The Pox of Liberty:
How the Constitution Left Americans Rich, Free, and Prone to Infection

(In Press, University of Chicago Press)

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Preface

I did not set out to write a book about how the American constitutional order shaped the country's disease environment and public health programs. Instead, I wanted to answer the question: how and why have some societies come to control infectious diseases while others have let them fester? I thought there was a straightforward, almost tautological answer to this question, an answer that said strong, well functioning governments eliminated disease, while weak dysfunctional governments did not. I wanted, in other words, to argue that there was a simple linear relationship between disease and the quality of governance: good public health systems, like good roads or good public schools, reflected good governance and well-functioning polities, while poor public health systems, like poor roads or poor public schools, suggested inferior governance and dysfunctional polities.

I was attracted to this way of thinking by a casual empiricism. If I looked at Africa, for example, I saw a continent dominated by governments that were either too corrupt or weak to provide basic public goods such as education or public health. That these same places were also impoverished struck me not as a cause of disease, but as a symptom of the same underlying pathology: a dysfunctional state. By the same token, when I looked to richer parts Asia or Western Europe I saw stronger, more benevolent states where politicians seemed to have a vested interest in promoting the health and well-being of their citizenry, and invested accordingly in the capital and public health systems necessary to combat disease. Given these observations, democratic institutions seemed the obvious solution to high infectious disease

rates and poor public health systems. In much the same way that Amartya Sen argues that famines rarely occur in democracies because democratic leaders have stronger political incentives to combat crises than do leaders of autocratic regimes, I wanted to argue democratic impulses drive polities to provide adequate levels of disease prevention, no matter what the climate or geography or even the level of per capita income.

While I still think there is something to this logic, history suggests there is much more to good governance than just democracy. As explained in the chapter 3, for example, public health laws are no less susceptible to the tyranny of the majority than are other areas of public policy and protections for individual rights and liberties are no less important there than they are anywhere else in American society. The only protective mechanism minority groups had against the encroachments of majority groups was the Constitution enforced by an independent judiciary, and even though that was no guarantee that the majority would not still violate minority rights, it did sometimes forestall implementation of blatantly discriminatory public health policies. By the same token, highly autocratic societies can, and often do, show greater fidelity to the principles of public health than more democratic regimes. The Soviet Union was less democratic than the United States and England yet it eradicated smallpox much more quickly. In Brazil, smallpox lingered until a military coup in 1964 ushered in a vaccination program that was much more intrusive than had existed over the previous century or so.[1]

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[1]See Gilberto Hochman, "Priority, Invisibility and Eradication: The History of Smallpox and Brazilian Public Health Agenda," *Medical History*, Vol. 53, No. 2, (April 2009), pp. 229-52; and A.W. Hedrich, "Changes in the Incidence and Fatality of Smallpox in Recent Decades,"

The Pox of Liberty is my attempt to develop a more complex and multifaceted understanding of the relationship between the structure of the state and infectious disease rates. In developing this line of thought, I have tried to highlight the generality and unintended consequences of constitutional rules and the ideological structures that support and sustain those rules. The import of that analysis is that there is no simple correspondence between the quality of political institutions and public health outcomes. Some political institutions often thought to promote desirable political and economic outcomes, can also hinder the provision of public health, and vice versa.

The Commerce and Contract Clause, for example, were designed to address the problem of factions, powerful political lobbies that captured the state to use it to support their own ends at the expense of broader societal welfare. In terms of economics and politics, these and other institutional controls of faction had many desirable features. The Commerce Clause fostered competition among jurisdictions for businesses and residents, giving rise to an optimal mix of taxes and public goods. As Barry Weingast explains, the federalist structure that grew out of the Commerce Clause also allowed state governments to make credible commitments to investors about taxes and regulations in the long-term, attracting fixed capital investments to the state. Similarly, the Contract Clause prevented state legislatures from altering the terms of contracts, particularly debt contracts, ex post, and this helped to revive American credit

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Public Health Reports, Vol. 51, No. 14, April, 1936, pp. 363-84.

markets, which had grown moribund under the Articles of Confederation.[2]

But these Clauses also directly impacted the provision of public health, for good and bad. At times the Commerce Clause obstructed the development of a coherent and rational system of quarantines to combat yellow fever, but at the same time the federalist approach it fostered also gave rise to highly effective local programs involving sanitation, which while they did not eradicate or control yellow fever in any way, had broader public health benefits. In terms of smallpox, the Commerce Clause and the American federalist system gave rise to jurisdictional sorting that allowed anti-vaccinationists to agglomerate in small communities and thereby undermined the goal of universal vaccination in the United States (see chapter 4).

Similarly, the Contract Clause and various statutory provisions helped to promote the market for municipal debt in the United States, making it possible for cities to underwrite the construction of large and expensive public water systems. This achievement was significant on two levels. First, investments in public water systems, when taken in the aggregate, were among the largest, and might even have been *the largest*, public investments in American history. Second, investments in water systems had a larger impact on human mortality than any other public health initiative. About 60 percent of the unprecedented decline in human mortality observed during the late nineteenth and early twentieth can be attributed to improvements in public water supplies.[3]

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[2]See chapter 3 for a full discussion of federalism, the Contract Clause, and the work of Barry Weingast.

