

# The Effect of Smallpox on the New World

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Smallpox devastated the world and has led to the exchange of ideas, the exploration of new lands and people and the successful eradication of the disease through these encounters. The Columbian Exchange is known in history as a way for the Old World to meet the New World. It was the beginning of smallpox in the New World. Columbus and his men brought new food, livestock, customs and ideas with them to the New World when they began to explore in 1492. The Native Americans were introduced to potatoes, sweet potatoes, horses, corn, chili peppers and many other things that were not native to the land. Along with this came new diseases that they were unable to fight including measles and smallpox. The devastation to their culture was immediate.

An estimated three hundred million people have been killed by the smallpox disease in the twentieth century alone. Smallpox has been noted throughout history as a deadly disease with the first known evidence found on the mummified body of Pharaoh Ramesses V of Egypt, who died in 1157 B.C.<sup>1</sup> The disease was carried from Egypt to India and then to China and Japan from the first to sixth centuries. It then spread to Europe in the eleventh and twelfth centuries and North and South America, primarily Mexico, in the sixteenth century.<sup>2</sup> The exploration by the Spain into the New World led to an encounter with Native American people in the America's who were unable to fight the disease. The encounter of these two groups led to the exchange of cultural practices, beliefs, goods and services, food and livestock and ultimately the belief of a better life. Unfortunately, that was only true

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<sup>1</sup> Flight, Colette. "Smallpox: Eradicating the Scourge." Last modified February 17, 2011. Accessed January 11, 2016. [bbc.co.uk/history/British/empire/seapower\_smallpox-01.shtml]

<sup>2</sup> Flight, Colette. "Smallpox: Eradicating the Scourge."

for the new explorers as the encounter devastated the Native American population throughout the United States. Part of that devastation came in the form of diseases, such as smallpox. Smallpox has spread to all parts of the world because of increased exploration of other countries in an attempt to find a better life despite the consequences of that exchange.

Europeans' desire to explore the New World brought the disease to Mexico in 1521 with Cortez and his men.<sup>3</sup> As it moved through Mexico into the New World it is estimated that smallpox killed more than a third of the Native American population in North America in just a few months. In 1630, the disease spread to Massachusetts and killed half of the Native American population. Soon it spread throughout the New World and missionaries from other countries all reported a large death toll to the Native American people primarily. The Native Americans' encounter with people from other worlds brought death to their culture, lives and communities. The introduction of herding animals, crops and food, horses and daily routines proved deadly in the encounter with the settlers. Since most European settlers had been exposed to the disease at some time in their lives they were not affected at the same level. However, the Native American people had no immunity to it, and they had no means to battle it medically with their own methods.

Lord Jeffrey Amherst, a British soldier, is the only documented person who used this disease as a way to impact the Native American population by distributing two infected blankets and a handkerchief to the Native Americans. Today this event is known as Pontiac's Revenge. This happened on June 24, 1763 at Fort Pitt outside

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<sup>3</sup> "The Columbian Exchange." Accessed January 11, 2016  
[<http://www.thecolumbianexchange.weebly.com/smallpox.html>]

of Pittsburg, Pennsylvania. The blankets caused Native American people to immediately develop symptoms of smallpox and die. The British army did this in order to control the Native American population and to control the possibility of losing war and the land they gained from the Native American people. Unfortunately, the early settlers believed the death toll was a Divine intervention as a plan for settler's to obtain land in a New World. They were not particularly upset about the loss of life.

Native Americans were able to develop methods to prevent the spread of the disease in the early 1700's. They began to use European medical practices with their own traditional methods, and they began to understand the reasons for quarantine to help reduce the spread of the disease. Vaccinations began to help the Native American people treat the disease, however, they were unable to overcome the disease quickly on their own. Eventually, European traders brought medication and items to assist the Native American people. The exchange of medication and information to help control the outbreak of the disease proved to be a beginning at controlling the spread of the disease with the native people, although this would not be evident for several years to come. The Native American people were following advice and recommendations from the Bureau of Indian Affairs which proved to be ineffective in the treatment of this disease as a whole. Eventually, new treatment methods and vaccinations became an accepted practice.<sup>4</sup>

Edward Jenner is credited with developing the vaccine for smallpox in 1796 by taking pus from a pustule of cowpox from a milkmaid and inserting it into the

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<sup>4</sup> Eddins, O. Ned. "Devastation of Smallpox on the American and Canadian Indians." Accessed December 29, 2015. [[http://www.thefurtrapper.com/Indians\\_smallpox.html](http://www.thefurtrapper.com/Indians_smallpox.html)]

incision on an arm of an eight-year-old boy. He proved that using cowpox provided immunity to smallpox, even though humans are unable to actually contract the cowpox disease. It would take another hundred years before his findings became a known medical practice.<sup>5</sup> In 1840, smallpox vaccination was declared illegal in England if done by inoculation.<sup>6</sup> Edward Jenner was not the first, however, to develop treatment for the disease. China and India developed the practice of inoculating healthy people with the virus, which proved somewhat successful. This was quite dangerous, as it could also lead to death. Lady Mary Wortley Montagu introduced the same practice in Britain in 1721.<sup>7</sup> This practice brought down the death rate to approximately two percent of people who had the disease. This number was still quite high, and the disease still quite deadly, as treatment was not mandatory.

