

“They Know Not What They Do”: Evil in the Anti-Smallpox Vaccine Movement

On May 26, 1721, Cotton Mather wrote with dread, “The grievous Calamity of the Small-Pox has now entered the Town.”¹ There is little doubt that the 12,000 Bostonians living in 1721 agreed with Mather’s horror. Even to the world-weary American colonists, smallpox was a cause for concern. At the time, 20-40% of those afflicted would die, and the survivors would be scarred for the remainder of their lives. However, when smallpox arrived in Boston 180 years later, the situation was different. Smallpox’s arrival provoked fear, but not fear of the disease—rather, fear of the vaccinations that the epidemic demanded. In the early twentieth century, mandatory vaccination was the subject of fierce debate within the contexts of medicine, class, democracy, and ethics. The anti-vaccine movement forced American legislators to consider the role of government in medical decisions, paving the way for medical regulation and other public health legislation. The 1901 Boston smallpox epidemic and controversy over vaccination highlighted American worries about the tension between individual and collective decision-making, the safety of vaccines, and the morality of a government that mandated them. Although the 1901 smallpox epidemic and anti-vaccine movement both passed, their underlying concerns became a theme in modern American consciousness that continues to plague Americans today.

The Rise of the Anti-Vaccine Movement

After the Civil War, anti-vaccination sentiment gathered.² The anti-vaccine movement began as an anti-mainstream medicine movement comprised of alternative doctors, primarily homeopaths, who had been put out of practice by medical licensure laws. Resentful of any government interference in medicine, vaccines became their symbol of government intervention in the extreme.³ As a result, much anti-vaccine thought was couched in terms of democracy and government authority. The resolutions of the Anti-Vaccination Society of America, established

in 1879, declared vaccination to be “a dangerous invasion of civil and personal liberty, setting aside the safeguards of our State and Federal constitutions, threatening us with absolute despotism.”⁴

Because of the physically invasive nature of vaccination, religious groups joined the anti-vaccine movement. Vaccination was highly controversial from a religious perspective for several reasons. First, vaccination involved putting animal matter—diseased cow flesh—into the pure human body. For the Swedenborgians, a mystical Christian denomination closely linked to homeopathy, this was the crucial offense. As John Pitcairn, president of the Anti-Vaccination League of America and a Swedenborgian, wrote, “As if there were such a thing as pure vaccine virus! Disguise it as you may, vaccine virus is simply the putrid matter running from the sore of a diseased calf.”⁵ American Catholics were suspicious of mandatory vaccination because it violated the purity of the flesh, but perhaps also because it was often inflicted upon poor urban immigrant communities that were predominantly Catholic. In *The Review*, an American Catholic newspaper, the editorial board endorsed the Anti-Vaccination Society of America, positioning itself strongly in the camp of the anti-vaccinators.⁶ In Britain, the pock from smallpox vaccination was depicted as the mark of the Beast, a sign that one had been infected by evil.⁷ Vaccination was an offense to the image of God, and to violate the blood with vaccine was to violate the soul.⁸

The second religious objection to vaccination involved human arrogance before God. Vaccination was an unnatural invention and allowed humans to escape their God-sent punishment of smallpox. If God intended for humans to be safe from smallpox, He would not have created it. Vaccination became part of the continued tension between religion and science in American culture. Writing again, Pitcairn raged against the audacity of vaccinators: “They

seek to interfere with Nature's laboratory which the Creator gives to a healthy child! With their man-made science, they would improve upon God's handiwork!"⁹ Set in the context of Darwin's Theory of Evolution (1859), the rise of Pasteur's germ theory (1864), and Mendel's discovery of genetics (1865), vaccination was yet another scientific assault on a religious understanding of the world.

