Introduction

*Health and Medicine in the Era of America’s Founders*

Experience learns us to be always anxious about the health of those whom we love.
—*Thomas Jefferson to Martha Jefferson, April 7, 1787*

Above all worldly goods, I wish you health, for destitute of that great Blessing, few others can be enjoyed.
—*Abigail Adams to Thomas Boylston Adams, June 2, 1799*

Introducing the Founders

The literature about America’s early leaders continues to proliferate, but instead of placing the usual emphasis on the political roles of the nation’s founders or their personal relationships, this book will focus a lens on their experiences with health, illness, and medical treatment. The lives of America’s founding mothers and fathers demonstrate that today’s preoccupation with good health and illness is not a new one. Abigail Adams fretted over her family’s health and particularly that of her husband throughout the American Revolution as well as John’s days as president, although ironically Abigail was by far the more fragile of the two. Thomas Jefferson often involved himself in the treatment of ailments that affected his family and slaves. He professed and practiced a surprisingly modern outlook and regimen for fostering good health, and he and his contemporaries Abigail and John Adams took the controversial step at the time
of making sure that they and their family members were immunized against smallpox. After the Continental Army was devastated by smallpox in 1776, George Washington insisted that all his soldiers be inoculated. Benjamin Franklin was an early and staunch advocate of smallpox inoculation and a primary initiator of the first voluntary public hospital and medical school in America. His inventions included bifocal glasses and a flexible urinary catheter, and his keen interest in what today would be termed preventative medicine led to numerous medical experiments as well as often sound advice on healthful living.

Despite differences in personality and political outlook, George Washington, Benjamin Franklin, John Adams, Thomas Jefferson, and James Madison shared the revolutionary desire to make fundamental changes in American social and political relationships, including the role of government in the lives of individuals and government’s ability to promote general welfare. As historian Peter Gay has observed of the Enlightenment era, “The most tangible cause for confidence lay in medicine. . . . Medicine was the most highly visible and the most heartening index of general improvement.” The founders recognized early on that government had compelling reasons to shoulder some new responsibilities with respect to ensuring the health and well-being of its citizenry. For example, on July 16, 1798, Adams signed a bill “to provide for the relief and maintenance of disabled seamen,” creating the United States Marine Hospital Service. It gave rise to a network of hospitals located at sea and river ports across the United States, and slowly over the next century it ultimately evolved into the national American Public Health Service. In the beginning, in a process administered by their employers, sailors paid a twenty-cent tax every month out of their wages as their share toward a form of insurance for hospital care, which provided for doctors, room and board, and medicine, and the government directed the use of those funds and underwrote most of the real remaining costs. The tax was turned over quarterly to the United States Treasury, and it was used in the district where it was collected.

With the Seaman’s Act, for the first time in American history, the federal government mandated and paid for the temporary medical treatment of individuals who could not afford their own private care, creating a safety net for thousands of mariners. The seaman’s bill was signed into law following a severe outbreak of yellow fever as sailors often brought a
variety of serious diseases with them to ports, including smallpox, cholera, and malaria, and quarantine was sometimes necessary. Although it took almost a century to take hold, in essence the legislation established a precedent for federal intervention in the health care arena.

Forward-thinking political men such as Adams understood that the failure to address the illnesses of sailors endangered the well-being of all citizens in American port cities. Adams as well as Washington, Jefferson, Franklin, and Madison clearly recognized that the health of the nation was inextricably tied up with the health of individuals; improving general health care and the state of medicine could have far-reaching positive economic and social consequences and was therefore beneficial for all Americans. The founders were witnesses to the fact that epidemics not only brought personal devastation to individuals, families, and communities; they also played havoc with commerce. It is telling that in his State of the Union Address on November 4, 1812, when the United States was embroiled in the War of 1812, Madison opened his remarks with a reference to the health of the nation, observing, “On our present meeting it is my first duty to invite your attention to the providential favors which our country has experienced in the unusual degree of health dispensed to its inhabitants” and tying the nation’s good health to its prosperity and implicitly to its democratic republican form of government. Although during that era public health still remained primarily a local responsibility, the contemporary debate over the federal role in health care had its roots with America’s founders, who modeled a foundation for its development.