[3]See chapter 5 for a detailed discussion of the health effects of pure water, and the associated documentation.

In *The Pox of Liberty*, I have also tried to highlight the importance of ideas and how ideas about politics, economics, and science interacted to shape the American disease environment. This component of the narrative is more dynamic than the institutional component. In this ideological component, I describe how the American commitment to commerce and the rise of the germ theory of disease transformed the public health system in the United States, moving it away from one based on volunteerism and private action at the municipal level, to one that was more national in scope and involved much more state intervention. Of particular importance is how the American quest for trade gave rise to large port cities that were vulnerable to diseases like yellow fever, and how the quest for trade gave rise to a stronger and more imperialist state that helped eradicate yellow fever once and for all. Ironically, the federal government was more successful and aggressive in its efforts to control yellow fever abroad than it had been at home. For its part, the rise of the germ theory of disease had its largest impact on the structure of municipal government, inspiring a wide range of public health programs and fostering growth in the both the size and scope of municipal governments, particularly public water and sewer systems.

In writing *The Pox of Liberty*, I adopted an overtly historical and institutional approach that contrasts the more quantitative techniques now popular in economics and political science. My decision to write and argue this way comes with costs and benefits. On the cost side, my ideas have to not been formalized and subjected to statistical tests that would allow clear falsification. I have chosen to leave that course for others to follow. The reason I have chose this explicitly historical and institutional approach is twofold. First, it enables me to analyze a

broader and more complex set of institutions than a more strict quantitative treatment would have allowed. Second and more important, this historical approach brings into sharp relief the language of history and the language of modernity, and in so doing, I hope revives and revitalizes an historical way of thinking that has been lost.

The language of modernity says we are unhealthy despite being rich and free. But the language of history suggests we are unhealthy, on at least some margins, because we are rich and because our legal and political institutions function well. Similarly, in the language of modernity, the geography of disease has become a sort of economic and political destiny. Tropical places, rife with disease, are doomed to poverty and poor governance; the effects of disease are so pervasive and deeply rooted in such places that they cannot be overcome. But in the language of history, a different, more hopeful rubric emerges, a rubric that says disease is a choice, a public and social choice perhaps, but a choice nevertheless.

Chapter 1. Introduction

James E. Robinson considered himself a judicial maverick. Elected to the North Dakota Supreme Court in 1918, Justice Robinson had promised voters to get "the court out of the old ruts of the law and to minister justice in a plain, common-sense, and businesslike manner." In practical terms, this meant writing brief opinions that spoke to the people; publishing those opinions in a local newspaper in a weekly column; frequently making decisions before hearing the arguments of counsel; and eschewing the practice of *stare decisis*, basing decisions on precedent. "I have little regard," Robinson explained, "for old, obsolete or erroneous decisions and prefer to decide every case in accordance with law, reason, and justice. I do never—like Pontius Pilate—wash my hands and blame the law or a precedent or party zeal for an unjust decision."[4]

Robinson's impatience with precedent and formalism earned him the ire of legal observers from coast to coast. Max Radin of the University of California at Berkeley published a ten page article in the *California Law Review* denouncing Robinson for his flagrant disregard of legal principle and for his refusal to apply the law in a non-partisan and impersonal way. This characterization flowed in part from Robinson openly saying that if a litigant before him was in the right, that person should win the case, no matter what the law or precedent said.[5]

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[4]Andrew A. Bruce, "Judicial Buncombe in North Dakota and Other States," *Central Law Journal*, Vol. 88, No. 9, February, 28, 1919, p. 155. See more generally, Herbert L. Meschke and Ted Smith, "Judicial Values: The Justice Robinson Experience," *North Dakota Law Review*, Vol. 82, pp. 25-48.

[5]Max Radin, "The Good Judge of Chateau-Thierry and His American Counterpart," *California Law Review*, Vol. 10, No. 4 (May, 1922), pp. 300-310.

Similarly, an editorial statement in the *Harvard Law Review* admonished Robinson for relying so heavily on his own discretion and for appealing to precedent only when the precedent comported with his own ideological preconceptions.[6] But the angriest rebuke came from the country's mid-section and the editors of *Central Law Journal* in St. Louis, Missouri. In an editorial titled "Judicial Buncombe in North Dakota and Other States," the *Central Law Journal* argued that Robinson's "perfunctory opinions" would culminate in "judicial despotism," a legal system based not on the rule of law but on the vagaries of a judge's friendships, sympathies, and fears.[7]

Few decisions illustrate Robinson's approach to adjudication better than a concurring opinion he wrote in the case of *Rhea v. Board of Education*. In this case, the Board of Education of the Devil's Lake School District issued an order requiring all students to show proof of a smallpox vaccination before they could enroll. The parents of Lawrence F. Rhea sued, arguing that the school district did not have the legal authority to issue and enforce such an order.[8] In ruling in favor of Rhea, Justice Robinson based his decision not on the law, but on his own views and medical opinions regarding smallpox control. Robinson acknowledged that "in

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[6]Samuel Williston, "The Progress of the Law, 1919-1920," *Harvard Law Review*, Vol. 34, No. 7, (May 1921), pp. 741-67.

[7]Andrew A. Bruce, "Judicial Buncombe in North Dakota and Other States," *Central Law Journal*, Vol. 88, No. 9, February, 28, 1919, p. 155.