The American government's refusal to acknowledge these religious concerns about vaccination gave rise to the third religious problem with vaccination: it was a violation of First Amendment religious freedoms. During the 19th century, only medical exemptions were granted from vaccination, for individuals whose health was too weak. To many religious individuals, religious objectors were as entitled to exemption as medical objectors, and the lack of religious exemptions was an outrage. M. R. Levenson, the Secretary of the Anti-Vaccination Society of America, expressed as much to the New York City Board of Education: "This regulation of yours is an act of tyranny...you should no more attempt to force this rite upon school children than you should the rite of circumcision."¹⁰ Anti-vaccinators increasingly used religious rhetoric when discussing vaccination, treating it as a sacred rite of a scientific religion, forced upon Christians by an unsympathetic government.¹¹

The anti-vaccination movement continued to gain momentum towards the end of the 19th century with the rise of the Progressive Movement, a coalition of liberals who sought to improve the lives of the lower class through political action and reform. Some Progressives advocated vaccination to decrease disease among the lower-class, but others believed that vaccination was a slap-dash compromise measure that offered a short-term solution to a long-term problem, namely, the abysmal state of American cities.¹² Anti-vaccinators often placed Progressive sanitation reforms such as clean water, food regulation, and urban redesign in opposition to

vaccination, because vaccination's reduction of disease would make other health reforms less necessary. Furthermore, vaccination had a counter-intuitive class component. The lower class was most likely to produce a smallpox epidemic because of their poor living conditions. By vaccinating the poor, the upper class could avoid solving the problems of poverty while saving themselves from the risk of smallpox. As anti-vaccinator Joseph Collinson lamented, "The whole scheme of vaccination is one of protecting the rich against the poor. It is not of the democracy, nor will it ever be."¹³ In addition, if the lower class were vaccinated, it could provide the herd immunity necessary to allow the upper class to avoid being vaccinated itself.¹⁴ Anti-vaccination Progressives perceived vaccination as upper class exploitation of the lower class' good health.

Two interesting factions completed the anti-vaccine coalition: animal rights' activists and eugenicists. Animal rights' activists opposed vaccination because it required the infection and harm of hundreds of cows.¹⁵ Anti-vaccination propaganda often featured sketches of cows, harnessed to tabletops while menacing doctors pricked mercilessly at their exposed stomachs, often accompanied by graphic descriptions such as:

the disease [is] allowed to run its course for five days, after which, when the sores are at their height, [the cow] is again strapped firmly down upon the table, legs, body, and even mouth tied—a cruel sight! The operator sits down, opens the vesicles on the animals' belly, and the lymph is squeezed out with clamps, the pressure almost invariably causing the lymph to contain an admixture of blood.¹⁶

These depictions of vaccine production garnered compassion for the animals used to make vaccines, while simultaneously thrilling the public with their gory details.

Finally, the eugenicists opposed vaccination because it extended the lives of the poor and unfit. This faction cut across existing political lines as members from both the progressives and conservatives supported eugenics. Progressives supported eugenics as a means of reducing poverty before it even began, and allowing smallpox to run rampant was one such approach.¹⁷

Conservatives opposed vaccination because it increased the number of lower-class families who added to the public burden.¹⁸ Eugenicians believed that vaccines were effective at preventing smallpox, and thus they disapproved of them. Vaccines' power to extend the lives of the poor was seen as an unfair cruelty to both the lower and upper classes.

The forces against vaccination assembled throughout the late 19th century, seeking conflict. Unfortunately, their anger found itself without cause. There were no smallpox epidemics between 1880 and 1900, and few states used their power to mandate vaccination. Anti-vaccinators could fight against mandatory school vaccination, but school vaccination was poorly enforced and failed to provoke the hoped-for revolution. In 1901, the anti-vaccinators' found their purpose: smallpox came to America.

The Boston Smallpox Epidemic

Smallpox first appeared in Boston in a factory in May 1901.¹⁹ The Boston Board of Health was unsurprised by the epidemic, yet they were wholly unprepared for it, explaining in their annual report, "During these twenty-seven years of comparative relief from small-pox, physicians and the people became more or less negligent of vaccination, and few physicians have become sufficiently familiar with the disease to recognize it, especially in a mild form."²⁰ The last smallpox epidemic had been in the winter of 1872, which killed more than 1,000 people.²¹ Bostonians had lost their fear of smallpox because they could not remember it. Vaccination was an unnecessary inconvenience—adults were rarely revaccinated, and few school districts enforced the vaccination requirements.²² Modern medical research has shown that smallpox requires 90% vaccination for herd immunity to be effective, and the Bostonians were far below that threshold.²³ The epidemic was made more problematic because there were two strains of smallpox, *Variola major* and *Variola minor*. *V. major* was the historic smallpox, with physically-

grueling illness and a high mortality rate. *V. minor* was a new, more contagious strain, causing the characteristic pocks but with only mild illness and low mortality. Cases of *V. minor* were rarely diagnosed as smallpox, yet they spread very quickly and could mutate into *V. major*, worrying public health officials.²⁴