Once Edward Jenner was able to introduce the idea of using cowpox as a way to prevent smallpox, the exchange of that idea in the political arena became quite important. A physician named Benjamin Waterhouse introduced Edward Jenner's idea of using cowpox as a vaccination to President Thomas Jefferson in 1801. Edward Jenner used the vaccines on his own children. He provided information and showed the survival rates of children with the vaccination improved survival rates of smallpox victims. He is considered the first United States physician to successfully use the cowpox vaccination. His idea to make a mandatory

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<sup>5</sup> Eddins, O. Ned. "Devastation of Smallpox on the American and Canadian Indians."

<sup>6</sup> Getty, David. "The 1840 Vaccination Extension Act and the Poor Law Authorities and its Implementation in Ireland." *Canadian Journal of Irish Studies*, 1998. Accessed April 14, 2016.

<sup>7</sup> Eddins, O. Ned. "Devastation of Smallpox on the American and Canadian Indians."

vaccination was well before its time. However, due to his desire to monopolize the cowpox material, he was unable to accomplish that on his own.<sup>8</sup>

In 1855, Massachusetts was the first state to require vaccinations by law. Europe had introduced this idea in the late 1700's and punished citizens, first with fines and then with jail, if they failed to comply. Leaders saw how deadly this disease was and felt the only way to control and possibly end it was to ensure all people participate in the vaccinations. Congress passed the Vaccine Act of 1813, which ensured vaccinations were available to all Americans. In 1832, with a budget of twelve hundred dollars, Congress made the vaccination available for all Native Americans who were not yet regarded as American citizens. It took more than seventy-five years for the early Americans to understand the impact of this disease for the Native American people.<sup>9</sup> In 1905, the Supreme Court ruled in a case known as *Jacobson v Massachusetts* that each state had the right to require vaccinations to control what was known as herding immunization in an effort to control outbreaks in communities.<sup>10</sup> By the early 1900's, industrial cities around the world had exchanged the information about how to treat and ultimately prevent smallpox and had established laws to ensure people were not at risk. The exchange of this information began the work of eradicating smallpox in 1980.

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<sup>8</sup> "Benjamin Waterhouse, 1754-1846." Accessed January 12, 2016.  
[<http://www.ocp.hul.harvard.edu/contagion/waterhouse.html>]

<sup>9</sup> Eddins, O. Ned. "Devastation of Smallpox on the American and Canadian Indians." Accessed December 29, 2015  
[[http://www.thefurtrapper.com/indian\\_smallpox.html](http://www.thefurtrapper.com/indian_smallpox.html)] 2002.

<sup>10</sup> Stern, Alexandria Minna and Howard Markel. "The History of Vaccines and Immunizations: Familiar Patterns, New Challenges." *Health Affairs*. Accessed February 28, 2016.  
<<http://www.healthaffairs.org/content/24/3/611.full.html>>

In the 1800's many of the early settlers began to feel that the government was violating their right to "privacy and bodily integrity."<sup>11</sup> There was dissent among the citizens of Massachusetts not wanting to vaccinate, and they felt that the government was overstepping the rules and laws given in the United States Constitution. Although these ideas and beliefs were eventually diminished through the legal system, the debate about vaccinations and government requirements continues to be an objection of many American citizens.

In 1958, the World Health Organization began a global initiative to eradicate smallpox. In 1950 there was an estimated fifty million cases around the world.<sup>12</sup> By 1975, the Horn of Africa was the only place that was still largely infected with the disease. The encounter with these cultures was difficult, as the land was underdeveloped and hard to reach without roads and modern conveniences. By 1977, very few cases were noted around the world. Those that developed were quickly treated, and smallpox essentially became quite rare. In 1980, the World Health Organization, monitored by the United Nations, declared Resolution WHA33.3, which stated smallpox had been eradicated worldwide.<sup>13</sup>

The historical impact of this exchange of knowledge has brought about recommendations from organizations such as the Center for Disease Control and the World Health Organization. These guidelines are for childhood vaccinations and medical staff vaccinations to ensure that the spread of disease remains contained.

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<sup>11</sup>Ajayi, Toyin. "Smallpox and Bioterrorism." *Stanford Journal of International Relations*. Accessed February 28, 2016. <<http://www.stanford.edu/group/sjir/3.2.02/ajayi/html>>

<sup>12</sup> Greenspan, Jesse. "The Rise and Fall of Smallpox." Accessed May 7, 2015. [<http://www.history.com/news/the-rise-and-fall-of-smallpox.html>]

<sup>13</sup> Greenspan, Jesse. "The Rise and Fall of Smallpox."

