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The Polio Years in Texas: Battling a Terrifying Unknown

The first major polio epidemic in the United States struck the New York region in 1916. Polio, however, was caused by a virus; and the transmission and pathogenesis of most viral infections remained unclear. The Polio Years in Texas: Battling a Terrifying Unknown

Other states suffered occasional outbreaks. By 1937 every state in the nation was reporting at least one minor outbreak each year. As time progressed, the virus became prevalent everywhere as it went around the country. The Polio Years in Texas: Battling a Terrifying Unknown

Nobody knew polio's origin, where it would strike, or how its victims would fare physically. Many times, polio entered a person's body and left it unscathed. Or, the disease would cause deformity or death, adding a sense of unpredictability. The Polio Years in Texas: Battling a Terrifying Unknown

By 1937 every state in the nation was reporting at least one minor outbreak each year. As time progressed, the virus became prevalent everywhere as it went around the country. The Polio Years in Texas : Battling a Terrifying Unknown

Polio is a hand-to-mouth disease. It is caused by a virus that is ingested through unwashed hands or contaminated objects. Whether this virus has paralytic effects is its location. The Polio Years in Texas: Battling a Terrifying Unknown

For a while, the general and scientific populace was ill informed about the virus and was unaware of how it spread and effects. This led to mass paranoia among the U. S's populace. The Polio Years in Texas: Battling a Terrifying Unknown

The disease could affect a region with a heavy toll, be virtually absent for several years afterward, and then return. From 1910 to 1930, highly populated states like New York, Illinois, and California seemed to be the primary recipients of polio. Other states suffered occasional outbreaks. Polio: An American Story

Poliovirus enters the body

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through the mouth, travels down the digestive tract, and is excreted in the stools. Most activity in intestines. Polio: An American Story Once injected with one type of strain and recovered, the monkey was shown to be immune to that strain Polio: An American Story Research had found early in the infection the bloodstream was the ideal place for the antibodies' work Polio: An American Story Incorrect analysis of the polio viruses entry into rhesus monkeys body's set progress back greatly. Instead of the normal way of entering via the mouth, this couldn't happen with this monkey Polio: An American Story Unlike others, Mr Salk was eager to do human testing, to better simulate the effects of the vaccine 50th Anniversary of the First Polio Vaccine 1955- Officially, the first polio vaccine was confirmed as successful 50th Anniversary of the First Polio Vaccine Through continuing efforts, Polio was eliminated from the Americas in 1994. 50th Anniversary of the First Polio Vaccine Due to this work 50 years ago, health workers can now protect children from more than 12 diseases, helping somewhat reducing disease rates by 99 percent in the United States. 50th Anniversary of the First Polio Vaccine Helped lead to the founding of the global polio eradication initiative, from 350,000 cases in 1988 globally to about 1,200 worldwide with this vaccine in 2004. 50th Anniversary of the First Polio Vaccine Since the introduction of this vaccine, great strides have been made in significantly reducing the impact of diseases on children and adults worldwide. The Death of a Disease: A History of the Eradication of Poliomyelitis Salk advocated for an unorthodox vaccine, thinking to inject it prematurely to the body's exposure to polio. The Death of a Disease: A History of the Eradication of Poliomyelitis Salk believed administering the vaccine was safer and more efficient than leaving the virus untouched within the body. The Death of a

Disease: A History of the Eradication of Poliomyelitis  
Connaught Medical Research Laboratories helped in supporting the creation of Salk's vaccine via Medium 199, the synthetic growth medium in which many liters of poliovirus could grow safely, and the rocking of bottles. The Death of a Disease: A History of the Eradication of Poliomyelitis  
The vaccine turned out to be well over 60% effective against all strands of the Polio vaccine  
The Death of a Disease: A History of the Eradication of Poliomyelitis  
Salk's success proved the conventional method of making a vaccine from a weakened virus was not as effective against polio. The Great Doctors  
Researchers found a way to grow polio virus in a test tube. The danger of contamination via nervous tissue was eliminated, and for the first time researchers had a plentiful supply of polio vaccine. The Great Doctors  
researchers Dorothy Horstmann and David Bodian demonstrated the true route of the polio virus. They showed how it first enters the digestive tract, and then passes into the bloodstream. The Great Doctors  
It travels through the blood to its ultimate goal, the brain. This discovery increased the usefulness of any vaccine that could be created. The Great Doctors  
Through a human-guinea pig test, Salk's vaccine was able to prevent any polio deaths, while showing deaths and cases for the unvaccinated groups  
The Great Doctors  
Salk's vaccine proved to be quicker and thusly more effective comparatively to the Sabin vaccine, which encountered several problems of its own. The Great Doctors  
Salk utilized a unique mixture of three strains of the killed virus in order to create his vaccine, which he hoped would give universal protection against polio in general. Polio: An American Story  
Polio spread was attributed to feces. since people were exposed to the source less and thus less able to become resistant, things spread quicker. Polio: An