Against these challenges, the Boston Board of Health sprang into action. When the Board realized the state of the epidemic, it immediately encouraged vaccination for all Bostonians by printing public notices and writing to major employers, asking them to provide free vaccination to their employees.²⁵ It soon became apparent that this was insufficient, and in November, the Board opened evening vaccination clinics in at-risk areas of the city.²⁶ The Board implemented a strict protocol. Upon diagnosis of smallpox, the patient was moved to isolation, his home was disinfected, and his close contacts were revaccinated and observed for two weeks.²⁷ After several editorials blamed the spread of smallpox on the homeless,²⁸ the Board assembled vaccination raid squads to infiltrate rooming houses and the black and immigrant communities of Boston.²⁹

By December 1901, 12,180 Bostonians had been vaccinated. It was not enough. With few other options, the Boston Board of Health asserted its powers under Massachusetts law chapter 75.137 to mandate vaccination, declaring, “In the opinion of this Board, the public health and safety require the vaccination or re-vaccination of all the inhabitants of Boston; be it ordered, that all the inhabitants of the city who have not been successfully vaccinated...be vaccinated forthwith.”³⁰ The law allowed for medical exceptions for children, and dissenters were subject to either a \$5 fine or a 15-day imprisonment.³¹

Anti-Vaccinator Response

Throughout the public health response to the epidemic, the anti-vaccinators caused trouble. In its Annual Report for 1902, the Board noted that

a serious drawback to our vaccinal protection against smallpox arises from the fact that Boston is practically a hot-bed of the anti-vaccine heresy, and although the vaccine house is built upon a rock, and is not likely to fall, the noisy storm has frightened many of our people into a dangerous neglect or opposition to vaccinal protection.³²

The anti-vaccinators offered up many arguments against vaccination, most of them interesting, but few based in fact. Many argued that the historic decrease in smallpox rates was due to improved public sanitation, not vaccination.³³ They accused doctors of corruption, noting snidely, “This [epidemic] again proves the folly of putting men in charge of health who make their living by having people sick.”³⁴ Others claimed that the severity of smallpox was entirely dependent on nursing quality—with a good nurse, a person could recover from smallpox within a week without a single pock!³⁵ Harkening back to alternative medicine roots, some anti-vaccinators offered up smallpox cures such as: “Medical Talk says lettuce is an absolute preventative of smallpox and I am not saying this is not true, but I want to say that plenty of vegetables is not a bad thing at any time, and I would add to the lettuce, onions, and celery,” or the even more extreme: “Smallpox is a blessing, not a curse. It is the last effort of nature to purify the system and save the patient’s life.”³⁶

Although it is easy to disregard the anti-vaccinators’ complaints as absurdity, some of them were legitimate concerns. One argument was that the smallpox vaccine was ineffective or that its effectiveness was impossible to determine. Anti-vaccinators were concerned about vaccination statistics because it was difficult to know if smallpox patients had been vaccinated prior to the illness—the pocks of the illness mixed with the vaccine pock, and when deciding whether or not a patient had been vaccinated, doctors usually declared the patient unvaccinated.³⁷ Even assuming that the doctors’ rulings were accurate, statistics suggest that vaccination was scarce protection. During the 1901 epidemic, 47% of those who developed smallpox had been vaccinated.³⁸ Vaccination’s major effect was that it reduced the mortality rate: 20% of

unvaccinated patients died of smallpox, whereas only 10% of vaccinated patients did.³⁹ The anti-vaccinators' concerns about effectiveness may have been legitimate; certainly, they should have been taken more seriously than they were.

