Smallpox Inoculation in Colonial and Revolutionary America

By

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INTRODUCTION

In 1905, the U.S. Supreme Court ruled in favor of the Commonwealth of Massachusetts in a case where one of its citizens challenged the authority of the state to require citizens to be vaccinated on constitutional grounds. The petitioner in that case was a Swedish pastor, Henning Jacobson, who objected to complying with Massachusetts’ smallpox vaccination law on the grounds that it impaired his individual liberty. Massachusetts had experienced a smallpox outbreak in 1901 and imposed fines and prison time for those who refused to be vaccinated.¹ Writing the 7-2 majority opinion in the case of *Jacobson v. Massachusetts*, Justice John Marshall Harlan stated, “According to settled principles the police power of a State must be held to embrace, at least, such reasonable regulations established directly by legislative enactment as will protect the public health and the public safety.”² The Supreme Court determined that, within a certain limit, the state (under its 10th Amendment police powers) had the right to impose measures on individuals that it deemed would help maintain general public health, such as vaccination against certain communicable diseases. After a long debate involving tenuous science, religious objections, and individual rights, vaccination became a legal method of upholding public health standards.

America has a long (and continuing history) of controversy surrounding compulsory public health measures to address dangerous illness. This controversy over cooperation and universal participation in addressing serious public health threats can be traced back to Colonial

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² *Jacobson v. Massachusetts* 197 US 11 (1905)
America and specifically to the Boston smallpox epidemic of 1721, a watershed moment in American public health.

The debate in 1721 over the use of inoculation to address smallpox epidemics laid the initial groundwork that eventually grew into public health laws and programs to address infectious diseases. Despite several centuries of very effective government oversight and enforcement in public health, some opposition to public health programs continues to persist. In their 2011 article, “The Age-Old Struggle against the Antivaccinationists,” Gregory Poland and Robert Jacobson trace the history of resistance against the use of vaccines from distrust of the smallpox vaccine to the modern debate surrounding the unfounded claim that vaccines can cause autism. Poland and Jacobson, both medical doctors, come down strongly in favor of the rule of science. “Ultimately,” they conclude, “society must recognize that science is not a democracy in which the side with the most votes or loudest voices gets to decide what is right.” The debate around vaccination has been more complex and nuanced than Dr. Poland’s and Dr. Jacobson’s article suggests. Indeed, the notion that science trumps democracy is overly simplistic.

Resistance to new, and certainly to compulsory, health measures has occurred over time for a number of reasons, including initial uncertainty about the scientific merit of each new measure, religious traditions and concerns, and the assertion of individual rights over government compulsion in health decisions. Compulsory measures attract even more controversy, generating discussion about the role of the state’s intersection with individual liberty. The debate in Boston in 1721 over the use of a new medical procedure, inoculation, to combat smallpox, can be viewed as the beginning of the initial foray in the battle for acceptance of public health programs to fight infectious diseases.

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Historiography

The literature on the Boston smallpox epidemic of 1721 and the subsequent debate over the use of inoculation suggest that historians have rarely considered the formative role that the 1721 smallpox epidemic and subsequent development of inoculation played in later public health initiatives. Rather, the literature focuses on the debate about inoculation in terms of the religious atmosphere of the Puritan community and the arguments made for and those against inoculation. As religion dominated every aspect of Puritan life, it is not surprising that a large volume of this historical work has focused on the tension between the rudimentary health science that existed at the time, and the fundamentalist religious beliefs that God had a hand in the onslaught of plagues and epidemics.

The historiography of this subject covers a broad range of historical factors in the fight against smallpox and, together, these works offer a wide variety of literature available not only about the specific 1721 epidemic, but also the larger conversation about smallpox and health throughout the world at the time.

Before the technique of inoculation was introduced in Boston, smallpox had ravaged different parts of the world for centuries as people struggled to combat an invisible, deadly enemy. Donald Hopkins’ comprehensive 1983 history, Princes and Peasants, discusses smallpox on the global scale and its history around the world. Hopkins observes the history of mankind’s battle with plagues must be viewed in terms of the very limited science that was available about communicable diseases, “Without such a perspective, many of the actions described in the remainder of this narrative would seem irrational or absurd. In fact, they were often logical
responses to a frightful but misunderstood adversary and reveal the pathetic price of ignorance.”

Hopkins traces the fight against smallpox back to the pharaohs of ancient Egypt and provides a critical historical framework for the practices and responses later seen in Boston during the 1721 epidemic. Hopkins, like many historians, discusses the broader effects of smallpox in colonial America, but colonial experience and development of inoculation is not the main focus of the work.

While Hopkin’s work uses one disease, smallpox, to frame world history, John Blake’s work, *Public Health in the Town of Boston*, uses primary sources about disease and various public health problems to construct a social and political history of Boston. Blake’s work provides a larger discussion of not only of the emergence of smallpox in colonial Boston, but also of the colonists’ social experiences until the development of inoculation. Using town records, court documents, as well as diaries and newspapers from the time, Blake examines what historically can be considered public health initiatives. Through these documents, Blake is able to discern a sense of the greater political and social issues throughout the American colonial period, and into the early Republic. He observes, “Herein lies, in part, the significance of the history of public health, for it illustrates and illuminates the attitudes of the time, not only toward disease and death, but also toward other basic social and political questions which every age must raise and answer in its own way.”

His survey spans from 1630 to 1822, beginning with a broad account of the development of public initiatives and the community’s attempts to combat illness in Boston prior to the smallpox epidemic of 1721, and follows the various challenges Boston faced, such as the typhoid and dysentery epidemics in the early nineteenth centuries.

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While Hopkin’s work focuses on one disease, smallpox, to frame world history, Blake looks more broadly at a series of diseases and various public health problems, but limits his social and political context by focusing solely on the town of Boston.

While Blake’s *Public Health in the Town of Boston* provides the larger narrative about health, Steven Coss’ 2016 book *The Fever of 1721* narrows the conversation about disease to smallpox and the climate during the smallpox epidemic of 1721 in Boston and the subsequent debate surrounding inoculation. Coss also frames the socio-political climate of pre-revolutionary Boston around an epidemic, but unlike Blake’s larger history, Coss’ narrative sets the stage for the establishment of an independent press and the American Revolution. While recounting the inoculation debate, Coss is working within the larger framework of the rising political tensions before the outbreak of the Revolution. The book examines the political atmosphere and the relationship between Boston and the Crown at the onset of smallpox, as well as how the inoculation debate, which played out in a war or words through published pamphlets, led to the emergence of Boston’s first independent newspaper.

Elizabeth Fenn’s *Pox Americana*, picks up where Coss leaves off and looks at the impact of the smallpox during the American Revolution. While Coss argues that the inoculation debate and the press played a role in the beginning of the Revolution; Fenn examines the role of smallpox in terms of military strategy in the Revolution. Fenn looks at different battles and demography of North America to show how George Washington’s decision to implement inoculation in the army was a crucial military tactic that affected the outcome of the war. Fenn’s work expands on Hopkins’ by not only showing the larger impact of smallpox, but how disease affects the outcome of history and the course of nations.
In his 2011 article, “Getting the Pox off All Their Houses: Cotton Mather and the Rhetoric of Puritan Science”, Robert Tindol examines how Cotton Mather’s advocacy on behalf of inoculation worked within the framework on Puritan theology. Tindol argues that Mather’s foundations for his argument for the science of inoculation leaned heavily on the fundamentals of Puritan religion. Providing a framework of traditional Puritan beliefs that hindered the community from immediately accepting the new science of inoculation, Tindol examines the arguments of Cotton Mather and his arguments and concludes, “Mather, therefore, can be credited with changing the rhetoric of American Puritanism in its estimation of science, even if he did little or nothing to change the theology of Puritanism.”

Tindol’s work brings the modern reader into the mindset of the Puritans and the article elucidates the reluctance of the community towards scientific advancement. This article demonstrates the popular ideologies of the time and how Puritans perceived life and their encounters with disease and death.

Like previously discussed works that provide the larger political and social context surrounding the 1721 epidemic and subsequent inoculation debate, Elizabeth Fenn’s Pox Americana and John Blake’s “The Inoculation in Colonial Boston” frame the 1721 epidemic as especially significant since it marks the beginning of preventative medicine in America. Written in 1952, Blake’s article acknowledges the accomplishment of inoculation while holding Mather and Boylston accountable for what Blake feels was a reckless experiment that could have potentially caused more deaths. “But they cannot escape censure for their neglect of the rights of the community for their failure to prevent those who were inoculated from transmitting the disease.”

For Blake, the positive outcome of the inoculation experiment in Boston was more due

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to luck than the scientific prowess of Boylston and Mather. His work acknowledges the complexity of the debate due to not only the health consequences but also the individual personalities involved. Blake does not go beyond the initial debate into the role of inoculation in the American Revolution, when George Washington required inoculation of the Continental Army, which became in the first government-enforced public health policy in American history.

While the previous works discussed focused on the central figures in the inoculation controversy or the political and socioeconomic climate of Boston, there were also issues of gender and race, and these are discussed in other pieces of historical research. In her work, “The Boston Inoculation Controversy of 1721-1722: An Incident in the History of Race,” Margaret Minardi looks at the issue of race and focuses on the crucial contribution of Mather’s slave, Onesimus, in introducing inoculation to the Massachusetts colony. Minardi’s work highlights the significance of a slave’s contribution to the health sciences and its place in the history of race in America. Onesimus introduced the African practice of inoculation to Cotton Mather by explaining how he had survived smallpox. Minardi argues, “Onesimus’ transmission of medical knowledge to Cotton Mather has slipped into the larger narrative of the 1721 smallpox epidemic only incidentally, since the history of the inoculation controversy is usually treated as distinct from the history of race.” In the colonial inoculation debate, Minardi places Onesimus’ contribution as an African American slave as significant to the subsequent scientific debate and what that debate can tell us about how race was viewed within the scientific community at the time.