[8]This case was orchestrated and pushed by anti-vaccination activists, such as Lora Little. See Robert D. Johnston, The Radical Middle Class: *Populatist Democracy and the Question of Capitalism in Progressive Era Portland, Oregon*, Princeton, Princeton University Press, 2002, pp. 209-12.

writing a judicial opinion [it] is customary to fortify it by a reference to authorities, that is, to decisions in similar cases." However, he maintained such references were not possible in this case because all previous judicial decisions had been rendered "under different statutes and conditions." Given this, he felt the question was to be decided based upon something he called "the fundamental law," as well as "the statutes, common knowledge, and pure reason." Accordingly, Robinson briefly discussed a few North Dakota statutes and relevant provisions in the state constitutions. He also mentioned a handful of cases from other states he felt were loosely related. But, by and large, the decision was written as a polemic against the practice of smallpox vaccination.[9]

Like most anti-vaccinationists, Robinson believed that smallpox was caused by crowded and unsanitary living conditions. The practice of vaccination continued only because it was "promulgated and adopted as a religious creed" by physicians blinded by orthodoxy and profit, and because parents were too ignorant to understand what the procedure was doing to their children. Never one to shy away from a biblical reference, Robinson interjected: "the light shineth in darkness and the darkness comprehendeth it not."[10] Again like most anti-

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[9]*Rhea v. Board of Education of Devils Lake,* 41 N.D. 449 (1919), p. 458. It is notable that more two decades before the North Dakota decision, the United States Supreme confronted a very similar case involving a mandatory smallpox vaccination order in Massachusetts. In that case, however, the Supreme Court upheld the mandatory vaccination order. Had Robinson and others on the North Dakota court followed the precedent of the Supreme Court, they would have arrived at a ruling very different from the one they issued, and upheld the school board's policy. See *Jacobson v. Massachusetts*, 197 U.S. 11 (1905). This case will be discussed in chapter 4.

[10]*Rhea v. Board of Education of Devils Lake,* 41 N.D. 449 (1919), p. 458.

vaccinationists, Robinson also believed that smallpox vaccination was an extremely dangerous procedure. He claimed that "25,000 children annually" were "slaughtered by diseases inoculated into the system by compulsory vaccination." In the same line of thought, he claimed that it had been shown, "beyond doubt," that smallpox vaccination "not infrequently" causes "death, syphilis, cancer, consumption, eczema, [and] leprosy." Robinson had little patience for those who disagreed with him on the merits of smallpox vaccination, writing at one point that anyone who held a contrary opinion, "either does not know the facts, or has no regard for truth."[11]

Robinson's tenure on the North Dakota Supreme Court was a short one; he was voted out of office after serving only five years on the bench. But his views regarding the dangers of vaccination were not the reason why. On the contrary, his decision was part of a broader legal and political impulse in North Dakota, and elsewhere in the United States, that limited the power of public health authorities to enact and enforce compulsory vaccination programs. As late as 1975, North Dakota law prohibited state authorities from denying unvaccinated children access to public schools. In such a legal setting, it is perhaps not surprising that the death rate from smallpox in North Dakota was roughly ten times higher than in states that expressly empowered health agencies to adopt mandatory vaccination programs and compelled recalcitrant citizens to undergo the procedure. In part because of states like North Dakota, the United States had a much higher death rate than most other wealthy industrialized countries. Even places like Sri Lanka, a relatively poor British colony, had a significantly lower smallpox

[11]*Rhea v. Board of Education of Devils Lake*, 41 N.D. 449 (1919), pp. 457-458.

rate than the U.S.[12]

How and why did the United States—the richest, most technologically-advanced democracy in the world at the time—lag behind poorer and often less benevolent societies in eradicating smallpox, as well as several other infectious diseases? Writing in the midst of a worldwide outbreak of smallpox in 1902, *Mosher's Magazine* gave the beginnings of an answer. It first noted that a century of human experience the world over had demonstrated the efficacy of vaccination in preventing smallpox. The magazine also pointed out that the leaders of the anti-vaccinationist movement in the United States and elsewhere were "the so-called intelligent ones, the professional people." It was "the lawyers, the writers, [and] the teachers" who were "most apt to deem themselves outside of the laws that make the ordinary human body sick or well." What *Mosher's* was referring to here was the mistaken anti-vaccinationist notion that smallpox originated from filth and uncleanliness, as opposed to a specific and contagious pathogen.[13]

But, more important than their peculiar understanding of the pathogenesis of smallpox, was the political ideology that undergirded the anti-vaccinationist cause. For anti-vaccinationists in America and elsewhere, the right to refuse and dissent from public vaccination programs was seen as fundamental as the right to free speech or private property.

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[12]See James P. Leake, "The Essentials of Smallpox Vaccination," *Public Health Reports*, Vol. 36, No. 33, August 19, 1921, pp. 1975-89; and Samuel W. Abbott, "Progress in Public Hygiene," *Boston Medical and Surgical Journal*, May 1, 1902, Vol. CXLVI, No. 18, pp. 465-467. For further data and documentation of the claims made in this paragraph, see chapter 3.

[13]*Mosher's Magazine*, July 1902, Vol. 20, No. 4, pp. 248-49.