The anti-vaccinators believed that the vaccine spread secondary infections, including smallpox itself.⁴⁰ Although the problem was not widespread, there is evidence that smallpox vaccine did sometimes cause other illnesses, because vaccines were so poorly regulated. Vaccines were unregulated until 1902, when the federal government began to oversee them as interstate commerce.⁴¹ As a result, doctors occasionally used dirt, sugar, or ground-up scabs, believing it to be reliable smallpox vaccine. Worse still, doctors sometimes received smallpox, rather than the milder cowpox, and would infect a patient.⁴² The procedure of vaccination was prime for secondary infection, which was fairly common, given that doctors had scarce comprehension of germ theory at the time.⁴³ Doctors used arm-to-arm vaccination, in which they took samples from a recently vaccinated individual to provide vaccine to the next patient. This practice was more cost-efficient but exposed patients to any infections that the previous donor had.⁴⁴ Finally, because of the ignorance of germ theory, doctors did not know how to store vaccine to protect it from other pathogens. Smallpox vaccine occasionally carried secondary illnesses like syphilis, tuberculosis, streptococcus, or tetanus.⁴⁵ In one incident, a batch of smallpox vaccine was infected by tetanus, killing more than 100 American children.⁴⁶ Rather than acknowledging the vaccines' culpability, the American government compromised with the budding pharmaceutical industry and allowed a cover-up, publicly blaming parents for not keeping their children's vaccine-sores clean.⁴⁷

The vaccination raid squads that forcibly vaccinated the poor and minority populations also alarmed the anti-vaccinators. In Philadelphia, the Anti-Vaccination Society of America

assembled more than 100 reports of vaccination raids; however, similar raids occurred in many American cities, including Boston.⁴⁸ In one account, the squad infiltrated a rooming house and vaccinated the residents who were held, struggling, to their beds by police officers. Another resident, after being vaccinated in his sleep, complained that it was his third such vaccination that month. In another incident, a squad forcibly vaccinated a family, causing the father, Howard, to develop smallpox and an infection. The reporter of the incident described the scene with rising fury: “The final result of this ‘illegal and forcible raid’ on the part of Dr Cairnes [sic] and his aids, was that this fine, big fellow came out of hospital [sic], WITH HIS LEG OFF and has had to go on crutches and will be a CRIPPLE the rest of his life. WHAT A GLORIOUS VICTORY FOR MEDICAL SCIENCE?”⁴⁹ The anti-vaccinators viewed the vaccination raids and mandatory vaccination as a gross violation of civil liberties. Mandatory vaccination was compared to rape,⁵⁰ slavery,⁵¹ the Spanish Inquisition, the French Reign of Terror, and the Salem Witch Trials.⁵² Some of these comparisons, especially rape, recurred frequently; they were apt, given the physically invasive nature of vaccination. A government that forced its people to submit to a potentially dangerous surgery was neither democratic nor reassuring, in the eyes of the anti-vaccinators.

Against the wishes of public health officials, anti-vaccinators portrayed vaccination as a moral issue on which the establishment was on the wrong side. Parents who exposed their children to the risks of vaccination were irresponsible, uncaring, and generally unfit, and it was the duty of good people “to restrain those deluded people who would submit their infant and utterly helpless offspring to its grave and appalling risks.”⁵³ The Anti-Vaccination Society of America declared their purpose to be a “holy war for life and health” and the “highest moral duty.”⁵⁴ One anti-vaccinator finished a piece of propaganda by lamenting, “Philanthropist, let us

pray in the words of the holy Crucified: ‘Father! forgive them, for they know not what they do!’”⁵⁵ On this point, the anti-vaccinators were correct: pro-vaccinators could not comprehend the moral reasoning behind the anti-vaccine movement.

Mainstream Reaction

Although the anti-vaccinators were vocal, they were not representative of public opinion. The media viewed the anti-vaccine movement with disbelief and disdain. The *Chicago Tribune* published a piece about Dr. A. J. Clausen, who came to Chicago to find individuals with stories of bad vaccinations; the subtitle remarked wryly, “Declares There Are 5,000 People in Chicago Who Suffer from Virus Inoculation, Hires a Big Hall to Receive Them, Has Stenographers to Take Down Their Tales of Woe, but Waits All Day Without Having a Single ‘Victim’ Call.”⁵⁶ The *New York Times* described the anti-vaccinators as a “familiar species of crank” whose claims were “absurdly fallacious.”⁵⁷ Most Americans caved to mandatory vaccination—in Boston, only nineteen adults refused vaccination.⁵⁸ Vaccination may have carried some risk, but it was unlikely to result in serious harm. Americans preferred to accept the mild risk rather than confront the dangers of smallpox and the hassle of protesting vaccination. The anti-vaccinators were outcast from the medical community as well. Despite anti-vaccinators’ best efforts to sway doctors to their side, most doctors were ardent supporters of vaccination. Dr. Jay Schamberg wrote in response to an anti-vaccination essay: “The idea that there is a division of opinion in the medical profession as to the efficacy of vaccination is entirely without foundation in fact. Upon no other medical doctrine is there such a unanimity of belief.”⁵⁹