As historian Joseph J. Ellis has observed, Abigail and John Adams and, by extension, the other founding mothers and fathers lived “through the most tumultuous and consequential chapter in America’s birth as a nation,” a period in which they all played highly active and pivotal political roles during both revolution and independence. However, in addition to their complex and visible public work, their private lives involved numerous personal relationships with family and friends. Even though they were part of the colonial elite, none of the members of the founding generation was immune to sickness and disease, and concerns over health frequently shaped the trajectory of their daily lives. Indeed, before the advent of modern antibiotics, one’s life could be abruptly shattered by contagion and death, and debility from
infectious diseases was commonplace in every ethnic group and class. Surgery was especially risky in an era when there were essentially no reliable anesthetics or antiseptics.

Abigail and John Adams were predeceased by four of their six children, and Franklin lost a much-beloved four-year-old son to smallpox, one of the greatest scourges of the age. Even given the grim mortality statistics of the day, Jefferson suffered what seems to have been a disproportionate number of family tragedies. He grieved deeply over the loss of his young wife, Martha, and the death in infancy and early childhood of four of their six children, as well as the later loss of an adult daughter only in her midtwenties. Washington battled a number of serious life-threatening illnesses and was predeceased by his two step-children, a favored nephew, and all his brothers, most of whom died of tuberculosis. His wife, Martha Custis Washington, sadly rivaled Jefferson in regard to family loss. By the time Martha was in her midtwenties, her young husband and two of her small children had succumbed to fatal illness, her remaining daughter died as a teenager as a result of an epileptic seizure, and her last surviving child, a son, died in his late twenties, probably from “camp fever” (typhus) contracted in a Revolutionary War army camp. Martha Washington’s and Jefferson’s experiences serve as extreme but far from unique reflections of the high rate of mortality among children and young adults at the time and demonstrate how easily illness could devastate a family.

Although it has been suggested that colonial- and revolutionary-era parents were inured to the death of children as a protective reaction to the high infant mortality of the era—as many as a quarter of infants died during their first year—the pain and grief the founding mothers and fathers exhibited at the loss of their children graphically demonstrates that this was not the case. They were, however, all acutely aware of how often during their era life ended tragically early. In 1785, Abigail Adams penned a letter to her sister about the impending demise of a favorite aunt at a relatively young age. “It will be another memento to us of the fragility of the whole, and that duration depends not upon age,” Abigail observed sadly. Nearly a decade later Martha Washington lamented, “It is the case with all parents that have many children—they lose them as soon as they raise them generally.” The words of John C. Jackson to his sister-in-law Dolley Madison serve as a poignant reminder that
death and illness were an almost daily occurrence at the time. Arriving home in the fall of 1808 shortly after he had lost his wife to disease, he found his children “very ill with a billious fever. . . . When shall sickness & death cease to terrify & distract me?” Jackson wrote in despair.

How this group of American founders coped with illness and tragedy and mustered the fortitude to go on with their lives reveals much about their characters as well as early American medical history.

Revolutionary Medicine provides an in-depth look at the health, illnesses, and medical endeavors of the collective group of America's founders highlighted above. It is based on close readings of literally thousands of their letters, their prolific writings, and hundreds of secondary sources. Over the last decades, serious scholarly examination of the subject has been limited. A few publications have studied the involvement of several founding fathers, most notably Jefferson and Franklin, in the growth of science in the Age of Reason, a handful have addressed, but only briefly or tangentially, their health experiences, and one recent monograph has even provided an admirable book-length examination of Franklin's “medical career.” However, these works have been limited in scope and have focused primarily on only one individual.

In contrast, this book has three main goals. The first is to demonstrate the critical but mostly overlooked roles these founders played in the development of a foundation for the country's later public health care system as they strove to effect “general” improvement of American society. Secondly, it reveals the dramatic, compelling stories of the founders' own personal encounters with illness and wellness issues, which encouraged them to support many surprisingly modern notions about health regimens and treatment. Finally, Revolutionary Medicine illuminates colonial and early-republic medical treatment and practice and provides salutary lessons for our time.

Public health in America was in its infancy under British rule. It was generally reactionary—prompted by epidemics and limited to often ineffective quarantines aimed primarily at avoiding contagion from diseases such as smallpox and yellow fever brought to America through passengers on incoming ships from foreign ports and at establishing rudimentary sanitary measures to control open sewers, protect water, and promote cleanliness in public streets in growing towns. However, several American founders, particularly Jefferson, Franklin,
and Washington, anticipated modern medicine and were on the cutting edge of public health advancement, beginning with small steps to promote community action in regard to disease, prompted by a strong sense of social responsibility. They personally advocated contemporary sanitary measures that led to cleaner thoroughfares and water, but at the same time they realized that municipal government could play a key role in their successful adoption.