American Story People were misinformed as to how it spread. Some thought it was from simple things such as hand-shaking, sneezing, Polio: An American Story three basic problems would have to be solved. First, researchers would have to determine how many different types of poliovirus there were. Second, they would have to develop a safe and steady supply of each virus type for use in a vaccine. Polio: An American Story Third, they would have to discover the true pathogenesis of polio—its route to the central nervous system—in order to fix the exact time and place for the vaccine to do its work. All were elementary, if essential, parts of the puzzle. Polio: An American Story First, human fecal matter was injected in the monkey's brains. soon after, animals were destroyed so their brains and spinal cords could be harvested for poliovirus. Tissue-serum mixtures of the virus were then injected into the brains of healthy monkeys. Those that received a known Type I strain and recovered were considered to have immunity to all other Type I strains. Polio: An American Story “ They now would be inoculated with virus of an unknown type. If they proved susceptible to infection, it would mean that the unknown strain belonged to Type II or Type III.... The tests then would have to be conducted all over again, using the same unknown virus to challenge monkeys immune to Type II or Type III. Polio: An American Story Tissue culture seemed perfectly suited for the study of polio, which, like other viruses, can exist only in living cells. In 1936 Sabin and Peter Olitsky of the Rockefeller Institute had shown that poliovirus could, indeed, be grown in test tube cultures. That was the good news. The bad news was that it would only grow in nervous tissue. Polio: An American story There was a logical explanation for this, though no one knew it at the time. The poliovirus in vogue at the institute was Simon Flexner's “ MV,” a

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highly neurotropic strain, unable to grow in anything except nervous tissue. And by using it in their experiments, Sabin and Olitsky had confirmed the mistaken belief that poliovirus could not survive anywhere else. The Polio Years in Texas: Battling a Terrifying Unknown For many polio victims, the virus was short-lived. If the virus only injures the anterior horn cells, the muscles involved will regain much of their previous strength. However, if the anterior horn cells are destroyed, the affected muscles will remain paralyzed. The Polio Years in Texas: Battling a Terrifying Unknown Due to the transient nature of polio, many individuals experienced reversible paralysis and recovered from the paralytic phase within a short period of time. The Polio Years in Texas: Battling a Terrifying Unknown during the period of there being no cure, medical therapy and rehabilitation were the only things available. A spinal tap was the main indicator for polio at the time. More dangerous things were also used. The Polio Years in Texas: Battling a Terrifying Unknown confusion was regarding how the poliovirus caused paralysis. This caused physicians to try a multiplicity of methods, some harrowing to the patient, to combat the crippling effects of the paralytic polio. patients were bled, had ice applied to their spines, were rubbed with special ointment to produce blisters, or were injected with smallpox vaccine, adrenaline, silver nitrate, strychnine, horse, goat, and monkey serum, and convalescent serum extracted from recovered polio patients. Physicians also prescribed plasters, pills, and injections, some with devastating results. Polio Existed for a long time, since the time of the Egyptians, but largely ignored and considered as relatively normal. Polio In 1908 Landsteiner and Popper ground up spinal cord material from the body of a nine-year-old boy who had died of polio and suspended it in a sterile fluid. the two scientists also injected the material