Extensive studies have been completed by the World Health Organization, and it is estimated that one thousand people for every million develop a reaction to the vaccination, fourteen to fifty-two of every million people vaccinated develop a life threatening reaction, and one to two of every million die from the vaccination.<sup>14</sup> The exploration of finding new treatments and new ideas with smallpox is still very much alive. It is believed that there are still two live strains of the virus stored; one is in Russia and one is in the United States. In 1986, the World Health Organization recommended all live viruses be destroyed and felt there was no further need for vaccination development.<sup>15</sup> Unfortunately, the virus has remained and has not been destroyed as of 2013, with the finding of scabs stored in New Mexico in 2004 and several vials found in Maryland in 2014 at the FBI Labs.

The scab samples found in New Mexico were pressed between pages of a library book in Santa Fe, New Mexico. The scabs were sent to the Centers for Disease Control, and the idea of tracking the history of the disease and the vaccination process was the target for the Center for Disease Control, although it was doubtful that they would be able to extract a live virus.<sup>16</sup> In 1999, the Centers for Disease Control labelled smallpox as a “great threat” to the United States. Although they house fifteen million active vaccinations, it is believed live cultures are

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<sup>14</sup> World Health Organization. “Safety of Smallpox Vaccine: Questions and Answers.” Global Vaccine Safety. Accessed December 29, 2015.

<[http://www.who.int/vaccine\\_safety/committee/topics/smallpox/questions/en/html](http://www.who.int/vaccine_safety/committee/topics/smallpox/questions/en/html)>

<sup>15</sup> World Health Organization. “Advisory Group of Independent Experts to Review the Smallpox Research Programme.” Accessed January 11, 2016.

[[http://apps.who.int/iris/bitstream/10665/97034/1/WHO\\_HSE\\_PED\\_CED\\_2013.3-eng.pdf?ua=1.html](http://apps.who.int/iris/bitstream/10665/97034/1/WHO_HSE_PED_CED_2013.3-eng.pdf?ua=1.html)]

<sup>16</sup> Ajayi, Toyin. “Smallpox and Bioterrorism.” *Stanford Journal of International Relations*. Accessed February 28, 2016. <<http://www.stanford.edu/group/sjir/3.2.02/ajayi/html>>



housed and situations as was found in New Mexico can still occur and put the overall population at risk.<sup>17</sup>

The encounter between the Native Americans and the British Settlers is believed to be the first account of a disease being used as a weapon. There is great debate as to how many influential people of the time understood the meaning of passing infected blankets or allowing exposure to communities without quarantine or treatment, but it is believed that the idea of allowing smallpox to kill a nation in order to gain control of the land and its people was approved of by those in authority. There are also accounts in history of smallpox being used in the American Revolutionary War. The development of a smallpox weapon was discussed during World War II against the Nazis although never followed through.<sup>18</sup> In 1955, the Centers for Disease Control developed a group known as Epidemic Intelligence Agency. This agency reviews the possibility of agents being used as biological weapons and makes overall recommendations to the Centers for Disease Control, World Health Organization and the United States government. They are charged with tracking and identifying possible threats.<sup>19</sup> In modern times, the American military considered the use of smallpox after the World Trade Center attacks in 2001 and began to vaccinate our military members again. In 2008, the military used the first vaccination that was developed in cell form in a laboratory. Today, the

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<sup>17</sup> Ajayi, Toyin. "Smallpox and Bioterrorism." *Stanford Journal of International Relations*. Accessed February 28, 2016. <<http://www.stanford.edu/group/sjir/3.2.02/ajayi/html>>

<sup>18</sup> Gill, Harold B. Jr. "Colonial Germ Warfare." [<http://www.history.org/foundation/journal/Spring04.cfm.html>]

<sup>19</sup> Ajayi, Toyin. "Smallpox and Bioterrorism." *Stanford Journal of International Relations*. Accessed February 28, 2016. <<http://www.stanford.edu/group/sjir/3.2.02/ajayi/html>>

vaccination is not used for the public as a whole but military personnel are still vaccinated if the threat appears real.<sup>20</sup>

Smallpox has been called the “speckled monster” and a scourge throughout history due to the devastation it has caused around the world with death tolls in the millions. It is still a feared disease that is discussed by governmental officials and medical experts around the world on a regular basis in order to ensure it remains eradicated. Smallpox devastated the world and has led to the exchange of ideas, the exploration of new lands and people and the successful eradication of the disease through these encounters.

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<sup>20</sup> Ajayi, Toyin. “Smallpox and Bioterrorism.” *Stanford Journal of International Relations*

## BLIOGRAPHY

### Primary Sources

Amherst, Jeffrey. Letter to Sir William Johnson. 9 July 1763. *Jeffrey Amherst and Smallpox Blankets. Lord Jeffrey Amherst's letters discussing germ warfare against American Indians*. Peter d'Errico. University of Massachusetts/Amherst, Department of Legal Studies, 2009. Print. This is one of several letters written to people talking about the desire to use smallpox to remove the Native American people through extinction by using the infected blankets. It shows the general dislike and disregard for human life that they had in their desire to take over the land and destroy the culture.