Context and Comparison of Anti-Vaccination Arguments

In many ways, the uproar over vaccination was part of the ongoing debate in Progressivism about the needs of the individual and the community. Early 20th century

Americans were uncertain of how much the individual should sacrifice for the good of the many.⁶⁰ The pro and anti-vaccinators disagreed both on the amount of sacrifice individuals could be expected to offer and on the risk of vaccines. The anti-vaccinators believed vaccination to be immensely dangerous, whereas the pro-vaccinators thought it was mildly harmful at most.⁶¹ Regardless of the danger, many of the anti-vaccinators' arguments centered on the fairness of mandating vaccination: even if vaccines had no ill effects, anti-vaccinators would have opposed the legislative imposition of a medical procedure.⁶² To the anti-vaccinators, the rights of the individual were paramount. This disconnect was the root of the disagreement over vaccination. Neither side was able to convince the other, because they were arguing from different sources of authority: for the anti-vaccinators, the individual was the final authority, for the pro-vaccinators, it was the community. The argument was a futile one.

The bulk of the anti-vaccinators' arguments centered on mandatory vaccination's violation of individual liberty and doubts about scientific validity. Anti-vaccinators overwhelmingly portrayed vaccination as a democratic issue.⁶³ Mandatory vaccination was unjust, and it was the duty of good citizens to refuse on principle, regardless of the efficacy of the vaccines. This argument, although pervasive in the anti-vaccinator rhetoric, does not appear to have been effective with most Americans, perhaps because most Americans wanted vaccinal protection and believed that good citizens should follow the law and protect their community from disease. Anti-vaccination arguments about democracy are a unique trait of the anti-smallpox vaccine movement, and have mostly receded from modern opposition to vaccination.⁶⁴

Somewhat ironically, the less common concerns about vaccine safety and scientific validity were arguably the anti-vaccinators' most effective objection. Smallpox vaccination in the early 20th century did have medical risks, and in several cases, the medical establishment

made deeply unethical decisions about vaccination. Anti-vaccinator complaints about the truth of vaccination statistics and vaccination's link to secondary infections were sometimes valid and often convincing. If the anti-vaccinators had used these arguments more frequently, their movement may have been more successful. It is unclear why anti-vaccinators did not. They may have felt that it was not their place to question doctors, or they might have believed that their primary audience—lower class urban Americans—was too uneducated to judge vaccine safety. Despite the anti-smallpox vaccine movement's avoidance of medical arguments, subsequent anti-vaccination movements have had scarce qualms about questioning medical claims, and concerns about vaccines' safety have become a tenet of modern anti-vaccine movements.

Aftermath

Within a matter of years, the anti-vaccination movement was rendered purposeless. Most progressives of the time viewed mandatory public health policy as ineffective, and governments preferred to use education, rather than compulsion. The end of the smallpox epidemic deflated the anti-vaccination movement. Anti-vaccinators would continue to write throughout the 20th century, but the movement had lost its energy by 1910. The World Wars overshadowed the anti-vaccination movement. Americans did not have time to complain about vaccination, especially when many of the new vaccines were vital to soldiers' survival abroad. After the World Wars, acceptance of vaccination was high. If vaccines were good enough for soldiers, then they were good enough for citizens.⁶⁵ In addition, the regulation and safety of vaccines had improved since the early twentieth century. By the end of the 1970's, all American states had detailed vaccination requirements for schoolchildren. Today, eleven vaccines are required for entry to public school. Overall, these changes passed without protest.⁶⁶

That is not to say that the anti-vaccination movement has left America forever. In recent decades there has been an increase in anti-vaccine sentiment, similar to the anti-vaccination movement that occurred a century prior. Americans continue to distrust their government's decisions and are deeply upset by the thought that mandatory vaccination could harm themselves or their loved ones. Today, 25% of American parents say they are reluctant to vaccinate their children.⁶⁷ Anti-vaccination thought seems to have become a persistent undercurrent in the American mind—sometimes in the foreground, sometimes at the back, but always present.