into the abdomens of two different types of monkeys, who, fortunately for medical science, were susceptible to the virus. PolioThe two researchers had provided pretty good evidence that polio was caused by a virus that could be isolated from the nervous tissue of individuals with the disease. They announced their discovery at a medical meeting in Vienna and published their results soon afterPolioOnce Landsteiner's and Popper's results were published, other experimenters in Europe and the United States repeated the experiment and confirmed their results. In experiments conducted over the next several years, researchers in several countries were able to detect poliovirus in non-nervous tissues collected from humans who had died of the disease. They found evidence of the poliovirus in tissues taken from tonsils, from the lining of the throat, in nasal secretions, in salivary glands, and in intestinal lymph nodes. PolioThis evidence supported Wickman's belief derived from his epidemiological studies that polio was more than just a disease of the central nervous system, even if that was where the damage that caused paralysis was done. PolioResearchers, including Landsteiner and Popper, were also soon able to take material from the spinal cord of a monkey infected with human polio virus, prepare a solution, and inject it into yet other monkeys. That these new monkeys developed polio as a result of passing the virus from monkey to monkey was additional evidence confirming the original identification of the poliovirusPolioFlexner and his team at the Rockefeller Institute followed their isolation of the poliovirus with numerous experiments that they hoped would reveal how polio was spread, how it entered the body, and how it entered and damaged the central nervous system. Scientists at the Rockefeller Institute and in laboratories in Europe also tried to identify where in the body the virus could be found

outside the spinal cord. Knowing this would be important to devising any plan of immunization. Flexner and his colleagues succeeded in demonstrating that serum derived from the blood of monkeys recovering from experimental poliomyelitis contained antibodies to the poliovirus. Shortly after Flexner's discovery of antibodies in monkeys, French scientists demonstrated that humans recovering from polio also produced antibodies to the poliovirus. These discoveries were important because they demonstrated that the immune system could be stimulated to produce antibodies against the virus through a vaccine. The antibodies, whether acquired in response to a natural infection or immunization, would protect the individual from developing the disease if he or she was exposed to the poliovirus in the future.

Polio Still Casts a Dark Shadow over the Health of Thousands of People across Wales; Thousands of Children in Wales Suffered Permanent Disability after Contracting Polio in the 1940s and 1950s. Polio May Have Been All but Eradicated in the Western World but the 'Forgotten Disease' Is Still Causing Misery, as Health Editor Madeleine Brindley Reports

“Decades after the initial illness, many polio survivors have experienced a new onset of weakness, fatigue and muscle and joint pain... these symptoms have tended to be dismissed simply as a part of the natural ageing process.”

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Based on the research available, anyone who had polio can develop post-polio syndrome. Some doctors haven't even heard of it... but post-polio syndrome symptoms make



existing conditions so much worse.” Polio Still Casts a Dark Shadow over the Health of Thousands of People across Wales; Thousands of Children in Wales Suffered Permanent Disability after Contracting Polio in the 1940s and 1950s. Polio May Have Been All but Eradicated in the Western World but the ‘ Forgotten Disease’ Is Still Causing Misery, as Health Editor Madeleine Brindley Reports

In just a tiny fraction of cases the virus invaded the nerve cells, causing paralysis – paralytic polio – which in many cases resulted in people being fitted with calipers to support weak limbs

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Symptoms include the onset of new weakness or abnormal fatigue in previously affected or unaffected muscles; a general reduction in stamina; muscle or joint pain; muscle atrophy; breathing, sleeping and swallowing problems or cold intolerance. It is thought that as many as four in every five people who contracted polio could develop symptoms of post-polio syndrome.

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A long time after having had polio, some people start developing new or increasing weakness, stamina problems, fatigue or pain. “ It can be quite difficult to recognise because these symptoms develop slowly and can be mistaken for other symptoms.”

Legacy of Polio

The victims of the

50s epidemic of polio ( just children and teenagers at the time ( have been left with a range of problems caused by a condition known as Post-Polio Syndrome. Legacy of PolioPost-Polio Syndrome (PPS) describes a range of new symptoms that occur 20 to 40 years after the original onset of the polio infection, and is in effect a knock-on effect of the damage originally done.