Baltimore Health News 16, New York State Department of Health. This man was never vaccinated against smallpox. (No. 2) November, 1939. Photograph. Chapin Library of Rare Books, Williams College. Williamstown, Massachusetts. I used this photograph to help me understand smallpox and why it was dangerous to people who were infected with the disease. The photo shows a man covered with the disease and shows how it took over his entire body.

Hicks, Robert D., PhD. "1879 Surgical Catalog: Smallpox Mail-Order Vaccine." *The Bakken Library and Museum*. 2016 College of Physicians of Philadelphia. Web. Accessed 21 February 2016. <<http://www.historyofvaccines.org/contents/blog/1879-surgical-catalog-mail-order-smallpox-vaccine.html>> This website shows the actual catalogs that were published and the vaccines and tools available to physicians in 1879 in order to treat smallpox. The catalogs show the advertisement of having their own herd of cows that the vaccine was drawn from under the supervision of a staff physician. This article was informative as I learned how difficult it was for physicians to treat the symptoms as medication was not readily available and the pictures of tools and equipment used verified why treatment was not usually effective for treating the disease.

Knox, Lucy Flucker. Letter to Henry Knox. May, 1777. The Gilder Lehrman Collection. The Gilder Lehrman Institute of American History. New York. Web. Accessed 8 January 2016. <<http://www.gilderlehrman.org/collections/00bdd736-090d-4604-b77d-698953626418.html>> This letter describes the population and how the disease impacted the community. It discusses the belief that God intervened in order for the colonists to take land that they thought should rightfully be theirs from the Native American people as smallpox killed 90% of the Native American population in the Boston area in 1634. I used this to understand the colonist's belief that the land was theirs and to link the ideas that when the New World was founded the desire to protect the Native people was not thought of and additional warfare continued by releasing these diseases on the Native American people.

Lieber, Francis. "Law of Nations, 1758." Philadelphia. T. and J. W. Johnson, Law Booksellers, 1844. Web. Accessed 8 January 2016.  
<[http://www.loc.gov/rr/frd/military\\_law/lieber\\_collection/pdf/DeVattel\\_LawofNations.pdf.html](http://www.loc.gov/rr/frd/military_law/lieber_collection/pdf/DeVattel_LawofNations.pdf.html)> This is the actual book the Francis Lieber wrote which was used to modernize the theory of international law and how to divide property, treatment of people after a war victory. Book 3 Chapter 8 specifically looks at issues such as using Germ Warfare, although it wasn't known as that at the time and the issues surrounding how that impacts nations, communities and individuals thru acquisition of war or conquest.

Montagu, Lady Mary Worthley. "Lady Mary Worthley Montagu on Smallpox in Turkey." *Children and Youth in History*, item #157. Web. 6 January 2016.  
<<http://www.chnm.gmu.edu/cyh/primary-sources/157.html>> This is a letter written by Lady Mary Worthley Montagu who was an American citizen living in Turkey. She describes the disease and how it is affecting children in the town she is in. Both she and her children had survived an outbreak but she discusses the physical symptoms and discusses that if a vaccination can be found it is worth fighting for in order to save those impacted by the disease.

National Library of Medicine. The hand of Sarah Nelms. Photograph. Baylor University of Medicine.  
<<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200696/figure/F3/html>> This is a hand drawing of Sarah Nelms' hand when Edward Jenner determined that it was smallpox and made a distinction from cowpox. I used this to understand how he made the distinction. This particular website has other photographs of Edward Jenner's work including his medical hut and people at various stages of the disease.

"Smallpox Vaccination Certificate for Martin Thomsen, 1885." *Museum of Danish America*. 2016 Museum of Danish America. Web. Accessed 20 February 2016.  
<<http://www.danishmuseum.org/explore/Danish-american-culture/viewed-through-the-lense/smallpox-vaccination-certificates?category=Primary%20Sources.html>> This is an actual certificate for a man who came to the United States by ship. All immigrants had to prove they had received the necessary vaccinations including smallpox and this document was for a gentleman named Martin Thomsen. This document was in German but did not mean the man was German since Denmark was under German rule during this time. I used this to show the progression of the disease around the world and the process the United States tried to use to control incoming immigrants from other countries.

“Vaccinate for Smallpox? The Paper War during Boston’s Smallpox Epidemic of 1721.” *National Humanities Center Resource Toolbox*. National Humanities Center. Web. Accessed 16 November 2015  
<[http://www.nationalhumanitiescenter.org/pds/becomingamer/ideas/text15/smallpox\\_vaccination/pdf.html](http://www.nationalhumanitiescenter.org/pds/becomingamer/ideas/text15/smallpox_vaccination/pdf.html)> This is a document put together by the National Humanities Center which outlines small sections of pamphlets that were written in 1721 in Boston which taught how to handle the smallpox vaccination and its effect on the city of Boston. It was a great resource to understand how the disease changed entire communities and the problems in treating it once it was in a geographic location. The information was obtained from both the Boston Gazette and the New England Current newspapers. It also shows a photo from the Center for Disease Control of the disease on a human arm and the way it scars people permanently.