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Like Minardi, Diana Barnes’ “The Public Life of a Woman of Wit and Quality: Lady Mary Wortley Montagu and the Vogue for Smallpox Inoculation,” focuses on another lesser-known facet of the debate. Barnes frames the debate over inoculation, which in the case of Lady Montague took place in England, in terms of its role in feminist history. Barnes’ work focuses not on the science surrounding the debate, but rather on the impact that women had in championing and promoting public health measures. Barnes focuses on Montagu’s reputation and her ability to advocate within a male dominated society. In her work, Barnes’ describes the debate over smallpox inoculation as a global conversation, not just one taking place in Boston. Like Mather, Lady Montagu learned of inoculation from people who lived in a distant and foreign country, and she introduced her knowledge of her own country, in her case, Britain. Her endeavors to convince the British government to accept inoculation was similar to the efforts that Mather made in Boston. But, Lady Montagu’s story is unique because she was a woman in a time when women rarely participated in public policy making. Lady Montagu’s story demonstrates the different ways in which people advocate for, and won, acceptance of this new technique.

Prior academic scholarship provides a broad overview of the topic of inoculation – not just the epidemic in Boston, but also the worldwide struggle against a barely-understood disease. The historical focus, however, has not been on the larger struggle to inoculate or vaccinate in America to prevent the kind of epidemics that were seen earlier in history. The 1721 smallpox epidemic in Boston and the subsequent debate around inoculation was the first debate in North America surrounding how a community should address a public health crisis and the rights of the individual.
This thesis expands on the works of Fenn, Coss, and Blake, and attempts to synthesize the literature and primary sources to show how the conflict surrounding inoculation, America’s first public health debate, continued into the American Revolution. This work continues in the same historiography as Coss and Blake and follows their assertion that the 1721 inoculation controversy in Boston was America’s first step towards preventative public health measures.

The first chapter of this thesis focuses on the history of smallpox and disease in colonial America. With the arrival of Europeans in America came the diseases that were endemic in Europe but unknown to Native Americans. The disease wiped out the majority of Native Americans while posing a different threat to the colonists. The endemic disease they knew in Europe now came in crushing waves of epidemics as new generations grew up without exposure and subsequent immunity to the disease.

The second chapter examines the pamphlet debate that occurred Boston during the smallpox epidemic of 1721. The practice brought up many concerns about public welfare and the potential risks of exposing people to a debilitating and potentially fatal disease. Cotton Mather and Zabdiel Boylston needed to reassure a fearful community of a risky medical technique. Among the challenges to inoculation were religious ideas about the meaning of disease. These conversations, medical and religious, along with their experiments, led to cautious and sporadic trials with inoculations all over the colonies in the following years leading up to the American Revolution.

The last chapter follows the impact of smallpox during the American Revolution as well as Washington’s crucial decision to inoculate the Continental Army. Moving from the heated debate of 1721 with Cotton Mather, we can trace the gradual acceptance of inoculation into the Revolution where George Washington implemented the first military mandated public health
initiative when he ordered all troops in the Continental Army to be inoculated. Inoculation moves from a potential health threat that is outlawed into an accepted method of regulating the effects of smallpox. The adoption of inoculation around the world set the stage for Edward Jenner’s vaccination, which led to the eradication of the disease.
Chapter One

Smallpox was an ancient disease that had afflicted Europe for centuries and was common in the Middle East, India, China, and Japan. Over the centuries, smallpox circulated constantly through communities the world over. It was first documented in the tenth century by an Islamic doctor named Rhazes whose account of a mysterious disease suggests that his community may have been suffering from a smallpox epidemic.1 However, humankind has almost certainly been afflicted with smallpox for at least several millennia. There is evidence that smallpox was present in ancient Egypt, afflicting the pharaoh Ramses V; and that smallpox was present in China as early as 1700 BC.2 People who lived in areas where smallpox was endemic would generally contract smallpox as children. Like chickenpox, smallpox was considered a childhood disease. Anyone lucky enough to recover from it, they would develop lifelong immunity. Because the disease constantly circulated within the community and those who survived to adulthood were generally immune to reinfection, smallpox was generally regarded as a potentially deadly childhood affliction that was less noticeable in the adult population.

Smallpox could be debilitating or even deadly, depending on the strain a person contracted. Variola major, the more severe form of the disease, was often fatal; and if not fatal, it often left people disfigured or blind. Those infected had flu-like symptoms twelve days after being exposed to the virus. During this time, they were contagious but often unaware of the threat they posed to those around them until the tell-tale rash appeared.3 Around the sixteenth

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day after being infected, victims broke out in hundreds of small pustules that accumulated mainly on their hands, feet, and face, causing tremendous pain. In his work, *Princes and Peasants*, Donald Hopkins describes the experience of smallpox,

> “Some patients appeared exactly as if they had been severely scalded or burned, and even less seriously affected victims said the skin felt as though it were on fire. In addition to the skin, which sometimes sloughed off in large pieces, the virus attacked the throat, lungs, heart, liver, intestines, and other internal organs, and that is how it killed. Victims reeked of a peculiarly sickening odor. In some, the disease cause hemorrhaging internally and externally, the so-called black smallpox, which is almost always fatal. Overall, about one out of every four victims died. Survivors were immune and usually could not get the infection again, but they were left with pockmarked faces, or less commonly, blind in one or both eyes.”

Smallpox could be transmitted in a number of ways. For two or more weeks, an infected person suffered oozing pustules. The disease could be passed through secretions from the unhealed pustule wounds or from exposure to bodily fluids such as urine. while the pustules were present, drying up, and falling off, the patient could infect others. As the pustules would dry up and fall off, the person afflicted could infect others who came into contact with the debris. Through the entire course of the disease, a patient could be contagious for almost a month, until their scabs had all fallen off. Even when a victim died, their corpse was capable of spreading the disease. Smallpox was able to survive in clothing and bedding for days at a time. Those taking care of the patient and handling infected clothing or bedding were at risk. However, it was noticed that a person who survived smallpox would not catch it again. This observation was basis for the practice of inoculation.

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5 Elizabeth Fenn, “Biological Warfare in Eighteenth-Century America,” 1561.
Inoculation, or also referred to as variolation, during this period refers to the practice of taking the scabs or pus from the pustules of smallpox victims and using them purposefully to infect healthy persons with a milder form of the disease. Contracting even a mild case bestowing upon them an immunity from future outbreaks. The practice had been used for centuries in other areas of the world, including Africa and China, prior to being introduced in Europe or being tried in Boston. It was introduced to Constantinople in 1672, and the knowledge of this technique began to spread into other countries in Western Europe. The techniques for inoculation were crude and uncertain, and included inhaling powdered scabs from smallpox victims, or inserting the pus from a current smallpox victim into a cut on a healthy person. While this practice resulted in a less severe form of smallpox and greatly reduced the mortality rate, it is still unknown why introducing the disease this way lessens its impact. However, unlike vaccines used today, an inoculated person remained infectious until the disease runs its course. When inoculated, the recipient became ill and contagious, and had to be quarantined because they could spread the disease naturally to others in the community.

Childhood mortality rates were very high during this period and so the effects of smallpox were often not isolated from other causes of death. An endemic disease in a crowded city that affected mainly children was less noticeable at that time. In crowded cities, smallpox could circulate with an almost endless supply of susceptible children. The longer smallpox circulated within a society, less severe its impact. As children were constantly being born, those that died were constantly being replaced. Thus, a disease that principally affected children

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8 Hopkins, Princes and Peasants, 12.
9 Hopkins, Princes and Peasants, 46.
10 Hopkins, Princes and Peasants, 7.
12 Tucker, Scourge, 8.
was less noticeable, and less problematic for the society, than a disease that would affect adults and children alike.13 But conditions in North American were different because the first generations born in the colonies had not been exposed to smallpox as children. Therefore, the North American colonies presented a unique situation where the children were no longer the principal part of the population susceptible to the disease.

This made a very big difference from a social and economic standpoint. If an epidemic affects the adult population of a society, it very adversely affects that society’s workforce and economy. The less densely populated American colonies did not have the population to support the disease endemically. In the colonies, smallpox would suddenly appear and kill a significant portion of the population, and then vanish as the members of the current generation either died or developed immunity. After several years, when a new generation had taken their place, smallpox would return, generally carried by outside travelers arriving by ship, to start a new epidemic that would ravage younger generations and those who had not yet been exposed.14 Often, these travelers had been exposed to the disease in port but were unaware that they were carrying it.

Smallpox was first introduced to North America by the Spanish explorers and settlers. The Spanish had subjugated many of the indigenous people they encountered in the New World and when harsh working conditions killed most of the native population, they brought slaves over from West Africa to supplement the labor.15 Smallpox was endemic in Africa and Europe, and some of the Spanish and slaves carried it with them. The disease wrought havoc on the remaining native populations who had no previous exposure. From what is now Haiti and the Dominican Republic, the disease spread into Mexico and then to North America.

13 Tucker, Scourge, 8.
14 Hopkins, Princes and Peasants, 8.
15 Tucker, Scourge, 9.
As smallpox spread through Native America’s “virgin soil”, epidemics ravaged the Native Americans. Between 1616 and 1619, the Native American population in Massachusetts Bay was almost entirely wiped out by smallpox.16 Puritans observed this as a divine sign that they were meant to take over the land from the indigenous people.17 Early settlers were astonished by how quickly smallpox decimated the native population and saw this as a sign from God. John Winthrop, governor of Boston, referred to smallpox as a “miraculous plague”.18 Cristobal Silva expressed the Puritans’ view that Native American susceptibility to smallpox demonstrated a moral inferiority, “While Christianity is what purportedly maintains the health of English colonists, the Native American body is represented as immunologically inferior.”19 Without an understanding of what caused disease, the Puritans attributed it to a punishment by an angry God. Similar to the way they perceived God’s role in the spread of smallpox to Native Americans, the Puritans would later view an outbreak of disease in their own community as punishment for transgressions against God.