All the founders were profoundly influenced by Enlightenment thought, which venerated scientific progress and empirical knowledge. Franklin and Jefferson were both elected as early presidents of the American Philosophical Society. Despite the somewhat misleading name, the organization’s focus was the study of “useful” knowledge, to be utilized primarily as a stepping stone to increased liberty, prosperity, and even happiness. The concept of personal happiness was a fundamental theme in Enlightenment philosophy. In the new American nation that ideal was famously voiced in the Declaration of Independence, authored by Jefferson with the input of Franklin and Adams, in the phrase that all men were entitled to “life, liberty, and the pursuit of happiness.” The European *philosophes* repeatedly connected contentment with good health, so medicine became a central focus; Voltaire famously declared that “there is no true happiness for the man who is not well.” John Locke, the philosopher who most influenced America’s founders, began his career as a physician, and he, too, emphasized the connection among health, happiness, and progress toward a better world.

Since the practice of medicine in the eighteenth century was largely theoretical and most medical knowledge and even a medical degree could be acquired by apprenticeship or study that emphasized “reading,” educated and highly literate laypersons like Adams, Franklin, Washington, Jefferson, and Madison were well acquainted with what they considered simply another branch of science, albeit a highly practical one. Influenced by Enlightenment aspirations for general progress, they anticipated that medical treatments would develop rapidly, although they would undoubtedly have been disappointed to find that it would take decades for nineteenth-century American medicine to advance in any measurable degree.

Due to their privileged status, this circle of founders was assured of access to contemporary medical knowledge, trained physicians, and the
best medications available, although until the Civil War, most health care took place in the home. Popular health guides of the era offered practical advice and even encouraged self-dosing. As one early historian noted, “Men of education and genius in varying paths of life did not consider it strange or peculiar to think, discuss, or write about medical matters.” Franklin and Jefferson, in particular, were perhaps as well versed in medicine as any contemporary learned medical practitioner, and women such as Abigail Adams, Martha Washington, and Dolley Madison were expected to treat family illness at home with their store of medicinal herbs and traditional remedies.

These particular founders were chosen deliberately for a variety of compelling reasons. All of them experienced dramatic and often tragic personal encounters with disease and epidemics. Not only does the prolific correspondence they left for posterity vividly and articulately describe these health “events,” but their experiences are illustrative of the host of health challenges almost all early Americans faced. Moreover, this group of founders displayed a remarkably impressive grasp of medicine for the time, but viewed the subject from somewhat different perspectives. For example, Franklin and Jefferson were leaders in promoting scientific medicine based on empirical evidence, while Washington represents the outlook of what might be dubbed a “warrior healer,” and Abigail and John Adams reflect a pragmatic approach to medical treatment. These founders’ often progressive outlooks about medicine influenced their efforts to improve American medical practice and disease control. The high level of political power that Washington, Franklin, Adams, Jefferson, and Madison possessed enabled them at times to translate their concerns about public health into practical action.

This introduction will set the stage for an examination of the founders highlighted in this book against the backdrop of eighteenth-century medicine, including descriptions of the many illnesses and diseases they confronted and the remedies available at the time. The next chapters will focus on their individual medical/health stories, beginning with the Washingtons, moving on to Franklin and John and Abigail Adams, and ending with Jefferson. Space constraints did not allow for a full chapter devoted exclusively to Dolley and James Madison. However, the highlights of their often-harrowing encounters with disease and Madison’s involvement with health care have been interwoven into several
chapters in the book, most prominently in this introduction, the two chapters focusing on Thomas Jefferson, and the epilogue. Conversely, Jefferson’s exceptional personal experiences with sickness and early death, his scientifically based, sophisticated understanding of medicine, and his prominent work in the battle to reduce smallpox in America during the early republic through the introduction of widespread vaccination resulted in two chapters focusing on his role.