The Savior of Summer: Remembrance; Jonas Salk, 1914-1995, Beat Poliofor many, strict parental orders to avoid the public pool, the local swimming hole and that lusciously cool curiosity, the air-conditioned movie house. For summer was the dread polio season. No one knew how paralytic poliomyelitis spread. But everyone assumed that crowds were a good place to get a one-way ticket to an iron lung. The Savior of Summer: Remembrance; Jonas Salk, 1914-1995, Beat PolioMothers admonished children to report immediately the slightest sore throat or, most feared of all, a stiff neck, and to stick with old friends (whose germs they already had). Yet children—especially children, for reasons no one understood — still caught the sometimes-fatal disease, and the little bodies piled up in hospital wards like driftwood. The Savior of Summer: Remembrance; Jonas Salk, 1914-1995, Beat PolioThere were a record 57, 879 cases in 1952, all incurable. In 1954 the National Foundation for Infantile Paralysis, having collected 75 million dimes in theaters throughout the country, funded tests of the first polio vaccine, on 1. 8 million schoolchildren. The Savior of Summer: Remembrance; Jonas Salk, 1914-1995, Beat Polio“ There was suddenly a release from this great fear — the dread that occurred each summer,” Salk recalled. Within weeks children by the thousands lined up for the shots. The annual number of cases dropped to a dozen or fewer. Now, according to medical experts, the disease has been virtually eradicated in the

industrialized world. The Savior of Summer: Remembrance; Jonas Salk, 1914-1995, Beat Polio To [challenge norms], he had to fight off the defensive backs of science. "...you couldn't immunize with a killed virus; you had to go through an infection to get immunity," Salk said. Some virologists argued vehemently that the killed-virus vaccine was inferior and should not be given to the public. poliomyelitis poliomyelitis, polio, or infantile paralysis, acute viral infection, mainly of children but also affecting older persons. Spread of the infection is primarily through contact with an infected person. Most people who contract polio either exhibit no symptoms or experience only minor illness; however, such individuals can harbor the virus and spread it to others. Less than 1% of the people who get infected develop paralysis. poliomyelitis If there is involvement of the central nervous system, paralysis ensues. Of those patients who develop paralytic poliomyelitis, about 25% sustain severe permanent disability, another 25% have mild disabilities, and 50% recover with no residual paralysis. poliomyelitis The disease is usually fatal if the nerve cells in the brain are attacked (bulbar poliomyelitis), causing paralysis of essential muscles, such as those controlling swallowing, heartbeat, and respiration. There is no specific drug for treatment. poliomyelitis In 1988 the World Health Organization began a global vaccination campaign to eradicate the disease—which continued to paralyze hundreds of thousands of children each year—by 2000. by 2003 less than a thousand new cases of polio worldwide, and the last last known case of type 2 poliomyelitis occurred in 1999. The Polio Years in Texas: Battling a Terrifying Unknown As the 1940s and 1950s progressed, it became apparent that polio was not going away. The nation's unprecedented polio toll of approximately twenty-six thousand seemed minor by the harrowing summer

of 1952 when the caseload more than doubled to almost fifty-eight thousand cases. During the same time frame, the Texas numbers multiplied as well from more than eighteen hundred cases to almost four thousand. The Polio Years in Texas: Battling a Terrifying UnknownA polio vaccine trial involving the inoculation of humans had not taken place in a while. since then, scientists had gleaned an exceedingly great amount of knowledge regarding polio. The successes of Koprowski, Horstmann, Enders, and other researchers had carved tremendous inroads into the mysteries of polio virology. Convinced of his preparations, Salk launched into human inoculation. Throughout the spring of 1952, the young virologist inoculated a variety of individuals including himself, members of his family, and co-workers. The Polio Years in Texas: Battling a Terrifying UnknownAt the Watson Home, Salk sought to verify whether his killed virus vaccine could stimulate further immune activity, and if it could, for how long? Salk utilized a group of volunteers who were recovering polio patients. Since these individuals already had the disease, there was little risk involved. After taking blood samples to measure antibody levels, Salk injected his subjects with the type of killed virus that corresponded to the polio antibodies in their system. For instance, those individuals with high levels of Type I antibody received the Type I vaccine. The Polio Years in Texas: Battling a Terrifying UnknownIn the midst of the Watson experiments, Salk inoculated residents of the Polk State School to determine the vaccine's safety and antigenic power. Some participants were injected with a single type of poliovirus while others received all three types mixed together. The Polio Years in Texas: Battling a Terrifying UnknownFortunately for Salk, the early vaccine trial proved successful. No illness was reported among the patient volunteers at