In highly England, smallpox had become endemic and established. However, in less populated New England, it was not. Massachusetts experienced only periodic epidemics and because there were sizeable gaps between each outbreak, potentially susceptible generations could grow into adulthood before being exposed to the disease. Thus, unlike the experience in Europe the smallpox outbreaks in Massachusetts would affect both adults and children. Cristobal Silva observes that, “cyclical epidemics are significant because they invert the patterns of

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16 Tucker, Scourge, 11.
18 Silva, Miraculous Plagues, 17.
19 Silva, Miraculous Plagues, 17.
infection and immunity with which first-generation settlers were familiar.” While endemic disease was a constant health threat, the stability of its presence and its primary effect in childhood, where mortality was higher, gave the illusion of it being more manageable. When a smallpox outbreak came on suddenly and affected the adult population as well as children, it was much more alarming. The colonial experience of epidemic smallpox was very different from what their forebears had experienced in England. In an epidemic, there was a greater psychological burden and economic impact when the adult workforce was affected, as opposed to an endemic disease that affected either the very young or the very old, groups that had naturally higher mortality rates.

Unfortunately, in the American colonies, the population was generally younger and those born in the American colonies had, at least initially, little or no exposure to the disease. Once reintroduced into a colony, such as Boston, it would quickly spread among the younger generations and develop into an epidemic. America’s physical isolation from Europe not only allowed for generations to be born without exposure to the disease, but created scenarios where travelers and ships could arrive and reintroduce smallpox to a large group of susceptible people. Between 1636 and 1698, Boston experienced six major outbreaks of smallpox. These outbreaks occurred roughly every ten years and would devastate the community as a large portion of the younger adult population would be susceptible to each appearance of the disease.

The Massachusetts Colony experienced an especially severe, outbreak of smallpox in 1677. The disease spread quickly, and it has been estimated that perhaps ten percent of the population died as a result. Colonial records indicate that somewhere between 500 and 800

20 Silva, Miraculous Plagues, 115.
21 Silva, Miraculous Plagues, 103.
22 Hopkins, Princes and Peasants, 237.
people (out of a population that was then not quite 6000 people) perished in that single epidemic. The small and isolated Massachusetts Colony had neither the means nor any conceptual approach for combating this initial smallpox epidemic. Early responses involved improved public sanitation efforts, such as regulations regarding how to dispose of waste, as well as quarantine measures for those found to be infected. After an earlier outbreak in 1647, the Boston authorities ordered ships carrying sick passengers to be quarantined in the harbor. Only once the cargo and ship were cleaned and all passengers declared well were they allowed into Boston. However, this maritime quarantine proved difficult to enforce as it relied upon ship captains to honestly report illness present aboard their vessels. Quarantine measures were not limited solely to ships. The entire community could be put under quarantine as well if it was deemed necessary.

Massachusetts Bay ordered the first quarantine of its own citizens in 1678 in an effort to limit the spread of smallpox to other communities(223,687),(844,710). These initial efforts to limit the spread of disease through localized quarantine measures proved largely effective and in early eighteenth century, Boston tried to extend quarantine regulations. Not long before the 1721 epidemic, in an attempt to limit potential plague outbreaks brought from Europe, Boston passed a law that required ships from certain areas to be quarantined at Spectacle Island. Located four miles off shore from Boston, Spectacle Island was home to a “pest house” that was built there to house the

26 Hopkins, Princes and Peasants, 239.
potentially contagious who arrived on ships and who could not be brought into the city for fear of contamination. However, even these cautionary measures were not always enough to prevent disease from entering the city.

In April 1721, smallpox arrived in Boston on a ship, the *HMS Seahorse*, which was returning from a voyage to the West Indies and carrying ill crew members. Due to the ship’s connection with the Royal Navy, it was not immediately subject to inspection upon arrival. Despite the fact that he had several crew members who were very sick, the ship’s captain, Thomas Durrell, opted to dock at Castle Island, citing the need for repairs. This decision allowed the *Seahorse* to bypass the remote Spectacle Island where the ship and its potentially contagious crew would have been quarantined. While the sick crew members remained below deck and unreported, the rest of the crew disembarked into Boston. Sometime after docking, a slave of one of the crew members was found ill with smallpox and quarantined. However, this discovery was too late. The ship’s crew had been roaming freely around town for several weeks while the disease spread. The Report of the Commissioners of the City of Boston noted the discovery of the illness onboard in their meeting notes from May 12, 1721, “Whereas his Majesties Ship Seahorse, Cap Thomas Durrell Comander, now lyeth in the Harbor of Boston. Infected with the Small pox, the greatest part of his Company are now on a Cruse, Sundry others Sick on Shore So that there is not above Ten or fifteen Effective men on Board.” Within a week of this report, Boston authorities had the city streets cleaned in an attempt to prevent the disease from spreading further. It was believed that these sanitation efforts would reduce the contagion.

32 Records Commissioners, *Report*, 13, 82.
However, within a week, different sections of town began to report cases of smallpox, making it difficult to quarantine any specific section to limit the spread of infection. Smallpox quickly spread throughout Boston and its effects were devastating to a community where so many were susceptible. In an effort to mitigate the damage of the disease, a minister, Cotton Mather, made a unique and controversial suggestion. He argued inoculation, a practice with which Bostonians were not familiar, should be used to confer immunity on those who not been exposed to diseases during previous epidemics.

Mather was born February 12, 1663 to a family of prominent church figures and attended Harvard at a young age. Mather elected to study to become a preacher, but struggled with a stammer that threatened his career. While working to overcome his speech impediment, he also studied medicine in the event that he needed to pursue an alternate route. Eventually, Mather overcame his stammer and grew to be a popular minister in the community. He rose in the Boston community into a position of significant moral authority, and so was consulted during the Salem witch trials and was asked his opinion regarding demonic possession. While Mather had he did not personally condemn anyone to death, he also did not speak out against the superstition and cruelty that characterized the trials. His participation in those trials would later diminish his standing in the community and tarnish his legacy in history.

By 1721, Mather’s reputation was greatly reduced due to his role in the witch trials and he had lost his high standing in the community. The backlash from the witch trials and Mather’s refusal to admit to his mistakes cost him his role as president at Harvard, a role his

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34 Williams, *The Pox and the Covenant*, 35.
35 Coss, *The Fever of 1721*, 42.
36 Coss, *The Fever of 1721*, 43.
father had once held. Saving Boston from the plague of smallpox was Mather’s chance at redemption and his way to secure his position of authority and leadership in the community. He turned his attention to science and set his sights on becoming one of the few American members of the prestigious Royal Society. In the years leading up to the smallpox epidemic, Mather was a prolific writer and submitted many scientific articles for consideration by the Royal Society of London.

The Royal Society was, and remains into the present day, a prestigious scientific community established in England and granted a royal charter by King Charles II in 1662. Their supplemental charter proclaims its preeminent role in England’s scientific community, “We have long and fully resolved with Ourself to extend not only the boundaries of the Empire, but also the very arts and sciences. Therefore We look with favour upon all forms of learned, but with particular grace We encourage philosophical studies, especially those which by actual experiments attempt either to shape out a new philosophy or to perfect the old.” The Society had many famous and historically notable members including Edmond Halley and Isaac Newton. Being accepted as a member was a great honor, and very few Americans in the colonies had achieved such recognition. However, in 1713, Cotton Mather was accepted as a member of the Royal Society.

Mather saw his role as a minister and as a scientist as interconnected, and that his duties as a minister encompassed guiding the community on medical matters as well. In Mather’s

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37 Coss, *The Fever of 1721*, 43.
38 Coss, *The Fever of 1721*, 73.
40 Coss, *The Fever of 1721*, 44.
41 Silva, *Miraculous Plagues*, 156.
view, a person’s spiritual wellness as connected to their physical well-being. In his work, *Angel of Bethesda*, a large scientific treatise that documented medical knowledge of the time, he discusses the moral lessons to be derived from suffering from smallpox. “Sentiments of PIETY to be raised in and from this grievous disease.” His position as a church minister gave him the responsibility to attend to the spiritual health of the town, and in the view of Mather and his Puritan parishioners, physical health was intertwined with spiritual health. In his diary during the epidemic, dated July, 10, 1721, Mather refers to the community as “the Flock” and conveys his feelings of personal responsibility towards them in finding a solution to end the suffering due to smallpox. He wrote, “The various Distresses come upon the Flock, in the grievous Disease now beginning to distress the Town, must be suitably considered by me; my Prayers and Sermons must be adapted unto their Condition.” While he vacillates between frustration when his ideas are not accepted and excitement when he is proven right, Mather’s diary shows a man who seeks to “do good” in his community. Mather’s interest in medicine, along with his position in the ministry, uniquely positioned him for the debate that would occur during this particular epidemic.

Both Mather and his father, Increase, were intellectuals, and their understanding and acceptance of new scientific advances being made in Europe put them at the forefront of the intellectual community in America. Both Cotton Mather and Increase Mather were heavily influenced by the ideas coming out of the intellectual movement at the time in Europe, which is

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45 Cotton Mather. *Diary of Cotton Mather*, 2, 635.
46 Williams, *The Pox and the Covenant*, 38.
now referred to as “The Enlightenment”. Cotton Mather’s study of science and the natural world continued after he left Harvard and he favored interpreting his observations of the natural world in a manner that aligned with his religious beliefs. The Enlightenment and its foremost thinkers, such as John Locke, proposed the social contract theory, which stated that people should forego certain freedoms and adjust their morals so that they might live with others in a civil society. Wendy Parmet observes how this Enlightenment idea is applicable to public safety during an epidemic, “In other words, protection of public safety, which presumably included safety from deadly epidemics, was the highest good. Indeed, its attainment was the rationale for civil society.” These ideas about public health and social contracts from the Enlightenment may have influenced Mather’s quest to seek a better way to address smallpox and quell the sporadic epidemics. Mather saw both science and the social contract in terms of a divine plan. God wanted humans to discover His creation through science, as those discoveries were another way to glorify God.