Efforts by state and local authorities to abridge that right were seen as despotic and tyrannical.[14] It is no coincidence, then, that anti-vaccinationists laced their polemics with the language of libertarianism. For example, in his lengthy tract against vaccination, H.B. Anderson began and ended by quoting extensively from the Declaration of Independence, the Gettysburg Address, and the Federal Constitution. According to Anderson, compulsory smallpox vaccination was equivalent to "medical slavery" and the Constitution was supposed to protect the citizenry from such bondage. Without a hint of irony, he appealed to the Thirteenth Amendment to the Constitution (forbidding slavery and involuntary servitude) as protection against mandatory smallpox vaccination.[15]

Similarly, when thousands of people gathered in Leicester, England in March of 1885 to oppose mandatory smallpox vaccination they too spoke mainly of individual liberty. One observer hailed the day as "a birthday of liberty," as a day that unified the free and principled citizens of England against an unjust policy: "from half the counties of England, from scores of towns and cities, men of all professions, of all trades, bound in close bonds of sympathy, not by tens and twenties, but by hundreds and thousands, met. Thank God for such that England has a conscience still, and a manhood and womanhood too that cannot and will not be trampled in

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[14]*Mosher's Magazine*, Vol. 20, No. 4, July 1902, pp. 248-49.

[15]Writing in 1920, in the wake of a series of legal developments that undermined his cause, Anderson claimed that there had "never been a time in the history of the United States when it was more important to keep in mind the words 'eternal vigilance is the price of liberty.'" To Anderson's way of the thinking, the liberty of all Americans was in peril: mandatory vaccination was but the opening wedge in a larger state-sponsored assault on medical freedom and individual choice in health care. See Harry B. Anderson, *State Medicine: A Menace to Democracy*, New York: Citizen's Medical Reference Bureau, 1920.

the dust by the hoof of tyranny." Although the Leicester participants spoke much about the dangers of "horse grease," beastly abominations, and "adulterated blood" and about how mandatory vaccination was just another phrase for "legalised compulsory medical quackery," they also made frequent appeals to libertarian ideals and principles, carrying banners that read "The price of liberty is eternal vigilance;" "Health and Liberty;" "Parental affection before despotic law;" "Men of Kent defend your liberty of conscience;" "Stand up for Liberty!" and "We fight for our homes and freedom."[16]

Mosher's Magazine attributed the persistence of smallpox among Americans and the English to this commitment to individual rights and liberty, a commitment that in the case of smallpox endangered the broader populace. To make its case, *Mosher's* turned first to Egypt, where British colonial authorities had made smallpox vaccination compulsory. Despite the fact that the British expatriates living in Egypt had "the best" there was "in the way of comfort, cleanliness, and sanitation," their smallpox rate was "six times higher" than the rate for the Egyptians. A British government report explained that while it was "possible to enforce vaccination among the native population" it was impossible to "enforce it" among the English, who simply refused to get vaccinated.[17]

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[16]J.T. Biggs, *Leicester: Sanitation Versus Vaccination. Its Vital Statistics Compared with Those of Other Towns, the Army, Navy, Japan, and England and Wales*, London: The National Anti-Vaccination League, 1912, pp. 109-10. For recent histories that put the Leicester protests in a broader European context, see Peter Baldwin, *Contagion and State in Europe, 1830-1930*, Cambridge, Cambridge University Press, 2005, pp. 245-354; and Nadja Durbach, *Bodily Matters: The Anti-Vaccination Movement in England, 1853-1907*, Durhan, Duke University Press, 2005, pp. 50, 61-63, 111, and 122.

[17]*Mosher's Magazine*, July 1902, Vol. 20, No. 4, pp. 248-49.

Mosher's went on to describe a "parallel case" in the Americas. Following the Spanish American War, the United States stationed troops in both Puerto Rico and Cuba. Within five years, smallpox was eradicated in both places while at the same time, authorities in New York City and Massachusetts continued, with only limited success, to battle the disease for another fifty years. Just as with the English in Egypt, *Mosher's* reported that it was "possible to enforce" compulsory vaccination programs in Puerto Rico and Cuba but not in the United States, where the capacity to dissent and resist mandatory vaccination remained.[18] As one Pennsylvania physician explained, Americans were "accustomed to do their own thinking" and were "quick to resent every measure which seem[ed] to threaten their individual liberty."[19]

Reading this introduction, it is tempting to say the United States got it all wrong. If only the country had been less ideological and more scientific/technocratic, the argument might go, it would not have lagged behind so many European countries in eradicating smallpox. Indeed, data presented in chapter 4 suggest that if the U.S. had been more like Continental Europe, it probably would have eliminated the disease 50 to 100 years before it actually did. Nevertheless, in *The Pox of Liberty*, I suggest that we should not be so quick to dismiss the American approach to disease prevention wholesale. Although the United States would have enjoyed lower smallpox rates in the absence of its commitments to individual liberty, that does not necessarily imply that the country would have been made better off by

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[18]*Mosher's Magazine*, July 1902, Vol. 20, No. 4, pp. 248-49.

[19]William R. Fisher, "Some Popular Objections to Vaccination," *St. Louis Clinique*, Vol. XVII, No. 1, January 1904, pp. 54-55.

scuttling those commitments in favor of a more centralized and extensive public health network.