### **Secondary Sources**

“Advisory Group of Independent Experts to Review the Smallpox Research Programme (AGIES).” World Health Organization, November 2013. WHO Press, Geneva 27, Switzerland. Web. Accessed 6 January 2016.  
<[http://apps.who.int/iris/bitstream/10665/97034/1/WHO\\_HSE\\_PED\\_CED\\_2013.3-eng.pdf?ua=1.html](http://apps.who.int/iris/bitstream/10665/97034/1/WHO_HSE_PED_CED_2013.3-eng.pdf?ua=1.html)> This is the written document of the review of live cultures and research completed in 2013 by the World Health Organization. This advisory board completed all research on smallpox, its spread and eradication and the review of currently keeping samples on file along with the continued research to develop antiviral agents. The advisory committee strongly recommended in all areas studied that all live virus and all models currently being stored be destroyed as there is not a need for use and the concern of biomedical terrorism is great in regards to this disease being introduced back into the public.

Ajayi, Toyin. “Smallpox and Bioterrorism.” *Stanford Journal of International Relations*. Stanford University, 2006. Web. Accessed 28 February 2016.  
<<http://www.stanford.edu/group/sjir/3.2.02/ajayi/html>> This article explained the scabs found in New Mexico in 2005 and the possible use and discovery. It also discussed the possibility of using smallpox as a weapon and the large threat it could be to the United States. It introduced the idea of the Center for Disease Control developing the Epidemic Intelligence Services which works closely with Center for Disease Control, the World Health Organization and the federal government to identify possible threats to the population with biological warfare agents.

“Benjamin Waterhouse, 1754-1846.” *Contagion Historical Views of Diseases and Epidemics*. Harvard University Library Open Collections Program, 2002. Web. Accessed 12 January 2016.  
<<http://www.opc.hul.harvard.edu/contagion/waterhouse.html>> I used this article to understand Benjamin Waterhouse’s role in developing and using the smallpox

vaccination which helped to promote the use around the country to help defeat the epidemic of the time.

Bollet, Alfred Jay, M.D. *Plagues and Poxes: The Impact of Human History on Epidemic Disease*. 2<sup>nd</sup> Edition. New York: Demos Medical Publishing, Inc., 2004. Print. This book explains in detail how smallpox came to the United States through immigration and the impact it had on the early settlements. It also gives detail on medical treatment people were given and how the vaccines were developed and distributed according to their ethnicity. It shows the poor treatment the Native Americans were given at the time.

Eddins, O. Ned. "Devastation of Smallpox on American and Canadian Indians." Afton, Wyoming, 2002. Web. 29 December 2015.  
<[http://www.thefurtrapper.com/indian\\_smallpox.html](http://www.thefurtrapper.com/indian_smallpox.html)> This paper was written by a local man who studied the development of the vaccination for smallpox in the 1800's. He outlines that the government took too long to recognize and solve this problem and discussed that Congress did not act until 1832 to release funds of \$1200.00 in order to vaccinate all people in danger of coming in contact with the disease.

Elwell, Frank W. "The Implicit Ecological-Evolutionary Theory of Jared Diamond." *Sociocultural Systems: Principles of Structure and Change*. March 2015. Web. Accessed 29 December 2015.  
<<http://www.faculty.rsu.edu/~felwell/Theorists/Essays/Diamond1.html>> This article discusses in detail the introduction of specific animals and foods in cultures which impacts how society can fight disease and how disease can impact and change a culture depending on the type of foods and animals introduced. Mr. Diamond believes that the timing of agricultural methods essentially brought disease due to the nature of animals herding and carrying things like coxpox which eventually led to other diseases that impacts humans.

"Epidemic Intelligence Service." *Center for Disease Control*. U.S. Department of Health and Human Services. 18 February 2016. Web. Accessed 28 February 2016.  
<<http://www.cdc.gov/eis/html>>. This site was introduced to me while researching the biological warfare idea of using smallpox. I learned that this organization investigates possible threats not only in the United States but around the world and acts as an advisory group to ensure disease is not manufactured and used as a means to harm the population.

Flight, Collette. "Smallpox: Eradicating the Scourge." *British History*. BBC, 2014. Accessed 11 January 2016.

<[http://www.bbc.co.uk/history/british/empire\\_seapower/smallpox-01.shtml](http://www.bbc.co.uk/history/british/empire_seapower/smallpox-01.shtml)> This article discusses the history of smallpox around the world. Written by a British writer it also looks at the concern of using disease as a weapon in today's world.