When the smallpox epidemic hit Boston in April of 1721, Cotton Mather was among those community leaders who were initially concerned with finding a way to protect themselves and their loved ones. One month after the epidemic began, a concerned Mather wrote in his diary, “I have two Children that are liable to the Distemper; and I am at a Loss about their flying and keeping out of the Town. As I must cry to Heaven for Direction about it, so I am on this Occasion called unto Sacrifices; that if these dear Children must lose their Lives, the will of my

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47 Williams, *The Pox and the Covenant*, 38.
51 Williams, *The Pox and the Covenant*, 39.
Father may be duly submitted to.” When Mather discussed the epidemic with his slave, Onesimus, he learned that when Onesimus had lived in Africa, he had been “given” smallpox on purpose. This resulted in a milder case of the disease and bestowed the same immunity as if he had caught it the natural way. Onesimus’ account of his experience with smallpox recalled for Mather similar measures he had previously read about.

Years earlier, he had acquired a copy of The Philosophical Transactions’ 1716 publication that included Timonius’ “An Account, or History, of the Procuring the Small Pox by Incision, or Inoculation; as It Has for Some Time Been Pratised at Constantinople.” Timonius was an Italian physician who had been living in Constantinople in 1706 and had been able to witness inoculation during a smallpox epidemic that year. In late 1713, Timonius published his account. In his account, Timonius described the process of inoculation and provided evidence to suggest that it had a positive impact. His account described the illness of children who underwent inoculation compared to those who were infected the natural way. He observed, “The Small-Pox begins to appear sooner in some than in others, in some with greater, in others with lesser Symptoms; but with happy success in all.” Timonius’ detailed account described how inoculation should be performed on the patient and assured the reader that this technique not only had been successfully performed “thousands” of times but also that this had been going on for years in various parts of the world. Timonious assured readers that, “the practice of procuring the Small Pox by a sort of Inoculation, has been introduced among the Constantinopolitans by the Circastans, and Georgians and other Asiaticks for about Forty Years.”

52 Mather, Diary of Cotton Mather, 2, 621.
53 Hopkins, Princes and Peasants, 46.
54 Timonius, Emanuel. “Procuring the Small Pox by Incision, or Inoculation; as It Has for Some Time Been Practised at Constantinople.” Transactions of the Royal Society 29 (1714), 74.
55 Timonius, “Procuring the Small Pox by Incision, or Inoculation,” 72.
bolstered by Onesimus’ personal history, led Mather’s to conclude that inoculation would effectively combat the terrifying epidemic that Boston was facing.

Upon the outbreak of smallpox in Boston, Mather wrote in his diary of his intentions to advocate for the practice of inoculation. “The grievous Calamity of the Small-Pox has now entered the Town. The Practice of conveying and suffering the Small-Pox by Inoculation, has never been used in America, nor indeed in our Nation. But how many Lives might be saved by it, if it were practiced? I will procure a consult of our Physicians, and lay the matter before them.”56 However, the search for a physician who would assist him was not easy and local doctors mostly ignored his requests. Only one locally trained physician, Zabdiel Boylston, agreed to aid in performing inoculations. Mather and Boylston began their own investigation into the effectiveness of inoculation. Their experiments would become America’s first foray into preventative medicine and spark debates surrounding public health and individual rights that would continue for centuries.

The debate in the American colony was not the only conversation about inoculation that was taking place in the eighteenth century. Despite the distance between America and Europe, there was an exchange of scientific information and opinion through this period. Mather both followed the publication of the Royal Society and contributed articles to it in the years prior to the outbreak of smallpox. Mather had first learned of inoculation from a Royal Society publication. Later, the Society would publish the results of Mather’s experiments with Boylston. Their data would become crucial evidence in the case being made for inoculation in Europe. While the colonial had experienced much more devastating epidemics of smallpox than Europe had during this period, Europe been weighing the benefits and risks of inoculation as well. These

56 Mather, *Diary of Cotton Mather*, 2, 621.
initial conversations about smallpox inoculation, specifically that in Massachusetts and in England, were critical in the eventual eradication of the disease. The acceptance of inoculation as a beneficial medical practice would lead to the development of a more refined variation of the inoculate - the vaccine that would ultimately prevent smallpox.

European society had learned of inoculation around the same time as Mather and there were those who had begun to advocate for its use even prior to Mather’s findings. After surviving smallpox in 1717, Lady Mary Wortley Montagu was burdened by significant facial scarring and began her own inquiry into the disease, despite her lack of medical training.57 Her brother had died of smallpox not long before she fell ill and Lady Montagu wanted to spare others from similar suffering. Her husband had been appointed as Britain’s ambassador to Turkey, and it was during his assignment in Turkey that she became familiar with inoculation.58 After personally witnessing the positive effects of inoculation on others, Lady Montagu had her five-year-old son inoculated in Constantinople.59 In April 1721, at almost the same time smallpox the epidemic began in Boston, Lady Montagu returned to Britain from Turkey and inoculated her young daughter. This was the first professional inoculation performed in England.60

Lady Montagu began to advocate for inoculation in England and the procedure gained the interest of the British royal family.61 In August 1721, to test the procedure, six prisoners in Newgate, a famous prison, were inoculated as a trial. The prisoners agreed to participate in the inoculation trial as they were promised that they would be released from prison if they survived.

57 Hopkins, Princes and Peasants, 47.
58 Hopkins, Princes and Peasants, 47.
59 Hopkins, Princes and Peasants, 48.
60 Hopkins, Princes and Peasants, 48.
61 Hopkins, Princes and Peasants, 49.
Their recovery was noted by the king’s physicians and the royal family had their own children inoculated in April of 1722. This inoculation of the royal family was the first step in England’s eventual acceptance of inoculation as a legitimate medical procedure. However, England, like other countries and the American colonies, continued to struggle with the potential problems from intentional infection.

England struggled with religious objections as well. In a sermon given on July 8, 1722 entitled *A Sermon Against the Sinful Practice of Inoculation*, the English preacher Reverend Edmund Massey compared the outbreak of smallpox to the trials suffered by Job and cites one particular passage from the book of Job which seems to describe clearly one affected with smallpox. “So went Satan forth from the Presence of the Lord, and smote Job with sore Boils, from the sole of his Foot unto his Crown.” Applying this Biblical reference to smallpox, Massey advised his congregation, “Let us then accompany him in the first Place, in finding out the Cases why Diseases are sent amongst Mankind. I take them to be principally two: Either for the Trial of our Faith, or for the Punishment of our Sins.” Massey believed that inoculation was man’s attempt to interfere with God’s plans. To fight disease was an attempt to avoid God’s punishment. Massey advised his congregation to consult the Bible on the matter of inoculation and warned, “Remembering then our Text, I shall not scruple to call that a Diabolical Operation, which usurps an Authority founded neither in the Laws of Nature or Religion, which tends in this Case to anticipate and banish Providence out of the World.” Many believed that God sent

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64 Job 2:7 as cited in Edmund Masey, “A Sermon against the dangerous and sinful practice of Inoculation.” Sermon. St. Andrew’s Holborn, July 8, 1722, 8.
http://quod.lib.umich.edu/e/evans/N02782.0001.001/1:2?rgn=div1;view=fulltext
65 Massey, “A Sermon against the dangerous and sinful practice of Inoculation,” 10.
66 Massey, “A Sermon against the dangerous and sinful practice of Inoculation,” 17.
disease to punish people for sin. According to Massey’s message, inoculation would interfere with God’s plan by disrupting the work of smallpox. These religious ideas about the purpose of disease conflicted with inoculation that would seemingly spare people from the wrath of God. To convince others of the benefits of inoculation, the debate would have to address not only public health concerns, but religious and moral ones as well.

Boylston and Mather were determined to show that inoculation was the best way to fight smallpox, but before they could combat moral objections, they needed examples of effective inoculations in the community. While performing inoculations, they collected empirical data to support their case. They shared their findings with the Royal Society and their experiment inspired others in Europe to do similar research.

In 1722, the British physician named Thomas Nettleton gathered statistics on the smallpox epidemic in Yorkshire. Nettleton made note of the mortality rates of those inoculated versus those who had naturally acquired the disease.\(^\text{67}\) Nettleton’s report was published in the Royal Society of London’s *Philosophical Transactions* and its secretary, James Jurin, who took an interest in Nettleton’s findings on inoculation, began requesting other physicians send their data to compile a more comprehensive picture of the success rate of smallpox.\(^\text{68}\)

Jurin compiled this data in *A Letter to the Learned Dr. Caleb Cotesworth, F.R.S. of the Collect of Physicians*, where he not only noted the data from English physicians but also included statistics from Cotton Mather and Zabdiel Boylston’s 1721 experiment. To create his report and substantiate his findings, Jurin went back twenty years to collect death statistics. From his data set and observations, Jurin concluded, “That of Persons inoculated with the same


\(^{68}\) Finger, *Doctor Franklin’s Medicine*, 57.
Caution in the choice of Subjects, as had been used by the several Operators one with another, here in England, (if we allow in the two disputed Cases abovemention’d, that the Persons died of the inoculated Small Pox) there will die one in ninety one.”⁶⁹ The debate over inoculation brought new attention to causes of death that people did not previously record. A need for empirical data to support their case in the debate made the figures surrounding small-pox crucial: never before had public health statistics been kept this way.⁷⁰ In his article, “Edward Jenner and the History of Smallpox and Vaccination,” Stefan Riedel observes, “The rapid adoption of variolation in Europe can be directly traced to the efforts of Cotton Mather during the Boston smallpox epidemic in 1721. Although many British physicians remained skeptical even after Mather’s success, the data he had published were eventually influential. Variolation was subsequently adopted in England and spread from there throughout Western Europe.”⁷¹

Through conquest and global interactions, smallpox was introduced to new parts of the world, creating different outcomes and effects on various societies. However, with the increased spread of information and conversations between countries, there began a global conversation about how to address this major health concern. This debate would become most contentious in the American colonies. The concerns and ideas from the Boston inoculation debate would follow into the Revolution and shape the conversation about public health in the new nation.