There are three reasons. First, the American commitment to liberty, while it hindered efforts to prevent smallpox, also promoted economic growth, political freedom, and improved health outcomes in other contexts. Put more precisely, the same constitutional provisions and ideological beliefs that slowed the implementation of mandatory vaccination programs in the United States simultaneously fostered economic prosperity and individual liberty. Whether the benefits of increased growth and freedom outweighed the costs of smallpox I will leave for someone else to say. My goal is only to show that the trade-off existed and that it is a trade off with more general relevance. Understanding the American experience with smallpox in this way suggests that the United States had high smallpox rates not despite being rich and free, but *because* it was rich and free. This idea inverts the way most observers think about disease—disease is typically portrayed as the result of poverty and deprivation, not riches and freedom—and it is an idea I will return to, in one form or another, throughout the book.

Second, institutional and ideological commitments to liberty and economic growth were not inimical to all disease prevention efforts; there were cases and particular diseases where the interests of public health and liberty were aligned. Chapter 5, for example, shows how constitutional rules protecting private property rights and promoting the sanctity of contracts not only fostered private investments and economic development, but also played a central role in the eradication of typhoid fever. Similarly, chapter 6 shows how the American commitment to federalism, a commitment that had decidedly negative effects on smallpox

eradication programs, simultaneously encouraged regional economic prosperity and the implementation of programs that were designed to protect cities and towns from the ravages of yellow fever. Although the anti-yellow fever programs that emerged from this federalist system did not always work exactly the way their designers intended, there is evidence to suggest that they had broad public health benefits, reducing deaths from all sorts of diseases beyond just yellow fever.

Third, history suggests that public health policies can sometimes veer away from promoting health to oppressing minority groups or promoting sectional economic interests. Perhaps the best known example of this occurred at the height of the American eugenics movement when public health officials in some states sterilized, or attempted to sterilize, individuals without their consent in order to prevent individuals with "socially undesirable" characteristics from reproducing.[20] Examples presented later in the book, while less well known, suggest that these deviations from appropriate policy occurred because politicians and public health officials were no less immune to the racist and baser economic motives that animated the rest of society.[21] When one recognizes the possibility that public health officials are not above implementing the same prejudices and biases that dominate the rest of the

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[20]For the history of anti-sterilization laws and the American eugenics movement, see *Buck v. Bell*, 274 U.S. 200 (1927); Paul A. Lombardo, "Three Generations, No Idiots: New Light on *Buck v. Bell*," *New York University Law Review*, Vol. 60, No. 2 (April, 1985), pp. 30-121; Robert J. Cynkar, "*Buck v. Bell*: 'Felt Necessities' v. Fundamental Values," *Columbia Law Review*, Vol. 81, No. 7 (Nov., 1981), pp. 1418-1461; Edwin Black, *War Against the Weak: Eugenics and America's Campaign to Create a Master Race*, New York, Dialogue Press, 2012.

[21]See, for example, the discussion of plague vaccination and the Chinese in San Francisco, presented in chapter 3.

society, the necessity of a system that protects individuals rights and liberties becomes apparent. Of course, the cost of such protections is that they not only limit the ability of public health officials to enact objectionable policies, they also slow the adoption and implementation of effective and desirable policies.

The Origins of an American Approach to Disease Prevention

In the chapters that follow, I expand on these ideas and explore how the American constitutional order shaped public health in the United States from colonial times to the mid-twentieth century. Although political institutions and ideologies are the focal point of my analysis, medical and scientific discoveries play an important secondary role. Most of my analysis focuses on three diseases: smallpox, typhoid fever, and yellow fever. Smallpox was a highly infectious disease, spread mostly through the air. Typhoid was a waterborne disease spread mainly, though not exclusively, through sewage-tainted water. Yellow fever was spread by a mosquito and was a regular visitor to large port cities, especially those in the American South. All three diseases plagued the United States throughout the nineteenth century, and smallpox and typhoid remained serious public health problems well into the twentieth century.

My central argument is that disease prevention efforts in the United States were shaped by an inter-connecting web of ideologies and institutions. Because some of these ideologies and institutions were distinctly American, they gave rise to a system of disease prevention that was also distinctly American. The defining features of this system were fourfold. First, it was decentralized, predicated mainly on the strategies and investments of municipal governments.

Second, initially the system relied almost exclusively on individual consent and private action, though over time it increasingly appealed to the coercive power of the state. Third, it relied heavily on private property rights to induce investments in health-related infrastructure. This was particularly true in the case of public water supplies, which were arguably the single most important public health initiative of the pre-1950 period. Fourth, it was heavily influenced by market processes and commercial and business interests, and those interests had a mixed effect on health outcomes, sometimes promoting healthier environments and at other times hindering them.

The ideas and ideologies that were most important in shaping the American approach to disease prevention were threefold. First, from their colonial inception, Americans showed a deep ideological attachment to forms of governance that were decentralized and rooted in private consent and voluntary action. This, in turn, fostered and helped sustain federalism in the provision of public health, despite historical and political forces that were pushing for greater centralization. Second, because Americans placed a high value on commercial success and economic prosperity, those values also influenced the practice and implementation of public health policies. While commercial and economic values are often portrayed as inimical to public health, there is evidence to suggest that such values could, at times, foster better public health outcomes. Third, the rise of the germ theory of disease interacted with, and reshaped, political beliefs and ideologies to usher in a vast expansion in the size and scope of government involvement in public health, particularly at the local level.