In the end, the anti-vaccinators got what they wanted: smallpox vaccine is no longer administered in the United States. It was discontinued in 1983, after smallpox was removed from the Earth in 1980. Smallpox remains the only disease to be eradicated.⁶⁸ The fate of smallpox serves as a powerful reminder of the power of communities to achieve a goal. Through incredible effort and cooperation, humans were able to hunt smallpox to extinction. Although perhaps not in the way the anti-vaccinators intended, smallpox vaccination and the disease it prevented have ended in modern America. However, both the benefits and the evils of vaccination remain.

¹ Qtd. in Arthur Allen, *Vaccine: The Controversial Story of Medicine's Greatest Lifesaver* (New York: Norton, 2007), 25.

² Kaufman, "The American Anti-Vaccinationists and Their Arguments," 463.

³ Stuart Blume, "Anti-vaccination movements and their interpretations," *Social Science & Medicine* 62 (2006): 628, <http://www.sciencedirect.com/science/article/pii/S0277953605003047>.

⁴ "Resolutions of the Anti-Vaccination Society of America," Minutes and Correspondence of the Anti-Vaccination Society of America, 1895-98, Historical Medical Library of The College of Physicians of Philadelphia (hereafter cited as Minutes, Anti-Vaccination Society).

⁵ Ibid, 18.

⁶ "Science and Industry," *Catholic Church, The Review* 8 (1901): 610, <http://www.mocavo.com/Catholic-Church-the-Review-1901-Volume-8/610267/610>.

⁷ Nadja Durbach, "They Might As Well Brand Us': Working-Class Resistance to Compulsory Vaccination in Victorian England," *Social History of Medicine* 13.1 (2001): 47, <http://shm.oxfordjournals.org/content/13/1/45.full.pdf>.

⁸ Pitcairn, "The Fallacy of Vaccination," 17.

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- ⁹ John Pitcairn, "Vaccination," (address, delivered to the Committee on Public Health and Sanitation of the General Assembly of Pennsylvania, Harrisburg, March 5, 1907), 9.
- ¹⁰ M. R. Levenson to the Board of Education of New York City, June 1895, Minutes, Anti-Vaccination Society.
- ¹¹ Charles Schieferdecker, *Dr. C.G.G. Nittinger's Evils of Vaccination* (Philadelphia, 1856), 33; Joseph Collinson, *What It Costs To Be Vaccinated: The Pains and Penalties of an Unjust Law* (London: A. Bonner, 1896), 10.
- ¹² James Colgrove and Ronald Bayer, "Manifold Restraints: Liberty, Public Health, and the Legacy of *Jacobson v Massachusetts*," *American Journal of Public Health* 95.4 (April 2005): 572, http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2004.055145?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dpubmed.
- ¹³ Collinson, *What It Costs To Be Vaccinated*, 35.
- ¹⁴ Blume, "Anti-vaccination movements and their interpretations," 639.
- ¹⁵ Collinson, *What It Costs To Be Vaccinated*, 9-10.
- ¹⁶ *Ibid*, 33-34.
- ¹⁷ Allen, Garland, "Eugenics and American social history, 1880-1950," *Genome* 31 (1989): 885-9, <http://www.nrcresearchpress.com/doi/pdf/10.1139/g89-156>.
- ¹⁸ Allen, *Vaccine*, 56.
- ¹⁹ Health Department of the City of Boston, *Thirtieth Annual Report of the Health Department of the City of Boston for the Year 1901* (Boston, 1902), 43.
- ²⁰ *Ibid*.
- ²¹ *Ibid*.
- ²² Allen, *Vaccine*, 60.
- ²³ Blume, "Anti-vaccination movements and their interpretations," 629.
- ²⁴ Health Department of the City of Boston, *Thirty-First Annual Report of the Health Department of the City of Boston for the Year 1902* (Boston, 1903), 36.
- ²⁵ Health Department of the City of Boston, *Thirtieth Annual Report*, 45.
- ²⁶ *Ibid*.
- ²⁷ *Ibid*, 111.
- ²⁸ "The Spread of Small-pox by Tramps," *The Lancet* 163.4198 (February 1904): 446, http://ac.els-cdn.com/S0140673601875115/1-s2.0-S0140673601875115-main.pdf?_tid=c5028ec0-687c-11e4-aff4-00000aab0f26&acdnat=1415584761_afbf0825aa9c7fe3441b52228b03c8a2.
- ²⁹ Allen, *Vaccine*, 97.
- ³⁰ Health Department of the City of Boston, *Thirtieth Annual Report*, 39.
- ³¹ *Jacobson v. Commonwealth of Massachusetts*, 197 U.S. 11 (1905).
- ³² Health Department of the City of Boston, *Thirty-First Annual Report*, 36.
- ³³ Pitcairn, "The Fallacy of Vaccination," 17.
- ³⁴ Flannigan of Texas, "What Are We Here For?," *Vaccination* 7.2 (March 1904), 17.
- ³⁵ L. Loat, *Replies to Pro-Vaccination Arguments* (London: National Anti-Vaccination League, 1944), 2.
- ³⁶ "How to Prevent Smallpox," *Vaccination* 6.12 (1904), 88.
- ³⁷ Collinson, *What It Costs To Be Vaccinated*, 16-7.
- ³⁸ Health Department of the City of Boston, *Thirtieth Annual Report*, 44.
- ³⁹ *Ibid*.