Getty, David. "The 1840 Vaccination Extension Act and the Poor Law Authorities and its Implementation in Ireland." *Canadian Journal of Irish Studies*, 1998. Web. Accessed 14 April 2016.

<[http://www.jstor.org/stable/pdf/25514248.pdf?seq=1#page\\_scan\\_tab.contents.html](http://www.jstor.org/stable/pdf/25514248.pdf?seq=1#page_scan_tab.contents.html)> This article helped me see what the rules were for vaccinations in Europe during this time and how they were different from the New World because they didn't understand the value of eradicating the disease.

Giblin, James Cross. *When Plague Strikes: The Black Death, Smallpox, AIDS*. New York: HarperCollins Publishers, 1995. Print. This book discusses three plagues that killed thousands and destroyed populations leaving financial and social consequences. It also talked about how each plague helped us develop our medical knowledge through the study of those it infected. I used this book to understand the suffering people went through, the frustrations of doctors and scientists and the change it had on families and communities.

Gill, Harold B. Jr. "Colonial Germ Warfare." *Colonial Williamsburg That the Future May Learn from the Past*. CW Journal, Spring, 2004. Web. Accessed 9 January 2016. <<http://www.history.org/foundation/journal/spring04/warfare.cfm.html>> This article gave a detailed account of how the smallpox disease was used as a weapon to assist the colonists in taking over the New World from the Native American people. It gave timelines and specific instances of how military leaders both in the United States and England gave orders to spread the disease to the Native Americans including giving them infected blankets. It also directed me to additional information to understand the development of the Law of Nations for international law.

Grap, Mary Ellen. "How the Spread of Disease Affected the Conquering of the Aztec Native Americans." Prezi, 2012. Web. Accessed 12 April 2016. <<http://www.prezi.com/apxr60hufvpz/how-the-spread-of-disease-affected-the-conquering-of-the-aztec-native-americans.html>> This article discusses the early rule of the Spanish empire over the Aztec Native Americans. It argues that the reason the Spaniard's were able to rule the Aztec nation was simply because they brought weapons that the Native American population throughout Cuba, South America, Mexico and eventually America had never seen and they brought disease that they were unable to fight. The sickness devastated the population and limited the people's ability to effectively fight against the explorers.

Greenspan, Jesse. "The Rise and Fall of Smallpox." History in the Headlines. A&E Television Network, LLC, 2016. 7 May 2015. Web. <<http://www.history.com/news/the-rise-and-fall-of-smallpox.html>> This article discusses the history of smallpox starting in 1000 B.C. up until 1980 when it was eradicated. This article discussed smallpox and how it impacted nations rather than just focusing on the United States. Also discussed the history of the Seven Years War which is believed to be the reason for smallpox to be introduced to the United States and the Native American people

Grubb, Farley. *German Immigration and Servitude in America, 1709-1914*. New York: Rutledge, 2011. Print.

This book explained in detail how smallpox changed the New World as immigrants came from Germany. It gave information on census data and morbidity rates for smallpox in the Philadelphia area. It explained that although it was a small sample of the population it was similar to what happened around the country and how the disease changed the way immigration was handled. This eventually led to federal laws and medical changes to help control the spread of this disease and set ground for others.

Halverson, Melissa Sue. "Native Americans and the Smallpox Epidemic." *The Early Review – Volume 11*. Archiving Early America 1995-2015. Web. Accessed 29 December 2015. <<http://www.earlyamerica.com/early-america-review/volume-1/native-americans-smallpox/html>> I used this resource for specific information on how smallpox affected the Native American population and the % of deaths each tribe had as the disease moved through the United States. It also gave a timeline of how long it took from the beginning of colonization to actually find a way to cure and eradicate the disease. It also discussed the sociocultural changes which led to additional research which helped me explore the theme's topics for this year.

Hendricks, Rick. "Infectious Disease in Eighteenth Century El Paso Del Norte." *Southern New Mexico Historical Review*, 10 January 2003. Web. Accessed 11 January 2016. <<http://www.newmexicohistory.org/people/infectious-disease-in-eighteenth-century-el-paso-del-norte.html>> I used this site to understand how this disease changed the Native American culture in El Paso and through New Mexico during the time period of 1700-1800. This article outlines how many deaths are connected with smallpox and other diseases that the Native American population were unable to fight due to their inability to develop immunity to it. It also discusses the Columbian Exchange and the introduction of other produce and animals which also played a part in their inability to effectively fight the disease.



“History of Smallpox.” *The History of Vaccines. An Educational Resource by the College of Physicians of Philadelphia.* The College of Physicians of Philadelphia, 2016. Web. Accessed 29 December 2015.  
<<http://www.historyofvaccines.org/content/timelines/smallpox/html>.> This website gave information on the history and significant people involved in the discovery, treatment and eventual end of smallpox. I used this information to verify other facts found and to understand the timelines of the disease.