The institutions that mattered most in forging the American approach to disease

prevention can be divided into four categories: democracy; private property rights; federalism; and protections of individual liberty. Democratic institutions allowed American politicians at all levels of government (state, federal, and local) to enjoy greater electoral success through investments in disease prevention. This aligned political and public health incentives: throughout the nineteenth century, good sanitation and disease prevention was good politics.[22] For example, when politicians invested in public health ventures that were successful, they garnered votes and political support; and when they devised ways to control and eradicate epidemics, they limited disruptions in trade, business, and tax revenues. In the case of public water and sewer, and sanitation more generally, there was an alignment of political, economic, and public health interests: as explained later in the book, even businesses wanted spending in these areas because it was seen as a means of promoting long-term economic growth.

As for private property rights, various provisions in state and federal constitutions constrained the future behavior of politicians and thereby enabled them to make credible promises about future behavior to potential lenders, private entrepreneurs, and taxpayers. To highlight the importance of these institutions, imagine how difficult it would have been for a city to raise the funds necessary to build a water and sewer system if potential lenders did not believe that the city would eventually pay back what was borrowed, or if there was a sizeable risk that local politicians would simply take the money they borrowed and use it for some other, less socially remunerative end. Constitutional rules governing municipal debt and

[22]Although this topic will be discussed in detail in chapter 5 on the development of urban water supplies, see generally, Jon C. Teaford, *The Unheralded Triumph: City Government in America, 1870-1900*, Baltimore: Johns Hopkins University Press, 1984.

prohibiting legislatures from passing laws that altered the obligation of contract ex post gave lenders and potential investors confidence that their loans would be repaid and that their capital would not be expropriated. But while these constitutional provisions made it much easier and cheaper for governments at all levels to raise the funds to finance otherwise costly public health initiatives, they could at times also hinder government efforts to regulate private enterprises engaged in activities that affected the public health.

As for federalism, during the nineteenth and early twentieth century, the regulatory structures of state and local government were more vast and intrusive than those at the federal level. The decentralized nature of American public health was well suited for localized epidemics and problems, but was less adept at controlling epidemics and health problems that crossed state borders. Another benefit of this decentralized approach is that it helped to limit the mass implementation of bad ideas in relation to public health. Also, in contrast to more centralized and bureaucratic regimes, America's federalist approach to public health gave ordinary citizens multiple venues to challenge the decisions of medical experts and health authorities. If the board of health in a particular town or state announced a policy that some individuals objected to, not only could those individuals challenge the policy in court or lobby legislators to pass a law barring the implementation of the policy, but if these options failed, the aggrieved parties could move to another jurisdiction where health officials adopted friendlier policies. In turn, sorting across political jurisdictions fostered the development of communities made up almost entirely of skeptics and medical heretics opposed to the recommendations of the medical establishment. As explained in chapter 3, sorting of this

variety gave rise to regional pockets of smallpox, which left the country with higher overall smallpox rates than it would have had under a more centralized public health system that suppressed jurisdictional sorting.

As for institutional protections of individual liberty, probably the most important was the Fourteenth Amendment to the Federal Constitution. Passed in the aftermath of the Civil War, the Fourteenth Amendment guaranteed all citizens equal protection under the law and prohibited states from taking from any individual "life, liberty, or property without due process of law." When individuals during the nineteenth and early twentieth century challenged any given public health measure as a violation of their individual rights and liberties, they almost always invoked the equal protection and due process clauses of the Fourteenth Amendment. While these challenges were often unsuccessful, the litigation that grew out them could slow or delay the implementation of policy, and in some cases might have helped popularize dissent. At a more fundamental level, the Fourteenth Amendment also appears to have helped galvanize ideological beliefs about the limits of state power in relation to mandatory vaccination.

In the case of mandatory smallpox vaccination, for example, when the courts upheld mandatory vaccination orders, despite claims that they violated Fourteenth Amendment rights, voters would simply trump the courts by securing passage of laws restricting the ability of public health officials to enforce mandatory vaccination policies. Ironically, in the political campaigns to legislate around the courts, those opposed to vaccination would often invoke the same constitutional provisions and protections the courts had said did not apply, suggesting

that popular thinking about what the Constitution said was nearly as important, or perhaps more so, than what the courts said in shaping public health policy.

The American Constitutional Order and the Mortality Transition

As much of the discussion above suggests, it would be a mistake to believe that American political institutions had only negative effects on disease prevention efforts. Although aspects of the American constitutional order impaired, and continue to impair, the provision of public health and disease prevention, there were also many cases where American political institutions fostered and promoted both public and private investments in disease prevention. The simplest way to highlight and introduce these more positive effects is by looking briefly at the history of life expectancy in the United States, giving particular attention to what demographic historians refer to as the mortality transition and the associated eradication of infectious disease.

