, neomycin, streptomycin, polymyxin B From through , a total of confirmed cases of paralytic poliomyelitis were reported, an average of 8 cases per year. Six cases were acquired outside the United States and imported. The last imported case was reported in Two cases were classified as indeterminant no poliovirus isolated from samples obtained from the patients, and patients had no history of recent vaccination or direct contact with a vaccine recipient. In , an unvaccinated U. A second case of VAPP from vaccine-derived poliovirus in a person with long-standing combined immunodeficiency was reported in The patient was probably infected approximately 12 years prior to the onset of paralysis. Also in , several asymptomatic infections with a vaccine-derived poliovirus were detected in unvaccinated children in Minnesota. The source of the vaccine virus has not been determined, but it appeared to have been circulating among humans for at least 2 years based on genetic changes in the virus. No VAPP has been reported from this virus. Poliovirus Vaccines Inactivated poliovirus vaccine IPV was licensed in and was used extensively from that time until the early s. Trivalent OPV was the vaccine of choice in the United States and most other countries of the world after its introduction in An enhanced-potency IPV was licensed in November and first became available in Characteristics Inactivated poliovirus vaccine Two enhanced forms of inactivated poliovirus vaccine are currently licensed in the U. This vaccine contains all three serotypes of polio vaccine virus. The vaccine contains 2-phenoxyethanol as a preservative, and trace amounts of neomycin, streptomycin, and polymyxin B. It is supplied in a single-dose prefilled syringe and should be administered by either subcutaneous or intramuscular injection. Kinrix does not contain any preservative. Oral Polio Vaccine OPV Contains 3 serotypes of vaccine virus Grown on monkey kidney Vero cells Contains neomycin and streptomycin Shed in stool for up to 6 weeks following vaccination Oral poliovirus vaccine not available in the United States Trivalent OPV contains live attenuated strains of all three serotypes of poliovirus in a The vaccine viruses are grown in monkey kidney tissue culture Vero cell line. The vaccine is supplied as a single 0. The vaccine contains trace amounts of neomycin and streptomycin. OPV does not contain a preservative. Live attenuated polioviruses replicate in the intestinal mucosa and lymphoid cells and in lymph nodes that drain the intestine. Vaccine viruses are excreted in the stool of the vaccinated person for up to 6 weeks after a dose. Maximum viral shedding occurs in the first 1â€”2 weeks after vaccination, particularly after the first dose. Vaccine viruses may spread from the recipient to contacts. Persons coming in contact with fecal material of a vaccinated person may be exposed and infected with vaccine virus. Protection against paralytic disease correlates with the presence of antibody. The duration of immunity with IPV is not known with certainty, although it probably provides protection for many years after a complete series. Oral poliovirus vaccine OPV is highly effective in producing immunity to poliovirus. As with other live-virus vaccines, immunity from oral poliovirus vaccine is probably lifelong. OPV produces excellent intestinal immunity, which helps prevent infection with wild virus.