Kirby, David. *Evidence of Harm – Mercury in Vaccines and the Autism Epidemic. A Medical Controversy.* New York: St Martin’s Press, 2005. Print. This book looks at the history of the smallpox vaccination and how ingredients used in the vaccinations today which were developed during the research of smallpox have caused a possible epidemic of autism in today’s society. I used this book to understand the smallpox history and its impact still today.

Oldstone, Michael B. A. “Viruses, Plagues and History.” *New York Times on the Web.* Oxford University Press, 1998. Web. Accessed 12 April 2016.  
<<http://www.nytimes.com/books/first/o/oldstone-viruses.html>> This article gave a history of smallpox and the devastation it caused not only in the New World but the World at large. It discussed the part Spain played in European politics and how the disease was used as a means of power and control long before the idea of bio-terrorism was developed. It gave a clear understanding that throughout history man has been able to use various means to control and conquer cultures and nations but focused on the early diseases that the settlers and Native Americans in North America faced.

Ong, Willie T. M.D. “Health Ties between Spain and the Philippines.” *Mind Your Body.* The Philippine Star, June 26, 2012. Web. Accessed 12 April 2016.  
<<http://www.philstar.com/health-and-family/12-06-26/821277/health-ties-between-spain-and-philippines.html>.> This article discussed the impact of smallpox which was introduced by Spain into the Philippines and how a doctor from Spain, Balmis after traveling to Mexico to find a cure came to the Philippines and inoculated children to cure the disease. This was the introduction of inoculation to the Philippines.

Piper-Terry, Marcella. “History of Infectious Disease and Vaccination in the United States.” *Vax Truth*, 29 August 1991. Web. Accessed 16 November 2015.  
<<http://www.vaxtruth.org/2011/08/history-of-infectious-disease-and-vaccination-in-the-United-States/html>.> This website gave a history of smallpox with statistical data showing how many people died in the early United States. It includes information of how it was used after the French-Indian War against the Native American people. It

also gives a history of the vaccinations and discusses the dangers vaccinations have on children overall today.

Porterfield, Kay. "Timeline of European Disease Epidemics Among American Indians." KPorterfield Blog. Web. Accessed 12 March 2016.

<<http://www.kporterfield.com/aicctw/articles/disease.html>> This timeline showed the introduction of disease carried by Columbus in 1493 through 1919. It shows not only the casualties of smallpox but also measles, typhoid fever, and cholera. It demonstrates how the various diseases were introduced to the Native American culture and at times the settlers because of the diseases being carried by ships, livestock and goods.

Portero, Ashley. "Deaths Caused by Diseases among the Native Americans in the 18<sup>th</sup> Century." *Synonym.com*. Demand Media, 2001-2016. Web. Accessed 11 January 2016.

<<http://www.classroom.synonym.com/deaths-caused-diseases-among-native-americans-18th-century-16655.html>>. This article is about the various diseases, including smallpox which impacted the Native American people, primarily in the New Mexico region and how it changed the population. The author talks about the fact that ships would land in areas along the western coast and find villages fit for 100 men that were barren due to the introduction of disease that the indigenous people were unable to fight. It talks in detail about New Mexico Native Americans who moved through the state after the goods would come through Mexico up to El Paso but due to the number of people who brought disease the Native Americans were unable to fight the changes to their culture, medical practice and ability to keep it from spreading due to society accepted practice.

Riedel, Stefan, MD, PhD. "Edward Jenner and the History of Smallpox and Vaccination." *Proc (Baylor University Medical Center)*. 2005. Jan; 18 (1): 21-25. Baylor University Medical Proceedings. 2005. Web. Accessed 29 December 2015.

<<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200696.html>> This article is very detailed about the history of smallpox but focuses on the man who found the way to treat and end smallpox. It gave a detailed account of his education and history and how he came to study and recommend treatments for smallpox and overall immunizations.

"Safety of Smallpox Vaccine: Questions and Answers." Global Vaccine Safety. World Health Organization, 7 January 2009. Web. Accessed 28 February 2016.

<[http://www.who.int/vaccine\\_safety/committee/topics/smallpox/questions/en/html](http://www.who.int/vaccine_safety/committee/topics/smallpox/questions/en/html)> This site gave me information regarding the safety of the vaccination, the statistics of effects of the vaccination and the death rate of the vaccination. It also discussed the use of smallpox in the future as a bioterrorism agent and discussed countries who are considering that including Russia.

“Should any Vaccines Be Required for Children?” Explore Pros and Cons of Controversial Issues, 16 February 2016. Web. Accessed 28 February 2016. <<http://www.vaccines.procon.org/html>> I used this article to understand the pros of vaccinating and the cons. It also gave a history of how legally the government has upheld the laws for vaccination including cases being heard all the way to the Supreme Court.

“Smallpox Conquered Killer.” National Geographic Society, 1996-2016. Web. Accessed 29 December 2015. <<http://www.science.nationgeographic.com/science/health-and-human-body/human-disease/smallpox/article/html>> This article discussed the history of smallpox and gave detail on how the vaccinations were developed including looking at Edward Jenner who was the first to understand the link between cowpox and smallpox up until the disease was eradicated.