Each chapter is biographical in nature but focuses on the book’s three central themes: each founder’s personal health, his or her individual experiences with illness and disease in terms of family and friends, and, for those who held political positions, his or her pursuit of public health policies. Not only did this elite cadre share a commitment to liberty and republicanism, but their lives frequently intersected in discussions about improving community health and concerns about sickness. Indeed, they all believed that a democratic republic was the most conducive environment for good health. They often shared their medical knowledge with their family members, neighbors, and the larger community and comforted one another in times of physical crisis and grief. In a variety of ways, each of them demonstrated early and active involvement in public health issues.

Illness and Disease in Early America

Because illness was so prevalent and often catastrophic in the colonial and revolutionary eras, disease was a constant fear embedded in the early American psyche—and with good reason, as such afflictions as tuberculosis, smallpox, malaria (intermittent fever or ague), yellow fever, typhoid, whooping cough, diphtheria (quinsy), cholera, measles, and dysentery (bloody flux) often reached epidemic and deadly proportions, and a “minor” infection such as bronchitis or strep throat, relatively simple to treat today with antibiotics, was serious enough to cause death. For example, complications from streptococcal or some form of throat infection (compounded by excessive bloodletting, which resulted in shock) is thought to have been the cause of the demise of George Washington.15

Before 1800, life expectancy at birth was startlingly low by modern standards, and there is evidence to suggest that the overall mortality rate in America actually increased in the nineteenth century before the Civil
War. Men in the eighteenth century on average lived into their late forties or early to middle fifties; women, who were at heightened risk due to frequent pregnancies (fertile women could expect to give birth on an average of every eighteen months to two years) and complications of childbirth, could often expect to live only into their forties. It is noteworthy that by contemporary standards all the American founders in this study exceeded those expectations remarkably, perhaps aided, in part, by their elite status, which gave them access to the best medical care available at the time, good nutrition, and a high standard of living.

As pioneer medical historian Richard Shryock put it over half a century ago, “In reviewing the circumstances of health in early America one almost wonders that so many people survived and that the country grew and prospered.” Historically, smallpox killed over 25 percent of those infected with the disease and scarred for life most of those who survived. In one New Hampshire town in 1735 nearly 20 percent of the population succumbed to diphtheria, and the victims were almost exclusively children. Due to the especially virulent disease environment, in southern colonies the child mortality rate was, tragically, even higher. Over 85 percent of the babies in early South Carolina died before they reached the age of two; more than a third of the babies in one of the colony’s parishes died before the age of five, many during the peak malarial season through the summer and early fall.

Cholera was another common and frightful disease, caused by a micro-organism arising from contaminated water. Doctors and family members could do little but stand by as victims were wracked by such severe diarrhea, stomach cramps, and vomiting that they became so dehydrated that their lips turned blue and their faces often turned purple. Most patients died within days. In 1793, by the time the yellow fever epidemic in Philadelphia ended with the advent of cooler weather, well over four thousand people, nearly 10 percent of the population, died, and another nearly twenty thousand people fled, including many government officials. While many realized that a number of diseases were contagious, the origins of the maladies and nature of the mechanisms of transmission were not understood, and leading physicians and sanitarians disagreed over both the cause and cure of most illnesses.

It is interesting to note that the lives of several of America’s founders, including Adams, Washington, Jefferson, and Dolley Todd Madison,
intersected during the epidemic, and the story of that infamous event is particularly instructive. Their experience of living in Philadelphia, at that time the nation’s capital and largest city, during arguably the greatest single public health crisis of the century undoubtedly helped shape their thinking about community health issues and what level of responsibility government should have in what had normally been regarded as a private issue. Social, economic, and political life was disrupted over the summer and fall of 1793 as those who had the means to escape did so, leaving many who were poor or infirm behind to cope with the limited assistance of a core group of selfless city officials, physicians, and volunteer private citizens. President Washington fled to Mount Vernon and Vice President Adams traveled to Massachusetts to avoid the terrifying path of illness and death, which sometimes killed as many as half of those who had contracted the disease. Jefferson, then the workaholic secretary of state, decried the panic and observed the epidemic from his airy rented country home on Philadelphia’s outskirts with a scientific eye, noting its symptoms and duration. But as danger mounted he, too, made plans to leave for Monticello.

Jefferson remained in the area longer than most government officials and escaped illness, but Dolley Todd, at that time the wife of rising young lawyer John Todd Jr., was not so lucky. Tragically, the terrible epidemic claimed the lives of her beloved husband, her sickly six-week-old son William Temple, and her in-laws in one fell swoop, leaving her ill and weak from complications following childbirth and with her sick two-year-old remaining son John Payne to care for. Dolley’s correspondence and the details of her harrowing days in the midst of the epidemic provide graphic insight into the anguish experienced by the victims and family members affected by the yellow fever.