Chapter Two

⁶⁹ James, “A Letter to the Learned Dr. Caleb Cotes-Worth,” Philosophical Transactions (1683-1775), 214.
⁷⁰ Finger, Doctor Franklin’s Medicine, 56.
The idea that disease was a punishment for sin sent by an angry God made sense to the Puritan residents of Boston at the beginning of the eighteenth century. The American colonies were societies dominated by religious thought, with only scant scientific knowledge of understanding disease. People of that time were fighting an invisible, unknown enemy and concluded therefore, that this enemy must have been sent from an invisible, all-powerful God. Seventeenth century responses to physical disease and epidemics emphasized traditional spiritual practices such as fasting and prayer as penance for sin in attempts to appease the irate deity.

When multiple cases of smallpox suddenly broke out in Boston in 1721, Governor Shute announced a “day of humiliation” that involved fasting and prayer to seek God’s forgiveness for transgressions that might have brought the disease. In his diary, Cotton Mather records that he preached to his congregation “for the Advancement of that PIETY, to which the Judgments of GOD should awaken them.” Even though Cotton Mather intended to advocate for inoculation in order to mitigate the effects of the epidemic on the community, he still believed that God had intended to teach its citizens a lesson by bringing the disease. Later, these notions about God’s intentions for the community and His part in bringing disease would be a focal point of the dialogue around inoculation.

Fasting and praying failed, of course, to cure or stop the spread of the epidemic. As a first public health measure, Boston authorities attempted to confine the sick and tried other ineffectual medical treatments. The Puritans were aware of writings of the ancient Greeks, and in particular, Hippocrates’ ideas about the origins and treatment of disease. Unfortunately, many of these ideas were inapplicable to the treatment of smallpox, but there was no clear scientific path, and so

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some doctors treated patients by bleeding them with leeches or inducing vomiting. In *Angel of Bethesda*, Mather can be seen citing the Greek medical texts in his description of inoculation, “The Greek Operatrix, prick’d more Places, and less Fleshy Ones, than Pylarinus approved of.” Mather incorporates these ancient medical practices into his work as they remained a significant part of medical thought at the time. If these treatments did not kill the patient, they did little more than other homeopathic herbal treatments.

This reliance on prayer, leeches, and herbs, makes it is clear that, as a general matter, the Puritan colonists of Massachusetts continued to subscribed to ancient theories about disease. European society was on the brink of scientific breakthrough in understanding disease, but the science was only developing at that time. Aton van Leeuwenhoek’s use of the microscope to detect microscopic organisms and the subsequent development of what he described as “animalcular theory” of disease had been published in 1673 by the Royal Society, but scientists still struggled with how to apply these findings to the disease of smallpox.

Based on what he had read in the Royal Society’s journals, and what he had learned of Onesimus’ own experience, Mather was convinced that inoculation would prevent many deaths from smallpox, and so he attempted to persuade the medical community in Boston on the merits of the procedure. Initially, Mather’s ideas were largely ignored by doctors, who were horrified at the thought of purposefully infecting a healthy person with a potentially fatal or disfiguring disease. In *The Angel of Bethesda*, Mather documented his struggle to find a doctor to help him and support the method of inoculation.

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“About the Month of May, 1721, the Small-Pox being admitted into the
City of Boston, I proposed unto the Physicians of the Town the unfailing
Method of preventing Death, and many other grievous miseries, from a
tremendous Distemper, by Receiving and Managing the Small-Pox, in the
Way of Inoculation. One of the Physicians had the Courage to begin the
Practice upon his own Children and Servants; And another Expressed his
Good Will unto it. But the rest of the Practitioners treated the Proposal with
an incivility and an Inhumanity not well to be accounted for.”

By June, Mather was determined to obtain assistance from a physician in his quest to test the
effects of inoculation. He sent letters to the town’s doctors, along with a summary of the
accounts of Timonius and Pylarinus from the Royal Transactions. His entreaties were ignored by
all except one doctor.

After reading Mather’s letter and the accompanying documents Mather, physician
Zabdiel Boylston agreed to assist in evaluating the merits of inoculation. Boylston was born in
1670 and his father was an apothecary and physician. Boylston did not receive formal medical
training in Europe. Instead, after the death of his father, Boylston apprenticed under John Cutler
who was regarded as one of the best surgeons in Boston. Boylston was the ideal recipient of
Mather’s letter because he was already well known in the Boston community for his willingness
to attempt new and risky surgeries. Prior to the outbreak of smallpox, Boylston had successfully
performed advanced procedures, such as a mastectomy and the removal of a bladder stone.

Like Mather, Boylston had survived a previous epidemic, but now his children were at
risk for contagion. Boylston chose to start the inoculation experiments with his own family. He
first inoculated his young son and two of his slaves to see if inoculation would produce more

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6 Mather, Angel of Bethesda, 113.
8 Williams, The Pox and the Covenant, 73.
9 Williams, The Pox and the Covenant, 73.
positive results than catching small-pox the natural way. Boylston reported that “a kind and favorable Small-Pox came out, of about a hundred a piece; after which their Circumstances became easy, our Trouble was over, and they soon were well. [...] It was plain and easy to see (even in two), with Pleasure, the difference between having the Small-Pox this way, and that of having it in the natural way.” After seeing first-hand the promising effects of inoculation, Boylston began to inoculate others in the community and kept detailed records of the experiences of those he inoculated.

Boylston’s records show the disparity in outcome between those that he inoculated and those he observed who contracted smallpox naturally. During his experiments, Boylston’s records indicate that he inoculated 282 people, only six of whom died from smallpox. He observes that 5,759 people in the town contracted the disease naturally, and of that group, 884 died. Through careful collection of data, Boylston was able to prove from his experiment that inoculation was safer than naturally acquiring smallpox from unintended transmission. However, not everyone felt that the results proved conclusively that inoculation should be put into practice. In his essay, “A Dissertation concerning inoculation of the small-pox”, William Douglass argued that the statistics presented by Boylston, “misrepresents the case very much: the true numbers, as I had them from Mr. Salterwere out of 5989, died 844 [...] which is something less than 1 in 7 or 14 per cent.” While Douglass attempted to make the point that there were some who did die from inoculation, the figures that Douglass reports still show the obvious benefits of inoculation.

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Even taking into account Douglass’ revised figures, roughly two percent of people died from smallpox when inoculated versus the fourteen percent that passed away from contracting the virus naturally.

Boylston’s detailed record of those he inoculated not only provides valuable statistical data to support his claim that those inoculated had a better survival rate: it is also an early case of tracking patient information to aid medical advancement, where previously there had been no such system. Until Boylston’s experiment with the effects of inoculation, Boston had not kept detailed records about deaths in the community. The cause of death of individuals was not noted in any public record, so there was no way to track whether the number of deaths in a given year was higher or lower than average. Additionally, previous records had no way to indicate whether a particular demographics’ mortality rate was affected. As Blake stated in *Public Health in the Town of Boston*, “The fact that deaths were not differentiated by cause, sex, or age -- though they were by race -- indicates how little real interest existed in using the data for the study of disease. Significantly, the one notable exception was the collection and use of smallpox statistics for testing the value of inoculation.” Boylston’s account of inoculations described how he tested the procedure on a wide demographic and provided detailed records of how the patients reacted to give a more accurate picture of the effects of inoculation. While testing the effectiveness of inoculation, Boylston changed how medical and patient data was recorded. To prove that inoculation was the best choice, Boylston had to carefully document those he treated and observed with an attention to detail that was not used before. “The question of whether inoculation was worth the risk, at least to the individual, began to be assessed statistically soon

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after the procedure made its debut in Boston.”16 The large sample and demographic information documented in the records demonstrated that those who underwent the procedure had a lower mortality rate, proving that inoculation could be successful if implemented in the general population.

After Boylston began to inoculate, word of his experiments spread terror throughout Boston. At first, people were terrified to learn that their peers were being actively infected with a highly contagious disease. Almost immediately, there was a public uproar as the populace reacted negatively and uneasily to this unfamiliar course of action. Cotton Mather commented in his diary that news of the inoculations, “raised an horrid Clamour”.17

Despite the statistical evidence that Boylston collected and that documented the success with inoculation, Boylston and Mather’s experiment met with harsh opposition from the Boston medical community and its only European-trained physician, William Douglass. Douglass had contempt for Mather because he felt that Mather had inappropriately inserted himself in the medical field. In Douglass’ view, Mather was wholly unqualified to give medical opinions. In his essay, “Inoculation of the small pox as practised in Boston”, Douglass admonished Mather and other the ministers for expressing their opinions on medical treatment when they were not medically trained. He wrote, “By the Indulgence of our Charter, the Ministers of all sorts are left sui juris, which may be the natural cause why some of them, abusing this Priviledge, do meddle in Matters not in the least appertaining to them.”18

16 Stanley Finger, *Dr. Franklin’s Medicine*, (University of Pennsylvania Press, 2006), 56.
Douglass feared that inoculation would cause smallpox to spread further because those who received the procedure were not be quarantined. He reasoned that those individuals who had been inoculated were infected, even with a milder form of the disease, and therefore were still capable of transmitting it to others. Even if they had contracted a mild form, there was no guarantee that whoever caught it from them would equally lucky to contract a benign case. Douglass, who had received formal medical training in England, was something of an outlier in the colonial Boston medical community. Most Boston physicians, like Boylston, had less formal medical education than Douglass and had been trained through apprenticeships. Mather, who had only studied medicine through reading publications about medical research and techniques was no less knowledgeable on many medical issues than many of the physicians practicing in Boston at the time, but lacked the formal training of which Douglass boasted.19

