Team Project: Polio

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The focal disease for our project is polio. Polio is caused by a viral agent called poliovirus which is a member of the Enterovirus genus. It occurs in three main types which make up the poliovirus family (Oshinsky, 2005). This virus is transmitted via human to human interactions and spreads by fecal to oral contamination. Once the virus has entered the mouth, it resides in the throat and intestines and may take up to 2 weeks until it starts to produce negative side effects in the host (CDC, 2017). This is the more mild form of infection which just results in the unpleasant viral symptoms, however, another method of transmission of the virus can be much more damaging. In contrast to living in the throat and intestines, some instances of the virus are actually absorbed by the lymphatic system. Research done by Nomoto (2007) shows that the poliovirus can also get transmitted along the axon which allows for it to enter the neurons of the host and begin replicating. Since the poliovirus attacks the central nervous system (CNS) directly, this process leads to the form of the disease that results in paralytic symptoms and can be deadly.

Although both routes of transmission are instigated by the ingestion of contaminated fecal matter, how the virus proceeds once in the body greatly affects the variation of the severity of the symptoms the patient experiences. When someone is first experiencing symptoms of polio they will mimic those of the common flu including fever, nausea, headache, stomach pain, etc. Based on the route taken by the virus once in the body, patients who suffer from the virus attacking the CNS would experience paralysis, meningitis, paresthesia and death. These symptoms are directly related to the nervous system being attacked (CDC, 2017). In addition to the symptoms initially experienced by the host of the virus, many survivors have now shown what are being called “post-polio” symptoms. This suite of symptoms include increased fatigue, reduction in isometric muscle strength, low oxygen uptake, and widespread pain (Lygren et. al, 2007).

Due to the serious and potentially deadly nature of the polio virus, vaccine prevention is important to exponentially reducing the instance of this disease (CDC, 2017). The polio vaccine was developed in 1952 by Dr. Jonas Salk and was a controversial prevention mechanism from the start. This form of the vaccine is the inactivated polio vaccine or IPV and uses a killed form of the virus to build immunity. This was the initial form of prevention used during the 1950s and 1960s and was the response to the main epidemic that we will be studying. The IPV results in a decreased amount of virus in the fecal matter of the sick and increased amount of pharyngeal mucus excretions (Nathanson, Martin, 1979). In contrast, the oral poliovirus vaccine (OPV) is now the main source of polio prevention. The OPV mimics the wild type poliovirus more closely and is better for protecting those in polio endemic areas or areas with poor sanitation. The OPV is also a better option for prevention in the sense that it is low cost, easily concentrated in oral drops, has a long shelf life if refrigerated, and results in little to no negative symptoms (John, 2009). In terms of treatment, polio is not curable. The best ways that polio was treated was palliative care based dealing with pain management, assisted breathing, and physiotherapy to help rehabilitate paralytic patients (Mayo Clinic Staff, 2017).
This disease experience culminated most notably perhaps in the 1940s and early 1950’s in the United States of America. In a post WWII country otherwise experiencing prosperous times, the seemingly unpredictable virus struck fear into children and parents alike. For our report we will be focusing on this specific epidemic of the disease. One of the main things that contributed to the perceived severity of the epidemic was the rapid increase in the incidence of the disease in contrast to the actual numbers of deaths (Oshinsky, 2005). The epidemic peaked in 1952 when there were 57,000 reported cases and according to Oshinsky (2005), “the United States had never experienced a higher crest of the epidemiological wave,” and this contributed to the widespread panic seen in the public sector. The epidemic spread in mixed diffusion. Mixed diffusion describes the pattern of expansion which starts in larger cities, in this case on the east coast, and spreads to the smaller cities in a westward direction (Trevelyan, Smallman-Raynor, Cliff, 2005). Another trigger of the epidemic was the change in sanitation standards within communities. An increase in public sanitation meant that people were no longer exposed to the virus in small amounts and immunity was not established (Neumann, 2004). This left the population vulnerable to host the epidemic seen in the 1940s and early 1950s. Initially the public responded with widespread panic. This intensified in the summer months where public pools were closed, movie theaters were avoided, and public spaces in general were feared (Beaubien, 2012). The response of the society after the initial panic was in part credited to President Franklin Delano Roosevelt. FDR was a survivor of polio and this gave polio a noble face in the eyes of the public. The president greatly supported polio rehabilitation centers and foundations. Due to the public’s positive opinion of FDR, people were also supportive of these foundations and were more motivated to work proactively to help polio survivors as well as work towards better prevention methods (Wilson, 1998).
References

This article discussed some of the societal reactions to polio, mostly feelings of panic. It also talks about President Truman’s efforts to combat the disease and the introduction of the vaccine.

This was a source used to give basic information about polio symptoms and transmittance.

This is a scientific review paper on the effectiveness and practicality of different preventative vaccines for polio. The researchers studied the effects specifically in polio endemic and low and middle income countries.

This is a primary scientific research paper describing a study done on patients who are survivors of polio. The symptoms of “post polio” and their prevalence in this group is stated.

This is a website that informs the general public and contains information about polio, its symptoms, treatments, and causes.

This was a scientific review paper and collection of statistical data gathered from many sources that talked about the history of polio and its treatment.

This is a review of the impact that polio had on the American society as a whole as well as more specifically the career of physiotherapy. This also included information on the
different ways that polio attacked the CNS and how that affected what people thought of polio sufferers.


This is a review of scientific research conducted on Polio transmittance within the Central Nervous System of mice and how this correlates to the transmittance of Polio within the human CNS.


This is a review of the initial response to polio in America and the development of the different vaccine types. This paper also discusses some basics of the disease and discusses the 1940’s polio outbreak in depth.


This is a primary scientific research paper that compiled statistical analysis and looked at the movement/spreading of the Polio virus in the United States from 1910-1971.


This is a review of the role that President Franklin Delano Roosevelt played in the initial reaction to and the search for preventative measures for polio. They describe the importance of having a notable figure with the disease for the disease to be one that is considered acceptable to have in society. They detail FDR’s contributions to varying polio disease foundations.