When the epidemic spread, Dolley’s husband sent her and the children away to what was considered a safer area in the countryside at a farm near Gray’s Ferry. However, John Todd remained in Philadelphia to care for his parents and conduct his law practice, and he visited his wife and children when he could. As the sad events unfolded, Dolley poured out her heart to her brother-in-law: “A revered Father in the Jaws of Death, & a Loved Husband in perpetual danger. . . . I am almost distracted with distress & apprehension—it is too late for their removal . . . I wish much to see you, but my Child is sick & I have no way of getting to you.”
Fortunately, the 26-year-old Dolley, as well as her mother, three brothers, and three sisters, survived the yellow fever epidemic, and Dolley remained especially close to them for the rest of their lives. An attractive widow, Dolley would marry future president James Madison in less than a year after Todd’s death, but her tragic experience left her always especially anxious about the health of family members, particularly Madison and her remaining child. As she wrote to a friend in 1808 after the death of her youngest sister,

Oh God! We must bow our heads to thy decrees however awful—we cannot change or avert them . . . when I trace the sad events that have occurred to me, I feel as if I should die two [sic]. . . . My Husband is nearly well & I have exerted all my fortitude, all my religion, in order to live for him & my son. . . . I used to think I could not survive the loss
Those like Dolley who survived yellow fever acquired lifelong immunity, and pregnant women who encountered the illness could even pass on some level of protection to their newborn children for at least the first months of life. Over the next decade, yellow fever affected people in varying but serious degrees in most bustling port cities up and down the coast, most notably in Philadelphia, New York City, and Boston, and served as an impetus for heightened government involvement in public health and sanitation and the stricter inspection of incoming ships. The virus required an initial pool of infected humans, most often travelers on incoming ships from tropical ports, but was carried and spread through the sting of infected Aedes aegypti mosquitoes. The insects bred in stagnant fresh water containers, including holes dug for runoff from gutters and cisterns and puddles that collected rain water in crowded urban centers, particularly in warm regions. Jefferson appears to have had a better understanding of the disease’s origins than most physicians of the time. In 1804 he wrote a friend that “on the question whether the yellow fever is infectious, or endemic, the medical faculty is divided into parties.” By the next year, on the basis of his own studies Jefferson concluded that it was indeed “an endemic, and not a contagious disease” that could be communicated from one person to another by contact, and he would emphasize the importance of sanitation and the efficacy of fresh water and air, particularly in urban centers.

Although yellow fever epidemics were deadly and frightening, the incidence of the disease in America, with its characteristic jaundice, high temperature, chills, purple bruises on the skin, and internal hemorrhaging that produced black vomit, was relatively infrequent. Infectious diseases generally rose and fell with the seasons; yellow fever and malaria thrived in the heat and humidity of hot summers, which encouraged the proliferation of breeding mosquitoes, while other diseases, like smallpox, tended to peak in winter, particularly in urban centers where it spread more easily as people congregated indoors. In reality, on a regular basis, respiratory infections and consumption (tuberculosis), enteric intestinal illnesses such as dysentery, and malaria caused more sickness and took more lives than outbreaks of the infamous smallpox, cholera, and yellow
fever, but the latter illnesses appeared more dramatic and hence aroused more apprehension and spurred more robust community action.26

Infant mortality at the time was very common, with a grim rate estimated to have been as high as 40 percent during the revolutionary age, and if one survived childhood, young adulthood posed another host of health challenges, especially tuberculosis and other respiratory illnesses.27 In Philadelphia, it is estimated that in the 1780s, half of all deaths occurred in those under the age of ten.28 Illness and disease were a given in the lives of most people of the era, an unavoidable fact reflecting the fragility of life, and as Martha Washington stated so succinctly from personal experience, “sickness is to be expected.”29 But what was the state of American medicine during the colonial, revolutionary, and early national eras, when doctors had little understanding of the causes of illness or specifically how one differed from another? How did the country’s early founders cope with a host of illnesses in the light of limited medical knowledge and practice and lack of effective medications?