The mortality transition took place during the late nineteenth and early twentieth century, when the United States (and other parts of the world) witnessed remarkable and historically unprecedented improvements in human health and longevity.[23] Between 1850 and 1950, life expectancy at birth among whites increased by 75 percent, growing from 39.5 to 69. Among non-whites there was an even larger increase, with life expectancy more than

[23]See Michael Haines, "The Urban Mortality Transition in the United States, 1800-1940," Historical Paper 134, National Bureau of Economic Research, Cambridge, Massachusetts, July 2001. Haines argues that mortality in cities begins to show sustained improvement only after 1870. A shorter version of Haines's working paper was later published under the same title in *Annales de Demographie Historique*, 2001/1, no. 101, pp. 33-64. See also, James C. Riley, *Rising Life Expectancy: A Global History*, Cambridge: Cambridge University Press, 2001.

doubling, rising from 23 to 60.8.[24] It is sometimes argued that the American mortality took place between 1900 and 1950, a time frame which saw American life expectancy among whites rise from 49.6 to 69, and for nonwhites saw life expectancy rise from 33 to 60.8.[25]

What is particularly notable about the comparatively large increase in non-white life expectancy is that it took place during the pre-Civil Rights era, at a time when African-Americans endured extreme economic and social deprivation relative to whites. It is possible that the catch-up among blacks stemmed from the fact that they were starting from a much lower base—after slavery, where else was there to go, but up?—but there is much evidence to suggest that investments in public health infrastructure over this period, particularly those related to water purification and distribution, benefitted blacks far more than whites. Whether one is talking about whites or blacks, life expectancy continued to rise after 1950, but the rate of improvement was one-half to one-third the rate observed in the earlier period.[26]

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[24]These data are from the *Historical Statistics of the United States*, Table Ab644-655. Published by Cambridge University Press, this database is also published online and was accessed through the University of Pittsburgh's online catalogue.

[25]Data from *Historical Statistics of the United States*, Table Ab644-655, accessed through the University of Pittsburgh's online catalogue.

[26]Between 1850 and 1950, life expectancy for whites increased by around half a percent per year (.0054778); after 1950, life expectancy increased at a rate of just under a quarter of a percent per year (.0023691). For nonwhites the contrast is even greater, with nonwhite life expectancy increasing 3 times faster during 1850 and 1950 period than during the subsequent period. Specifically, between 1850 and 1950, life expectancy for nonwhites increased by just under one percent per year (.0091572); after 1950 life expectancy for nonwhites grew at an annual rate of .0032396. As explained in previous two footnotes, the data for these calculations are from the *Historical Statistics of the United States*. For a full discussion of how improvements in public water supplies helped narrow the gap between black and white life expectancies, see Werner Troesken, *Water, Race, and Disease*, Cambridge: MIT Press, 2004, especially pp. 1-8.

The improvement in health and longevity that occurred between 1850 and 1950 were associated with radical change in the country's disease and age profile. Before 1880, the leading causes of death were diarrheal diseases—such as typhoid fever and dysentery—and respiratory diseases—such as tuberculosis, influenza, bronchitis, and pneumonia. But by 1925, deaths from waterborne diseases such as typhoid had been largely eradicated; and respiratory diseases, while still common, were being eclipsed by heart disease and cancer as the city's leading causes of death. These changes in the country's disease profile were associated with sharp improvements in child and infant mortality because infectious diseases such as diphtheria and diarrheal diseases bore disproportionately on the young.[27] Put another way, as the country moved from a high to low mortality environment, chronic diseases and diseases of old age replaced infectious diseases and child mortality as the leading causes of death.[28]

The eradication of infectious diseases is typically seen as a purely technological process. For some, the technological changes wrought by industrialization, increased per capita incomes and made it possible for people to buy better housing and improved nutrition, which in turn,

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[27]Probably around half of all deaths in 1850 occurred in children under the age of five; by 1950, well under a quarter of all deaths occurred in children under the age of five. In 1850, between 20 and 30 percent of all new-borns perished in the first year of life; one hundred years later, only 2.5 to 3.5 percent of all infants died. See *Historical Statistics of the United States* (Millenial Edition).

[28]This paragraph draws heavily from the data in Joseph P. Ferrie and Werner Troesken, "Death and the City: Chicago's Mortality Transition, 1850-1925," Working Paper #11427, National Bureau of Economic Research, Cambridge, MA., 2005. See also, Robert William Fogel, *The Escape from Hunger and Premature Death, 1700-2100*, Cambridge: Cambridge University Press, 2004; Herbert S. Klein, *A Population History of the United States*, Cambridge University Press, 2012; and Michael R. Haines and Richard H. Steckel, *A Population History of North America*, Cambridge: Cambridge University Press, 2000.

allowed households to more effectively prevent and fight off infections such as tuberculosis. For others, improvements in the technologies associated with public health, such as water filtration and the diphtheria antitoxin, were the driving force behind the improvements in human health and longevity. For still others, there is a focus on the development of antibiotics and more modern medical treatments, though most scholars agree that these changes came along well after the largest improvements in longevity had already been achieved.[29] But whatever technologies one wishes to emphasize, the emphasis on technology is far too simple because new technologies, and the capital investments that embodied those technologies, were predicated on political and legal institutions.[30]

Nowhere are the connections among institutions, capital investments in public health, and the mortality transition clearer than in the history of typhoid fever. A waterborne disease, typhoid was eradicated through a series of city-level decisions to invest in water distribution networks and water filtration. Cities made these investments in response to the demands of voters who wanted effective responses to repeated typhoid epidemics and rewarded politicians with re-election for implementing such responses. White voters supported extending water distribution systems into black neighborhoods because they feared that

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[29]For evidence and a review of the broader literature on the origins of the mortality transition, see Robert William Fogel, *The Escape from Hunger and Premature Death, 1700-2100: Europe, America, and the Third World*, Cambridge: Cambridge University Press, 2004.