“Smallpox.” Mayo Clinic. Mayo Foundation for Medical Education and Research 1998-2016. Web. Accessed 28 December 2015. <<http://www.mayoclinic.org/diseases-conditions/smallpox/basics/prevention/con-20022769/html>> This is a basic history of smallpox and how it was treated and eradicated in 1980. This website helped me understand how hard it was to treat and the need to find and cure this deadly disease although it took hundreds of years.

“Smallpox.” *The Columbian Exchange*. Web. Accessed 29 December 2015. <<http://thecolumbianexchange.weebly.com/smallpox.html>> This website gives a history of the Columbian Exchange. It discusses the five issues that were introduced to the New World that caused great problems. It discusses smallpox and the Native American’s inability to fight the disease and develop immunity to it because of the fast introduction into their population and the introduction of other things such as corn, sugarcane, horses to the Native American population.

Stern, Alexandria Minna and Howard Markel. “The History of Vaccines and Immunizations: Familiar Patterns, New Challenges.” *Health Affairs*. Project Hope, May 2005. Web. Accessed 28 February 2016. <<http://www.healthaffairs.org/content/24/3/611.full.html>> I used this article to understand the history of Edward Jenner’s development of vaccinations and the legal issues it developed including the pros of it and the cons that citizens felt as vaccination became a violation of their rights and personal integrity. This cite also gave information on the legal process to make vaccinations mandatory in England and the United States.

Swendiman, Kathleen. "Mandatory Vaccinations: Precedent and Current Laws." *Congressional Research Service*, 10 March 2011. Web. Accessed 11 January 2016.

<[http://www.idsociety.org/uploadfiles/IDSA/Policy\\_and\\_advocacy/Current\\_Topics\\_And\\_Issues/Immunizations\\_and\\_Vaccines/Health\\_Care\\_Worker\\_Immunization/Related\\_Links/Mandatory%20Vaccinations%20Precedent%20and%20Current%20Laws%20031011.pdf.html](http://www.idsociety.org/uploadfiles/IDSA/Policy_and_advocacy/Current_Topics_And_Issues/Immunizations_and_Vaccines/Health_Care_Worker_Immunization/Related_Links/Mandatory%20Vaccinations%20Precedent%20and%20Current%20Laws%20031011.pdf.html)> Ms. Swendiman is a legislative attorney who conducted a study and report on the history of mandatory vaccinations and the role of the federal state and local governments for congressional consideration. She reviews a history of mandatory vaccinations with the general population and with medical workers. She discussed the origin of mandatory laws which began in England and then was enacted in the United States in Massachusetts in 1809. The basic findings were that it remains an issue for each state to address and monitor according to the needs of the state. Discussion of recommendations from organizations like the Center for Disease Control should be considered and implemented if a national outbreak should occur again.

"Timeline of Smallpox." *The History of Vaccines. An Educational Resource by the College of Physicians of Philadelphia*. The College of Physicians of Philadelphia, 2016. Web. Accessed 29 December 2015.

<<http://www.historyofvaccines.org/content/timelines/smallpox/html.>> This website was extremely helpful as it gave a visual timeline of smallpox beginning in the year 1000 through 2010. The visual helped me understand how far reaching and devastating it was to countries and communities throughout the world and show significant developments in the eradication of the disease and the significant people who medically assisted and politicians who tried to control it in the New World and the United States today.

Walters, Mark Jerome. *Seven Modern Plagues*. Washington: Island Press, 2003. Print. This book compared the plagues of today such as HIV and Lyme disease to diseases of the past including smallpox. It discusses the possibility of developing medications and vaccinations for today's deadly diseases by following the methods of the 1700-1800's in finding and removing disease threat with the use of vaccinations.

Whipps, Heather. "How Smallpox Change the World." *Live Science*. Perch, 23 June 2008. Web. Accessed 16 November 2015. <<http://www.livescience.com/7509-smallpox-changed-world.html.>> This article helped me learn the general history of smallpox including the number of people who died from it and the countries it was believed to have come from. This article also talks about the fact that it was eradicated but some believe it is still a concern for today's world and could be used as a means of bioterrorism.

“WHO Declares Smallpox Eradicated 1980.” *Public Broadcast System*. WGBH Educational Foundation 1998. Web. Accessed 6 January 2016.  
<<http://www.pbs.org/wgbh/aso/databank/entries/dm79sp.html>> This site give a short history on smallpox, the development of the World Health Organization under the United Nations and a summary of the cases, victims and mortality rate once the World Health Organization began monitoring and pushing for tighter control after World War II.

Willrich, Michael. *Pox an American History*. New York: Penguin Group, 2012. Print. This book shows how smallpox spread throughout the United States. It shows the government’s fight with doctors, citizens and the debate that develop over the need to vaccinate everyone verses the fight for individual’s rights. This book helped me understand how smallpox spread, the fight to control it and the changes it brought for the entire country.