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- ⁴⁰ Kaufman, "The American Anti-Vaccinationists and Their Arguments." 471.
- ⁴¹ Allen, *Vaccine*, 72.
- ⁴² *Ibid*, 51.
- ⁴³ *Ibid*, 58.
- ⁴⁴ Durbach, "They Might As Well Brand Us," 47.
- ⁴⁵ Allen, *Vaccine*, 52.
- ⁴⁶ *Ibid*, 70.
- ⁴⁷ *Ibid*, 92-4.
- ⁴⁸ Reports found in folder 1 of Anti-Vaccination Reports, Historical Medical Library of The College of Physicians of Philadelphia.
- ⁴⁹ C. J. Field, "Wholesale Vaccination Raid: A Painful and Distressing Case of One Man Growing Out of Raid," May 8, 1910, folder 1, Anti-Vaccination Reports, Historical Medical Library of The College of Physicians of Philadelphia.
- ⁵⁰ "Resolutions of the Anti-Vaccination Society of America," Minutes, Anti-Vaccination Society.
- ⁵¹ Kaufman, "The American Anti-Vaccinationists and Their Arguments," 473
- ⁵² Schieferdecker, *Dr. C.G.G. Nittinger's Evils of Vaccination*, 2.
- ⁵³ Collinson, 46.
- ⁵⁴ "Resolutions of the Anti-Vaccination Society of America," Minutes/Correspondence of Anti-Vaccination Society of America.
- ⁵⁵ Schieferdecker, *Dr. C.G.G. Nittinger's Evils of Vaccination*, 37-8.
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<http://search.proquest.com/docview/175452663?pq-origsite=summon>.
- ⁵⁷ Qtd. in Lawrence O. Gostin, "*Jacobson v Massachusetts* at 100 Years: Police Power and Civil Liberties in Tension," *American Journal of Public Health* 95.4 (April 2005): 577,
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1449223/>.
- ⁵⁸ It is likely that this statistic does not include individuals vaccinated by raid squad.
- ⁵⁹ Jay Frank Schamberg, "What Vaccination Has Really Done," in *Both Sides of the Vaccination Question* (Philadelphia: The Anti-Vaccination League of America, 1911), 42-3.
- ⁶⁰ Durbach, "They Might As Well Brand Us," 50.
- ⁶¹ Allen, *Vaccine*, 72.
- ⁶² Blume, "Anti-vaccination movements and their interpretations," 639.
- ⁶³ Blume, "Anti-vaccination movements and their interpretations," 639.
- ⁶⁴ Colgrove and Bayer, "Manifold Restraints," 573.
- ⁶⁵ Allen, *Vaccine*, 117.
- ⁶⁶ Daniel A. Salmon et al, "Compulsory vaccination and conscientious or philosophical exemptions; past, present, and future," *The Lancet* 367.9508 (February 2006): 439,
<http://www.sciencedirect.com/science/article/pii/S0140673606681440>.
- ⁶⁷ Allen, *Vaccine*, 15.
- ⁶⁸ *Ibid*, 12.