[30]See, for example, Simon Szreter, "Economic Growth, Disruption, Deprivation, Disease, and Death: On the Importance of the Politics of Public Health for Development," *Population and Development Review*, Vol. 23, No. 4 (Dec., 1997), pp. 693-728.

typhoid epidemics in the black community might spread to white neighborhoods.[31] In addition, once a decision was reached to build a local water distribution and filtration system, the financing for that system relied on an institutional framework that assured potential investors that the local authorities would repay the money and invest it as promised.[32]

The social rate of return on investments to eradicate typhoid, and distribute pure water, were enormous, and the mortality transition in the United States would have been a much less impressive feat absent investment in public water supplies.[33] More precisely, the available demographic evidence suggests that improvements in water quality account for well over half of the reduction in mortality observed between 1850 and 1925.[34] This occurred because access to safe drinking water affected a broad range of health outcomes, not just waterborne diseases.[35] Juxtaposing the U.S. experiences with smallpox and typhoid fever makes clear that *The Pox of Liberty* is not a wholly negative story about freedom inhibiting public health, but is a

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[31]See Werner Troesken, Water, Race, and Disease, Cambridge: MIT Press, 2004; and Werner Troesken, "The Limits of Jim Crow: Race and the Provision of Water and Sewerage Services in American Cities, 1880-1925," *The Journal of Economic History*, Vol. 62, No. 3 (Sept., 2002), pp. 734-772.

[32]Chapter 5 presents documentation and evidence for the observations made in this paragraph.

[33]On the overall returns to investments in public health, see Edward Meeker, "The Social Rate of Return on Investments in Public Health, 1880-1910," *The Journal of Economic History*, Vol. 34, No. 2 (December, 1974), pp. 392-421.

[34]David M. Cutler and Grant Miller, "The Role of Public Health Improvements in Health Advances: The Twentieth Century," Demography, Vol. 42, No. 1, (Feb., 2005), pp. 1-22.

[35]Joseph P. Ferrie and Werner Troesken, "Water and Chicago's Mortality Transition, 1850-1925," *Explorations in Economic History*, Vol. 45, No. 1 (January, 2008), pp. 553-75.

positive one as well, with American commitments to property rights and representative politics fostering an extensive effort to eliminate waterborne diseases.

Modern Relevance: Why This History Matters

Anyone who writes or teaches history inevitably has to answer the who-cares question: what makes this particular history relevant? For the case here, that question is no less inevitable. Why then should anyone today care about how the Constitution and ideological commitments to individual rights and liberties shaped the American disease environment from 1800 to 1950? First, this history can help us understand a host of modern health care debates in the United States because many of the same Constitutional rules and structures that shaped disease prevention efforts in the past continue to influence health outcomes today, though on a much broader scale. This is especially true of the Commerce Clause and the Fourteenth Amendment. Abortion rights; state laws regarding contraception; policies governing HIV prevention efforts; federal spending on women's health care; medical privacy laws; the tenacity of the modern anti-vaccination movement; the extended legal and political battles over medicare and national health insurance; all of these in one way or another, harken back to an earlier time when smallpox, typhoid, and yellow fever were an integral part of the American experience.

Second, the evidence presented below suggests that disease and economic outcomes are both shaped by political institutions; both depend on, and are products of, the structure of the state. Whether it was the American commitment to federalism as embodied in the

Constitution's Commerce Clause, the Fourteenth Amendment, popular beliefs about individual liberty and the appropriate functions of government, or a variety of institutions that fostered private property rights, the American constitutional order affected both income and the provision of disease prevention. If one accepts that income and disease are both determined by the same underlying institutions and ideological preferences, the puzzle that opened this chapter—the observation that United States was slow to eradicate smallpox—becomes much less puzzling. In particular, it is tempting to ask: "why did the United States have middling smallpox rates despite being so rich?" Yet the evidence below suggests that such a question is predicated on a false sense of causality. The United States had middling disease rates for the same reason it was rich: because the institutions and ideological preferences that shaped political and economic outcomes also shaped health policies. To this way of thinking, the United States lagged in the eradication of this infectious diseases not despite being rich and free, but because it was rich and free.

The third and final path for making the history that follows relevant begins with the following observation. Today, when scholars look to Africa and other parts of the developing world, they often portray disease solely as the product of geography, tropical climate, poverty, and economic under-development. By contrast, in the rubric of *The Pox of Liberty*, preventable diseases are as much the result of choices, both public and private, as they are of geography and climate. In the same way societies choose the quality of their schools, roads, police forces, militaries, and so forth, they also choose or at least heavily influence the quality of their public health systems and the associated levels of infectious diseases. Put another way, the disease

environment is not just a function of geography and climate; it also shaped by politics and individual preferences. In this setting, epidemiology is as much an exercise in political economy as it is in estimating statistical correlations. Understanding disease processes this way challenges the many scholarly claims that infectious diseases, and the biological processes that underlie the transmission of those diseases, have been inexorable forces in human history, beyond the control of either individual actors or states.