However, as Stephen Coss points out in his book *The Fever of 1721*, Douglass was every bit as disdainful of his fellow Boston doctors as he was of Mather and Boylston.20 Coss describes Douglass as, “privately contemptuous of all his colleagues, chiefly (though not solely) because they had been educated through an apprenticeship system and lacked the benefit of his medical education.”21 Douglass felt that his formal education in Europe, especially his training under the famous Dr. Sydenham, made him the natural leader in Boston’s medical community. Douglass’ mentor, Dr. Sydenham was renowned for pioneering the idea that there existed different diseases and rather than a single “illness” that manifested itself in different ways.22 Douglass’ formal training, along with his connection to a prestigious mentor, led him to have disdain for the

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19 Williams, *The Pox and the Covenant*, 35.
20 Coss, *Fever of 1721*, 106.
21 Coss, *Fever of 1721*, 106.
opinions of his medical colleagues who had been trained informally in the American colonies, where there were no formal medical schools at the time.23

In “A Dissertation Concerning Inoculation of the Small-Pox,” Douglass discounts Timonious’ report that inoculation has been used effectively to control smallpox in other parts of the world. Douglass suggests instead that these cultures used inoculation for far less socially acceptable purposes, and one would not want to follow their example. “The Circassians living between the Euxine and Caspian Seas, time out mind, have carried on a considerable Trade with Turkey and Persia, in Selling their own Children, or young Slaves taken by Incursions from their Neighbors.”24 Douglass accused these cultures of developing the method of inoculation to ensure that their young women remained beautiful in order to sell them at a higher price. “So that the first Intention of Inoculation was not the Saving of Life, but as a more ready way of procuring the Small-pox, than by accidental infection; that they might know what Beauties were proof and would answer the charge of being carried to market.”25 Douglass had criticized Mather as a preacher attempting to practice medicine without appropriate training; and yet, he was questioning the morality of the technique Mather had been championing by claiming that those who used inoculation in other parts of the world did so only to profit from the sale of their female children or slaves, rather than to attempt to improve the health of the community.

Douglass also warned that the practice of inoculation actually increased the danger of epidemic by creating the additional risk that those who were treated with inoculation would spread smallpox naturally to others. “To force the spreading of infection by an unbounded inoculation is a hardship upon Mankind, to oblige them to quit their business with their

23 Coss, Fever of 1721, 106.
24 Douglass, A Dissertation Concerning Inoculation of the Small-Pox (Boston: 1730), 1.
25 Douglass, A Dissertation Concerning Inoculation of the Small-Pox, 1.
habitations; means used to save my own life, ought not to endanger my Neighbours.”

Ironically, Douglass would later become a proponent of inoculation. However, the latter of his two initial objections to the procedure of inoculation – that it presented added risk of spreading the infection – would continue on even after Douglass himself had changed his opinion. In his writings, Douglass expressed a strong fear that those who were inoculated and were not adequately monitored and rejoined the community while they still remained contagious. Strict quarantine was recognized by medical experts of the time as the most effective means of limiting a smallpox epidemic, and any new approach that might undermine quarantine posed a serious health risk. In addition, there was no clear evidence at the time that inoculation would necessarily mean that subsequent naturally acquired infection from contact with that person would not be fatal.

Although the controversy in Boston over inoculation often invoked Biblical references, religious objections were not the only, nor necessarily the most divisive arguments in the debate. John Blake commented that, “[t]he religious question, though significant, should not be overemphasized. While much of the argument was couched in religious terms, the real dividing point was medical.” The debate about inoculation during the Boston epidemic of 1721 involved questions of the medical effectiveness of this new procedure. This was the question about the balance of rights between the individual citizen seeking healthcare and the interests of the community in which that person resided. The specific question raised in this instance was whether an individual could choose to undergo an experimental treatment to protect himself/herself against a potentially fatal disease, if that treatment might put others at risk and perhaps endanger the community as a whole.

26 Douglass, A Dissertation Concerning Inoculation of the Small-Pox, 20.
In his work, *Miraculous Plagues*, Cristobal Silva observes, “This is perhaps the distinction between illness and epidemic: as illnesses act on individuals, so epidemics act on communities. Ultimately, the concept of herd immunity suggests that to speak of immunity is to consider the dynamic relation between personal and communal bodies -- a relation that, if not particular to seventeenth-century New England Puritans, is certainly central to the tensions at the heart of Puritan rhetoric.” While an individual clearly has the right to seek treatment for an individual ailment, an epidemic involved risk to an entire community. Infectious, deadly diseases, like smallpox, are not limited to the individual, but a threat to the greater community. And, in the case of inoculation, the individual being inoculated was not seeking to avoid the disease entirely; rather, that individual was actually attempting to contract the disease in a lesser form so as to prevent contracting the more virulent form. And this potentially posed the risk of creating a smallpox epidemic. When this is considered, it becomes clear that Douglass’ objections were not simply medical; they were also political in that they questioned the right of the individual to consider his own health only, and not the health of others in his community. “To force the spreading of infection by an unbounded inoculation is a hardship upon Mankind,” Douglass wrote in *A Dissertation Concerning Inoculation of the Small-Pox*, “to oblige them to quit their business with their habitations; means used to save my own life, ought not to endanger my Neighbours.” Douglass was aware of this conflict between choices of an individual and an individual’s potential effect on the greater community.

Inoculation also raised socio-economic questions about the availability of health care to the entire community. Even as inoculation became more generally accepted by communities, it remained a complicated social issue because it raised questions of the basic equity of health care.

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The cost of being inoculated by a trained physician could be very high, especially in the face of an impending epidemic, and those who were inoculated usually had to be quarantined for weeks while they were ill. Not everyone in the community could afford to pay for the procedure, or to take weeks away from work or their families to go through the recovery process. Trained physicians and the hospitals who could administer inoculation charged for the service. By 1788, an inoculation hospital run by Dr. Aspinwall in Massachusetts charged eight dollars for inoculation.\textsuperscript{30} The wealthier citizens could afford to have their families inoculated, which prompted fear by those less fortunate that the recently inoculated could infect their families the natural way and begin another epidemic.\textsuperscript{31} The result was that often members of the lower economic classes tended to be more strongly opposed to inoculation as it was a measure that was not only inaccessible but also potentially put them at risk. In 1764, Boston’s initiative to inoculate the poor was the first public health response for lower classes in North America.\textsuperscript{32}

The introduction of inoculation to the American colonies during the Boston epidemic of 1721, and the substantial proof of its effectiveness in limiting that epidemic, did not, however, end the debate surrounding the practice. As John Blake has commented, the debate surrounding inoculation had raised important social issues about public health and the community’s response to infectious disease.\textsuperscript{33} While the epidemic of 1721 provided evidence of the relative effectiveness of inoculation in protecting the individual, it had proved inconclusive to the various questions regarding the larger community interests. Blake observed, “Some just method of reconciling this conflict was needed, and the experience of 1721 had failed to provide an

\textsuperscript{30} Hopkins, \textit{Princes and Peasants}, 256.
\textsuperscript{31} Blake, \textit{Public Health in the Town of Boston}, 106.
\textsuperscript{32} Hopkins, \textit{Princes and Peasants}, 256.
\textsuperscript{33} John B. Blake, “Smallpox Inoculation in Colonial Boston,” 286.
answer.” So even after the 1721 epidemic had been quelled and inoculation was shown to be effective, the town of Boston continued to struggle with acceptance of the practice.

The next epidemic, in 1729, in March, Boston held another town meeting attempting to address the continued practice of inoculation and to establish regulations to ensure “[t]hat all proper care be taken that such persons as shall for the Future be inoculated for the smallpox do immediately keep in their Houses.” The record goes on to require citizen to report if they are undergoing inoculation so the town’s authorities could monitor them, “First giving notice to the Neighbourhood of such their designs. And that during the operation of the distemper all proper methods be taken to prevent its spreading.” No clear result was reached. Inoculation would later be legally prohibited for a time, but the prohibition was not enforced strictly, and public records show that many persons were inoculated despite the legal prohibition. There continued to be ambivalence surrounding its use in the Massachusetts colony for the remainder of the eighteenth century.

These debates around inoculation spread to other parts of the American colonies as physicians in those regions learned about the procedure, and began to administer inoculation to their patients. Inoculation was outlawed in some regions, but and permitted in others. By the time the American Revolution began in 1775, there was still no consensus in the American regarding the use of inoculation. It would be George Washington, who was legendarily “first” in the American republic in so many other ways, who would become America’s leader in the

35 Records Commissioners, A Report of the Record Commissioners of the city of Boston, 12, (Boston, Massachusetts: Rockwell and Churchill, 1876), 15.
https://archive.org/stream/reportofrecordco12bost_0#page/14/mode/2up
36 Records Commissioners, Report, 12, 15.
widespread acceptance of inoculation against smallpox. George Washington’s resolve to save the lives of his soldiers made inoculation America’s first military mandated public health measure.
Chapter Three

Neither the threat of smallpox, nor the inoculation controversy, ended with the passing of the 1721 epidemic and introduction of inoculation. Because of the demographics of the American colonies – small but growing populations, and sparsely settled towns that were receiving periodic influxes of new settlers, smallpox remained a looming threat. Initially, in some areas of the American colonies, inoculation to prevent smallpox was restricted, or was limited to situations where there had been an outbreak of natural smallpox in the community and there was the immediate threat of epidemic. However, the use of inoculation became increasingly more prevalent as its positive effects were noticed with each outbreak of smallpox.