Early Medical Theory and Treatment

As we will see, many of the founders not only educated themselves about health and new as well as traditional treatments but also advocated government-sponsored public health measures and sometimes became informal medical practitioners themselves. During the era, sickness and health were part of a communal agenda, and particularly during times of crises, families and communities often combined their medical knowledge and resources to aid one another.30 Early Americans often resorted to a wide range of proposed cures. While some of those medical treatments, such as bleeding for virtually every ill, appear ludicrous to us today, we should be mindful that medical science has always been a moving target, characterized by trial and much error. Medical progress has never been uniform, but fragmented and sometimes contradictory. Even today there are frequent news stories concerning medications or treatments that were considered safe and effective, only to be recalled or denounced a few years later.31

Medical theory in colonial America had not developed far from that espoused by the Greek physician Galen in the second century, and many doctors continued to emphasize that good health was a result of
the balance of four bodily humors, which included yellow and black bile, blood, and phlegm. Conversely, illness was seen as a result of an imbalance of those factors. The goal of “cure” was frequently the alleviation of outward signs, as the connection between symptoms and underlying illness and disease was poorly understood: in other words, symptoms were seen as the disease. Moreover, specific diseases with attendant particular causes and treatments were concepts to be developed in future modern medicine.

Galen espoused bloodletting (venesection) as a means of ridding the body of bad humors. Bleeding, for example, might be used to relieve a patient of excess blood that contained diseased morbid matter that was thought to have caused fever. Raising skin blisters using caustics such as cantharides derived from the crushed body of the Spanish fly was thought to counteract overactive blood or tissue. Many radical practices were thought to remove “poisons” from the system and restore proper balance and equilibrium through their stimulating or sedating powers. Challenges to accepted theory began to appear in England in the late seventeenth century. A handful of physicians began to advocate more direct patient intervention based on a doctor’s own experience rather than theory alone, and some emphasized the healing power of nature through the use of drug remedies compounded from either plant extracts or chemicals. Mercury to treat syphilis is a prime example, although it often brought a host of dangerous side effects. Franklin and Jefferson were among the first American leaders to argue for medical treatment based on scientific empirical evidence, and Jefferson frequently decried invasive measures such as bloodletting.

Despite modest advances, confusion characterized eighteenth-century medicine and even persisted into at least the first half of the nineteenth century. Although prevailing medical theory of the time emphasized imbalances of the humors, another popular strain of medical thought attributed all illness to “solidism,” the alternating states of tensions and relaxation in the nervous and vascular systems. If blood vessels became “too excited,” for instance, the situation might produce fever, which required “calming” by removing excess blood. Both systems relied on bleeding and purging to bring the body into better alignment.

No one at the time understood the role of microbes and that diseases were frequently spread not only through direct physical contact but also
through droplets in the air resulting from coughing and sneezing—although Franklin certainly entertained a nascent theory on contagion. The subject of contaminated food and drinking water, which contributed to gastrointestinal illnesses like dysentery and diseases such as typhoid and cholera, was a mystery as well, and ideas about the efficacy of good sanitation to prevent some of these types of sicknesses was just emerging. In the absence of knowledge about bacteria and viruses and their relationship to infection, a number of radical therapies and theories thrived during the colonial, revolutionary, and early national periods.

Contemporary medicine in the eighteenth century often pointed to miasmas, “morbid,” noxious air and vapors rising from stagnant water, or decomposing filth and rotting garbage as the cause of virtually all common diseases such as malaria, yellow fever, and typhus, which we understand today as being viral in origin, with microbes transmitted either from person to person, through contaminated food and water, or by infected insects that multiplied in filthy, standing water. In the case of malaria, for example, hordes of *anopheles* mosquitoes hatched in stagnant pools became frequent hosts of malarial parasites, spreading the illness among hapless human victims by feeding on their blood through their infectious bites and in the process destroying red corpuscles in the human bloodstream. When the disease was treated by the common therapy of bleeding, it often made matters worse by producing severe anemia in the victim.34

Malaria, which affected a large number of early Americans, could result in death, but more often the victim experienced chronic or intermittent fever and chills, an enlarged spleen, which produced pain in the abdomen, headache, fatigue, and general malaise. Two early visitors to South Carolina, for example, reported, “Fevers prevail all the year, from which those who are attacked seldom recover; and if some escape their complexion becomes tawny [jaundiced].”35 Washington and Madison, both Virginians, probably suffered from malaria and recurrent flare-ups throughout their adult lives.