the Watson Home and their blood tests showed a significant rise in antibody levels. The findings from the Polk study provided even better intelligence. The Polio Years in Texas: Battling a Terrifying UnknownThe killed virus vaccine had stimulated a high antibody response to all three types of poliovirus that persisted for months. Although it was too soon to tell if Salk's vaccine would produce long-lasting effects, the early trials did prove that it worked. 47 At this news, excitement ran high among both scientists and laymen. The Polio Years in Texas: Battling a Terrifying UnknownWhat if the vaccine somehow interfered with the natural immune system, leaving children even more exposed to the poliovirus than before? What if the serum that held the virus caused allergic reactions or cancer? How could the National Foundation not go forward with the trials? Each summer polio infected thousands more young people. How many more would risk paralysis if the NFIP waited a few more years to attain complete certainty? As history would prove, the ultimate success of the trial was worth the effort involved. The Polio Years in Texas: Battling a Terrifying Unknownthe Salk vaccine trial was composed of two studies: one a randomized doubleblind controlled trial and the other an observational survey. The controlled study, or group, involved the inoculation of over 650, 000 children in the first, second, and third grades in diverse regions throughout the country. The Polio Years in Texas: Battling a Terrifying UnknownThese young students alternately received either vaccine or placebo, under code. The observational study involved another 1, 180, 000 children in the first and third grades who received neither vaccine, but whose health was monitored for comparison. The Great DoctorsA vaccine would create antibodies—defensive cells that would live in the blood. When the polio virus entered the bloodstream, the

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antibodies would swoop into action and intercept the virus before it could reach the vital nerve cells. The Great Doctors This was how immunity worked in the bodies of those who had had a mild case of polio. They already had the polio antibodies in their blood. The Great Doctors a single drug company had manufactured all the Salk vaccine that had caused polio. Through some terrible mistake, sediment containing live virus particles had slipped into several batches of vaccine. Rigid new testing procedures were instituted. The factors that had allowed such a thing to happen were eliminated— permanently. The Great Doctors And, as the years passed and more and more people, young and old, received the Salk shots, the polio statistics declined. Dr. Salk still devotes long hours to perfecting his vaccine, making it even more effective, more long-lived in the immunity it confers. The Great Doctors Albert Sabin his live-virus vaccine. was not a really satisfactory long-term polio enemy. The live virus vaccine had many advantages. It could be taken by mouth, instead of being injected. It would give near-permanent immunity against polio. It would be simpler and cheaper to produce and to administer than the Salk vaccine. The Great Doctors In 1962 the Sabin vaccine was licensed for public use. But almost immediately one of the types of Sabin vaccine ran into problems and had to be withdrawn. After further testing, the Sabin vaccine was once again made available, and it and several other oral polio vaccines are now in widespread use. Legacy of Polio Polio has now been conquered by vaccination, which babies are immunised with at two months, but during the 1950s there were 45, 000 cases and hundreds died. March of Dimes and Vaccine Advocacy The polio vaccine became available in 1955, due almost entirely to the efforts of the March of Dimes. During the Depression, U. S. citizens were asked to contribute one dime.

Jonas Salk advocated a killed-virus vaccine while Albert Sabin proposed a live-virus vaccine. Both competed for both recognition and funding from the March of Dimes. March of Dimes and Vaccine Advocacy In 1955 Salk's vaccine was adopted, nationwide vaccination programs were implemented, and polio rates dropped by 80 percent. In 1961, Sabin's vaccine, endorsed by the American Medical Association, became the vaccine of choice. March of Dimes and Vaccine Advocacy The World Health Assembly advocated polio eradication by the year 2000. By 2004 eradication efforts were threatened by allegations linking vaccines to chronic diseases. Immunization dropped and polio resurfaced in the U. S., Australia, Africa and Russia. Despite this, numbers continued to stay at a low level March of Dimes and Vaccine Advocacy Invasion of the central nervous system is rare but potentially deadly, as the virus destroys critical neurons that stimulate contraction of muscle fibers. This was not known when polio clusters first appeared, nor was there any explanation for why the condition primarily affected children, affected more boys than girls, and spiked during certain times of the year. 1955 the Congress Many adults still remembered the great epidemic of 1916, which killed more than 6, 000 and left another 27, 000 paralyzed. As recently as 1952 more than 3, 000 had died of polio, and more than 20, 000 had been fully or partially paralyzed. Polio The first monkey developed an illness after six days and died on the eighth day following the injection without showing any obvious signs of paralysis. the two researchers had provided pretty good evidence that polio was caused by a virus that could be isolated from the nervous tissue of individuals with the disease. Polio Some of the earliest scientific research into this newly emergent disease was conducted by scientists in Sweden, which had experienced polio epidemics in 1899, in <https://assignbuster.com/junior-thesis-research-cards/>