The debate around inoculation after the 1721 epidemic not only continued in Massachusetts, but in fact spread to other parts of the American colonies. It would remain a contested public health issue for the remainder of the eighteenth century. In the years prior to the American Revolution, other prominent figures, such as John Adams and Benjamin Franklin, would join the conversation about how to address smallpox and whether to accept inoculation. Their opinions and the decision of George Washington during the American Revolution would set the stage for future public health policy in the new nation to address smallpox.

In colonial New England, the conflict between personal rights to take a preventative health measure through inoculation versus the right of society to protect against the risk of potentially spreading smallpox was never successfully resolved. Most New England states, including Massachusetts, at some point made inoculation illegal because of the fear of spreading smallpox. Despite this, many Bostonians elected to be inoculated in any case. Boston town records indicate that, by 1752, the instance of smallpox from inoculation, as opposed to natural contamination, had risen to twenty-eight percent of total cases, in comparison to only two
percent during the epidemic of 1721. While inoculation continued to be debated as a public health issue – and even eventually legally prohibited -- the evidence of the lower mortality rates for people who had been inoculated had overcome the fears and objections of many in the population.

A leading proponent for inoculation was John Adams, one of the founders of the American republic and its second President. In 1764, John Adams, a Boston resident, decided to undergo inoculation, despite it being illegal at the time. In a letter to his concerned wife, Abigail, he described meeting someone who had contracted smallpox the natural way and its horrific effects,

“They say he is no more like a Man than he is like an Hog or an Horse -- swelled to three times his size, black as bacon, blind as a stone. I had when I was first inoculated a great Curiosity to go and see him; but the Dr. said I had better not go out, and my Friends thought it would give me a disagreeable Turn. My Unkle brought up one Vinal who has just recoverd of it in the natural Way to see Us, and show Us. His face is torn all to Pieces, and is as rugged as Braintree Commons.”

John Adams’ confidence in inoculation may have been grounded in his family’s history. Zabdiel Boylston, Cotton Mather’s partner in advocacy for inoculation during the 1721 epidemic, was Adams’ great uncle. In her book, *Revolutionary Medicine*, Jeanne Abrams comments that, “Boylston’s support and earlier example undoubtedly played a part in [John Adams’] undergoing the still contested and potentially dangerous procedure.”

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1 Blake, *Public Health in the Town of Boston*, 113.
5 Abrams, *Revolutionary Medicine*, 122-123
Adam’s decision did not reflect public policy at the time. Inoculation was made illegal in Boston at the outbreak of the epidemic of 1764. Boston authorities decided, instead, to try to control the spread of the disease by implementing a quarantine system. Still, Boston remained divided between those who felt that inoculation provided important individual protection against smallpox, and those who saw inoculation as a threat of spreading smallpox within the community. The Selectmen’s minutes from January 1764 in the Report of the Record Commissioners notes this anxiety about the inoculated spreading smallpox to others. Discussing the growing number of families infected the report stated, “It might be at least check’d for some length of Time should our care be continued, otherwise Persons will immediately go into Inoculation and spread it all over the Town as soon as that Circumstance takes place.” But despite the legal ban on inoculation, many people decided to undergo the controversial procedure rather than risk naturally catching smallpox. Like Mather and his uncle, Zabdiel Boylston, John Adams had witnessed the devastating effects of the disease and determined that inoculation was the better option.

Even Adams’ advocacy for, and his own use of, inoculation did not end the debate in Massachusetts. In 1775, when smallpox again threatened to become an epidemic, Boston again voted in a town meeting to outlaw inoculation and “desired to see that the Law relative to the concealing & spreading of Infectious Distempers, be put into Execution against any Persons, who shall make Attempts of that Nature, by Inoculation, or in any other way.” People were fearful of the potential spread of smallpox and aware of the very real risk that those undergoing inoculated could spread it naturally to others.

6 Record Commissioners, Report, 20, 15.
7 Record Commissioners, Report, 18, 223-224.
John Adams was not the first of the Founding Fathers to recognize the potential benefits of inoculation. Benjamin Franklin, the famed American scientist, inventor and political leader living in Philadelphia, had learned of the use of inoculation during the Boston epidemic of 1721, and much earlier than Adams had taken up the cause of inoculation. Franklin’s enthusiasm for inoculation was, to a great degree, a function of his views of the proper role of government. In her book, *Revolutionary Medicine*, Jeanne Abrams writes of Franklin, “Early on, Franklin arrived at the firm conviction that government, whether municipal, state, or eventually, federal, had a pivotal role to play alongside concerned individual citizens in promoting health and reducing sickness and disease, a commitment he shared with all the founders in this study.”

Determined that government should participate in bettering public health, Franklin became active in not only promoting the use of inoculation, but making it more widely available for the general public.

Like Mather and Boylston, Benjamin Franklin understood what was at stake in the controversy from his personal encounter with smallpox. Unfortunately, Franklin had not had everyone in his own family inoculated, and his personal experience with smallpox had not ended happily. In 1736, his young son, Francis Folger Franklin, who was only four years old at the time died from smallpox, having acquired the disease naturally. Franklin never forgot this mistake. Almost fifty years later, while writing his autobiography, Benjamin Franklin expressed grief and enduring regret over his failure to inoculate, and perhaps, save his child,

“In 1736 I lost one of my sons, a fine boy of four years old, by the smallpox, taken in the common way. I long regretted bitterly, and still regret that I had not given it to him by inoculation. This I mention for the sake of parents who omit that operation, on the supposition that they should never

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forgive themselves if a child died under it, my example showing that the regret may be the same either way and that, therefore, the safer should be chosen.”

Franklin became an outspoken advocate of inoculation in the years that followed his son’s death. Like Mather, Franklin was a follower of the Enlightenment with an avid interest in the scientific advances of the time. He published a pamphlet in 1759 in support of inoculation that documented the steps of the procedure. But inoculation was an expensive procedure that many poor people in Philadelphia could not afford. Those who could not hire a physician remained at risk for natural exposure. So, being aware of the considerable cost of inoculation and the inequity of making it available only to the better-off in society, Franklin also participated in raising funds to provide inoculation for poor children in Philadelphia.

Inoculation was introduced in Philadelphia during an epidemic in 1730, and its use in the city did not cause the same uproar that it had in Boston. In contrast to Boston’s doctors, Philadelphia’s medical community was almost immediately receptive to the idea of inoculation. Hopkins credits Philadelphia’s acceptance of inoculation to the city’s European-trained medical leaders, and postulates that their more extensive education possibly made them more open to medical innovation. Certainly, the citizens of Philadelphia were no less afraid of smallpox than colonists in Boston. But while the Boston medical community insisted on adhering to the established quarantine system, the Philadelphia medical community welcomed the larger benefits in inoculation.

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10 Benjamin Franklin quoted in Markel, Howard, M.D. “Life, Liberty, and the Pursuit of Vaccines.”
11 Abrams, Revolutionary Medicine, 79.
12 Abrams, Revolutionary Medicine, 86.
13 Abrams, Revolutionary Medicine, 86.
14 Hopkins, Princes and Peasants, 254.
15 Hopkins, Princes and Peasants, 255.
16 Hopkins, Princes and Peasants, 255.
Despite the leadership and advocacy of Adams in Boston and Franklin in Philadelphia, the American colonies remained divided on the issue of inoculation right up until the Revolutionary War. Inoculation was still not accepted in many parts of the colonies and was still a contentious subject. The practice was banned in New York and greatly limited in other states that, like Massachusetts, believed that banning inoculation would help to prevent contamination of the general public.\(^{17}\)

The real turning point in this national debate was the crisis faced by the Continental Army during the American Revolution when a number of cases of smallpox were detected among the men fighting in the Continental Army. George Washington was commanding the Army and had had personal experience with smallpox that showed him how deadly or debilitating the illness could be, and he knew that the problem had to be addressed immediately and decisively, even if it required controversial measures.

Washington’s personal experience with smallpox had occurred several decades earlier, in November of 1751, when he traveled from Virginia to Barbados with his brother who was suffering from tuberculosis. The Washington family believed that Virginia’s climate had contributed to his brother’s health problems, and they hoped that the air in Barbados would help to improve his condition.\(^{18}\) Ironically, this pursuit of a remedy for his brother’s disease exposed Washington to a different disease, smallpox.

During a dinner party hosted by friends, Washington was exposed to smallpox and, not having been inoculated, he soon fell ill.\(^{19}\) Washington had been aware that a member of the

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\(^{17}\) Hopkins, *Princes and Peasants*, 255.
\(^{19}\) Fenn, *Pox Americana*, 14.
family had been ill with smallpox and he had reservations about attending the party. “We went--myself with some reluctance, as the smallpox was in his family.”

His diary contains no entries for the following month that detail his condition or symptoms from having contracted smallpox so it is difficult to determine the severity of the particular strain of the disease that he had contracted. He survived, but he had personally experienced the debilitating effects the disease. Washington’s encounter with smallpox most likely influenced his pro-active campaign to inoculate the Continental Army he was commanding in 1777 when he realized the continual outbreaks among the troops.

The Continental Army consisted mainly of young men who were born in America and who had not yet been exposed to smallpox. A large group of non-immune people in close quarters was the perfect recipe for a smallpox epidemic. And, unchecked in such a population, smallpox was more capable of destroying the army than British forces were. Records show that during the Revolutionary war, disease caused far more patriot deaths than injuries incurred from the British. In fact, Historians have estimated that ninety percent of soldier deaths during the Revolution were from disease.

Smallpox was a problem for the Continental Army from the very beginning of the Revolution. Its effect on the American military were initially felt during the siege of Quebec in the winter of 1775-1776. The Second Continental Congress had authorized two expeditions of forces – one commanded by General Richard Montgomery and the other by Colonel Benedict Arnold -- to march on Quebec City in the hope of enlisting support among Canadian colonists for the Revolution. The advancing American army was camped outside of a loyalist colony in

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20 Fenn, *Pox Americana*, 14.
Quebec when smallpox struck with disastrous outcomes.\textsuperscript{22} In his account as a doctor in the Continental Army, Dr. Lewis Beebe wrote of his experience in Quebec while smallpox ravaged the small army of eleven hundred soldiers, “The Regt is in a most deplorable Situation, between 4 & 500 now in the height of the small pox. Death is now become a daily visitant in the Camps.”\textsuperscript{23} The Continental Army in Quebec was constantly beleaguered with smallpox and unable to hold off British attack. Even incoming replacement troops were of little assistance as they quickly fell ill as well upon arrival, after being exposed to so many ill or infected. With each battle with the British, the troops were forced to retreat as those too sick to flee were left behind and hundreds of others were taken prisoner, where smallpox spread quickly through cramped prison cells.\textsuperscript{24}

Smallpox struck the American Army again in 1777. In a letter dated April 13, 1777 to Abigail Adams, John Adams wrote, “The Graves of the soldiers, who have been buryed, in this Ground, from the Hospital and bettering House, during the Course of the last Summer, Fall, and Winter, dead of the small Pox, and Camp Diseases are enough to make the Heart of stone to melt away. […] Disease has destroyed Ten Men for Us, where the Sword of the Enemy has killed one.”\textsuperscript{25} Adams’ estimation of the effects of disease in the army were not an exaggeration. Disease, not just smallpox, was a prevalent problem in the army. In her article, “Smallpox in Washington’s Army,” Ann Becker concedes that it is difficult to tell from the records exactly how many people died from smallpox. She writes, “Statistics specific to this disease are not

\textsuperscript{22} Fenn, \textit{Pox Americana}, 62.
\textsuperscript{24} Fenn, \textit{Pox Americana}, 68-69
readily available but anecdotal evidence and historical analysis strongly suggest that in eighteenth-century warfare, disease invariably caused more deaths than wounds.”26 Given the high numbers of soldiers that died from any disease, finding a way to limit the spread of a prevalent and highly contagious one, namely smallpox, would have lasting benefits throughout the war.

Washington’s decision to order the use this controversial treatment could not have been an easy decision for him. In the fifty years since inoculation had first introduced during the Boston epidemic, American colonists had struggled with the idea of using a virus to blunt the effects of that same virus. For some, it simply did not seem logical that making a person sick with a mild form of a disease could have the lifelong health benefit of immunizing them from contracting that disease again; for others, it did not seem to make sense to intentionally infect a person who then might infect others.

However, by 1777, the American army was in grave peril of collapse, and Washington realized that he had to take decisive and potentially risky measures, even if those measures were controversial and difficult. The question of whether to mandate inoculation was a critical one during the Revolutionary War. Washington realized that a large part of the Continental Army was either suffering from smallpox or susceptible. To complicate matters further, the majority of the British troops were already immune to smallpox due to being exposed as children. Should an epidemic break out, the British would not suffer nearly as much as the Continental Army. Becker argues that outbreaks of smallpox among the Continental Army troops, as well as fears of the

British using smallpox as biological warfare, greatly impacted military strategy during the war.27

Military doctor Hall Jackson wrote a memo in April 1777 expressing this fear,

“I am also informed that these diabolical wretches had concerted a scheme for spreading the Small Pox thro’ the Country by infecting these counterfeit Bills with this destructive disorder, and it is more than probably, they have succeeded in their indeavor, as the Small Pox is breaking out in every place in the most mysterious manner.”28

After being inoculated, American troops had to be quarantined and taken off the lines to recover. Washington faced the choice between risking further disastrous spontaneous outbreaks or beginning the long process of inoculating the troops while hoping he could hold the British until his army was back at full strength. Washington determined that the best course of action was to begin inoculating the soldiers, both current and incoming, and hope that they would be well enough to join again before the British discovered this crucial weakness. He wrote of his decision to begin the process of inoculating his army, “The small pox has made such Head in every Quarter that I find it impossible to keep it from spreading thro’ the whole Army in the natural way. I have therefore determined, not only to inoculate all the Troops now here, that have not had it, but shall order Doc. Shippen to inoculate the Recruits as fast as they come in.”29

In January 1777, Washington began his campaign to inoculate the arm. He continued to monitor the troops and camps for the disease and enforce his dictate of inoculation when he saw the disease appearing in other areas.30

In a letter to his brother dated August 5, 1777, Washington congratulated him on coming through inoculation and recovering from smallpox. He lauded the

29 Fenn, Pox Americana, 93.
30 Fenn. Pox Americana, 98.
practice stating, “Surely the daily instances, which present themselves, of the amazing benefits of inoculation, must make converts of the most rigid opposers, and bring on a repeal of that most impolitic law, which restrains it.”

Washington’s determination to inoculate his army and to make his troops immune from smallpox meant that often a significant number of recruits had to be detained while recovering. In 1778, as many as 3800 men were sick or recovering from the procedure. In his account of his experiences in the Continental Army, Joseph Plumb Martin recalls his experience being inoculated, “I had the smallpox favorably as did the rest, generally. We lost none, but it was more by good luck, or rather a kind Providence interfering, than by my good conduct that I escaped with my life.” Washington’s foresight in this regard proved beneficial when the troops were able to meet the British in battle without fear of being stricken with illness. As Fenn observes, “The army had pulled of the first large-scale, state-sponsored immunization campaign in American history.” This campaign to immunize the Continental Army against smallpox was a significant move by the new American government to implement a public health policy.

Washington’s decision to order smallpox inoculation of his entire army of course went far beyond merely permitting personal use of this technique. But it was the first military mandated preventative health measure in the new American Republic and legitimized the idea that government could and should, in the face of crisis, intervene and mandate public health measures. Inoculation, which was a controversial procedure when introduced in Boston during

31 https://archive.org/stream/writingsofgeorge05washuoft#page/22/mode/2up/search/Smallpox
34 Fenn. *Pox Americana*, 102.
the epidemic of 1721, had become a mandated public health measure when Washington made
decision to inoculate his entire army.

Ultimately, inoculation was not the ultimate cure for preventing or eliminating smallpox,
but it was a critical step in Eighteenth Century efforts to control it.\textsuperscript{35} The use of inoculation to
combat smallpox ended abruptly in 1798 with Edward Jenner’s development of a vaccine
involving a medical approach that was similar to inoculation. Jenner had observed that women
working in dairies who contracted a mild disease known as cowpox did not contract smallpox
during an epidemic. As a doctor, Jenner administered smallpox inoculations as a regular part of
his duties and while working in rural areas, and he had the opportunity to observe not only
smallpox but also cowpox.\textsuperscript{36} Jenner noted observing dairy-hands and milkmaids that contracted
cowpox and reflected on the significance, “what renders the Cow-pox virus so extremely
singular, is, that the person who has been thus affected is forever after secure from the infection
of the Small-Pox; neither exposure to the variolous effluvia, nor the insertion of the matter into
the skin, producing this distemper.”\textsuperscript{37} He theorized that by contracting cowpox, the women had
somehow developed immunity to smallpox. The term “vaccination” itself is derived from the
Latin word \textit{vacca}, meaning “cow,” a reference to this early use of the cowpox virus to immunize
against smallpox.

\textsuperscript{35} Raymond Phineas Stearns. \textit{Science in the British Colonies of America}. (Urbana: University of
\textsuperscript{36} David Bardell. “Edward Jenner and the First Vaccination,” \textit{The American Biology Teacher},
39:7 (1977), 441.
\textsuperscript{37} Edward Jenner. \textit{An Inquiry into the Causes and Effects of the Variolae Vaccine: A Disease
Discovered in Some of the Western Counties of England, Particularly Gloucestershire, and
Known by the Name of Cow Pox}. London: 1798.
Jenner’s vaccination process followed a nearly identical insight and procedure of inoculation, but cowpox had the benefit of being a far milder disease than smallpox. Cowpox produces similar flu-like symptoms in its human host--they suffer from fever, vomiting, and headache--among other symptoms. Unlike smallpox, however, the pustules produced by cowpox remain mostly on the hands and forearms. Far fewer pustules are produced by cowpox and Jenner observed that they only spread to other parts of the body if transmitted by the patient through scratching or spreading the disease with infected hands. Jenner documented his process for vaccinating the first person using cowpox. His procedure is remarkably similar to that of inoculation, “The matter was taken from a sore on the hand of a dairymaid, who was infected by her master’s cows, and it was inserted, on the 14th of May, 1796, into the arm of the boy by means of two superficial incisions, barely penetrating the cutis, each about half an inch long.”

Jenner’s development of inoculation was a tremendous improvement and a great step forward because, unlike in the case of inoculation, the vaccination recipient did not contract smallpox and was not contagious.

**Conclusion**

The initial debate over inoculation in 1721 and the subsequent continued use of inoculation during the Revolution and the rest of the Eighteenth Century had paved the way for public acceptance of vaccination. By the time Jenner made his discovery, the American public was more prepared to accept the seemingly contradictory idea that infecting a healthy person with one disease in order to prevent the spread of another disease.

Jenner’s vaccination method provided a safer way to control smallpox and that it was his discovery that led to the eventual near eradication smallpox. In 1980, the World Health Organization declared smallpox eradicated. However, the movement towards smallpox eradication in North America began in Boston’s Puritan community when a pastor and a county doctor decided to take bold, defiant steps against local government when they saw a chance to improve the lives of those around them.

The inoculation controversy in 1721 stands as an early example of an issue that is common to many public health debates – i.e., that policies and practices often represent the best scientific knowledge at the time, but not necessarily a science that is fully understood or fully accepted. It was a familiar public health debate over the relative weight accorded to the rights of individual versus the greater good for the community. The evolving views seen in the subsequent years and Revolution show a distinct move towards awareness surrounding preventative medicine.

1 Center for Disease Control and Prevention. “Smallpox Disease Transmission.”
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