1903, and in 1905, when there were 1, 031 cases in the largest world epidemic up to that time. Ivar Wickman observed the 1899 and 1903 epidemics as a medical assistant in a Stockholm clinic. PolioWhen the 1905 epidemic erupted, Wickman decided to study the outbreak to see what he could discover about polio, the way it spread, and how contagious it was. As he began his study, Wickman made a crucial decision to include abortive, non-paralytic, and paralytic polio cases in his study. This decision would enable him to get a more accurate picture of the extent of the disease and how it spread in a communityPolioThe next important step in understanding polio came in the laboratory of the Vienna, Austria, immunologist Dr. Karl Landsteiner. Landsteiner, along with his assistant Erwin Popper, would be the first to identify the cause of polio as what was then called a filterable virus. PolioVirology, the study of viruses, was in its infancy in the early twentieth century. Only a few viruses, including those causing smallpox and rabies, had been identified when Landsteiner discovered the poliovirus in 1908. Part of the problem was that viruses were too small to be seen by even the most powerful optical microscopes of the time. The only way to identify a virus was to pass suspected infected material taken from someone with the disease through filters with holes too small to permit the passage of all known bacteria. PolioIf the material that had passed through the filters was then injected into a laboratory animal such as a monkey and appeared to cause the same disease as that in the individual or animal from which the material was taken, the scientist could conclude that the disease was caused by a filterable virus too small to be seen. PolioWickman’s study of the 1905 epidemic revealed a number of interesting characteristics of polio. Relatively isolated rural communities in Sweden experienced much higher rates of polio



than the more crowded cities. Wickman believed this was because children in these communities had no previous exposure to the disease and thus no immunity when polio struck. PolioHis study also revealed that polio was not just a disease of the central nervous system; mild cases in which there was no paralysis, and hence no nervous system involvement, also helped spread the disease. Wickman also estimated that the incubation period for the disease, the time between infection and the beginning of disease symptoms, was three to four days, a figure that would only be confirmed in the 1950s. PolioWickman's most important conclusion was that polio was a very contagious disease in which mild, non-paralytic cases were just as important as the paralytic ones in spreading the illness Wickman's most important conclusion was that polio was a very contagious disease in which mild, non-paralytic cases were just as important as the paralytic ones in spreading the illnessPolioUnfortunately, Wickman's study did not have the immediate impact it deserved. The discovery of the poliovirus a few years later encouraged scientists to focus their studies on experimental polio rather than on the knowledge that could be gained from careful epidemiological and clinical studies. PolioScientists studying experimental polio concentrated on the actions of the virus in nerve tissue, especially in the spinal cord, which, while important information, did not address some important facts about how polio entered humans, where it went, and what it did before it damaged the nerves of the spinal cord. It would not be until the 1930s that scientists again took a careful look at what epidemiological and clinical research could reveal about how the poliovirus entered the body and what it did once it gained entryPolioFlexner and his team at the Rockefeller Institute followed their isolation of the poliovirus with numerous experiments that

they hoped would reveal how polio was spread, how it entered the body, and how it entered and damaged the central nervous system. Scientists at the Rockefeller Institute and in laboratories in Europe also tried to identify where in the body the virus could be found outside the spinal cord. PolioKnowing this would be important to devising any plan of immunization. Flexner and his colleagues succeeded in demonstrating that serum derived from the blood of monkeys recovering from experimental poliomyelitis contained antibodies to the poliovirus. PolioAll the evidence suggests that polio has afflicted humans for a very long time, certainly from well before the time of written medical records. PolioPolio probably emerged as a human disease sometime after men and women began to settle in villages, towns, and cities following the development of agriculture. But polio was unrecognized for many millennia because of several of its characteristics. PolioRemember that over 90 percent of all infections are inapparent and that only about 3 to 5 percent of infections cause permanent paralysis. PolioOne of the earliest descriptions is actually from an ancient Egyptian wall carving from the Eighteenth Dynasty (1580-1350 B. C. E.), or about 3, 500 years ago. The next suggestive evidence appears in written records from ancient Greece and Rome. PolioMedical reports in Europe in the nineteenth century first reported clusters of fevers followed by paralysis in children. PolioGiven all the other maladies that affected humans until recently, an occasional paralyzed limb in a child did not seem particularly remarkable. PolioIn the late 1880s and early 1890s, doctors began to notice an increasing number of polio cases, especially in and around Boston. There were, for example, twenty-six cases in eastern Massachusetts in the summer of 1893. The following year the first significant and well-documented epidemic of polio occurred in

nearby Vermont. PolioIt is difficult to know just how widespread these cases of polio were because the doctors were not always required to report their diagnosis of the disease to public health authorities. In New York, for example, polio did not become a reportable disease until 1911. PolioThe Vermont epidemic of 1894 and the New York epidemic of 1907 did suggest that the disease was beginning to change its character and its prevalence. Epidemics of polio were increasing in frequency, size, and severity. Although most polio patients were young children, the number of older children and even adults who succumbed to the disease was rising. PolioIn spite of the increasing occurrence of polio in the northeast, doctors, public health officials, and parents were unprepared for the size and severity of the 1916 epidemic in New York and surrounding states. The epidemic began in June and lasted until November. In that time there were over 27, 000 cases reported in twenty-six states. There were approximately 6, 000 deaths (22 percent of the total). New York City recorded over 8, 900 cases and 2, 400 deaths (27 percent of the cases) (Rogers, 1992, pp. 10-11). The epidemic frightened parents and children and strained the capacity of hospitals and the public health system. PolioAs word began to spread about the polio epidemic through the news media and other channels, anxiety increased among parents fearful that their children would succumb to the disease. Parents worried about their children being exposed to the disease anxiously scanned any sick child for signs of weakness or paralysis. PolioParents in the wealthier parts of the city urged the Health Department to place restrictions on immigrant communities and on the freedom of individual immigrants to move about the city as ways to limit the spread of polio. Immigrant families feared both the disease and the imminent imposition of restrictions, and

repeatedly begged health officials for medical assistance for their sick infants. PolioMany also looked for a cause for the epidemic, and suspicion often fell on the many immigrants who lived in New York. Middle-class parents, in particular, were likely to blame immigrants, especially Italian immigrants, who lived in crowded, often filthy, and unsanitary conditions, for bringing the disease to the city and spreading it. Polio: An American StoryFor one thing, he unluckily chose the wrong monkey for his experiments. Macaca mulatta (rhesus monkey) is one of the rare primates that cannot contract polio through oral feeding. The virus simply does not replicate in its digestive tract. Indeed, the only sure way to infect this species is to shoot poliovirus directly to its brain or spinal cord, as Flexner had done. Polio: An American StoryFlexner was determined to find the portal of entry for poliovirus, a key piece of the puzzle. Learning how it got inside the body, and from there to the central nervous system, was essential in preparing a defense. Flexner began by feeding poliovirus to the monkeys by mouth; none took sick. Polio: An American StoryThen he swabbed their nasal passages with the virus and watched them fall quickly to the disease. The message seemed clear: poliovirus entered through the nose and traveled along nerve pathways through the brain and into the spinal cord. Polio: An American StoryThis error, in turn, led to others. By passing poliovirus repeatedly through the brains and spinal columns of his monkeys, Flexner produced a strain—known as MV or mixed virus—that was highly neurotropic, able to multiply only in nervous tissue. Polio: An American StoryThis made the conquest of polio even more problematic since animal nervous tissue can provoke a serious allergic reaction in humans, making it a dangerous medium for growing the poliovirus needed for a workable vaccine. Given Flexner's prominence, MV

quickly became the strain of choice in the polio field, leading researchers down yet another blind alley. Polio: An American Story Flexner wasn't sure. Over time, he would lose faith in the promise of a vaccine, working instead on ways to guard the nasal passages with some sort of chemical blockade" (see pp. 125-26). For the moment, however, optimism prevailed. In 1911 the New York Times gushed that polio would soon go the way of smallpox, typhus, and other vanquished plagues. Its impeccable—if single—source was Flexner himself. " We have already discovered how to prevent infantile paralysis," he noted. " The achievement of a cure, I may conservatively say, is not now far distant." 23