Because the concept of bacterial or viral infection was unknown at the time, the highly regarded Dr. Benjamin Rush of Philadelphia insisted that when Benjamin Franklin died in 1790, the pleurisy that led to his death “was caught by lying with his windows open.”36 In Charleston, South Carolina, an early statute maintained, “The air is greatly
infected and many maladies and other intolerable diseases daily happen.” John Tennent’s popular book titled *Every Man His Own Doctor*, authored in 1725 and reprinted several times by Benjamin Franklin, attributed “fevers, coughs, quinsies, pleurisies, and consumption” to “Fogs and Exhalations” in the air arising from marshes, swamps, and bodies of water. Miasmas were considered most dangerous in warm climates, particularly during the “unhealthy months,” but even people in northern states experienced their share of illnesses, including malaria. During the Revolutionary War, a high percentage of soldiers in some regiments were infected with parasites, which they introduced after returning home to New England. Several serious malaria epidemics descended on the region in the late eighteenth century, encouraged in part by marshy areas created by milldams, which served as a breeding ground for the mosquitoes that spread the disease.

In late-seventeenth-century England, Dr. Thomas Sydenham was on the leading edge of early Enlightenment-inspired physicians who began to emphasize empirical clinical medicine based on observation and data, and his ideas later gained popularity in America. But even Sydenham began the treatment of virtually every disease by opening a vein with a lancet. In America, purging, blistering to raise pus-filled lesions from which to expel “harmful matter,” sweating through the use of heat and steam, and especially bleeding—the ineffective but often detrimental taking of a pint or more of “bad” blood from the afflicted—also became the common medical therapies for almost all ills and were considered “best practices.”

Forward-thinking about health care in many other ways, Washington, Abigail Adams, and Franklin frequently recommended purging, bleeding, and blistering for their own families and friends and claimed to have personally experienced the benefits of the procedures, undoubtedly the result of a powerful psychological placebo effect. Indeed, common medical wisdom recommended bleeding at least until 1835, when the French physician Pierre-Jean-George Cabanis demonstrated it to be worthless by using medical statistics to prove his case, although most American doctors still ignored his findings. Many American doctors continued bleeding as well as purging with mercury taken in the pill form of calomel through the infamous cholera epidemics that took place between the 1830s and the 1850s. Acrimonious debates about the
efficacy of bloodletting and a variety of heroic drug therapies raged up
to the Civil War, before the procedures gradually faded into disuse.

The use of these extreme “cures” was often worse than the illness itself, and many in an already weakened state died as a result of violent bleeding or purging. Today we know that mercury is poisonous, and many patients who were treated with calomel undoubtedly experienced deleterious effects. One revolutionary-era Boston physician distanced himself from the majority of doctors and violently criticized contemporary medical practice in early New England, which “was very uniform, bleeding, vomiting, blistering, purging, anodyne, etc. if the illness continued, there was repetendi, and finally murderandi.”

Jefferson, who generally only turned to medical men as a last resort, took contemporary physicians to task in a similarly caustic manner and declared, “the inexperienced & presumptuous band of medical tyros let loose upon the world, destroys more of human life in one year, than all the Robinhoods, Cartouches & Macheaths do in a century.” In fact, he was not far off the mark. It is noteworthy that advanced medical ideas often stemmed from educated laymen like Jefferson and the other American founders included in this study rather than physicians, who often had little to offer seriously ill patients. Jefferson would undoubtedly have looked with approval on the early-nineteenth-century “revolt” against the excesses of heroic medicine and the heated rivalry between regular physicians and “irregular,” unconventional natural homeopathic healers such as herbalist Samuel Thomson that flourished in the decades after Jefferson’s death.

Most early doctors, apothecaries, and lay healers compounded their own medicines, largely from combinations of chemicals, herbs, and plants. A number of “patent” medicines made use of plant-derived ingredients such as opium from poppies. After 1785, digitalis derived from the foxglove plant was used successfully for heart patients to treat “dropsy” or congestion. Homemade remedies mixed by laypeople often worked well for minor illnesses and spared them the expense of purchasing a patent medication, which was not inconsiderable. For example, doses of the popular laxative jalap in mid-eighteenth-century Virginia cost about the same as two pairs of shoes. Indeed, we know that nature was the first source of medicine used to treat human illnesses, and even in modern times they remain an important avenue of healing.
Today’s ubiquitous and remarkably effective medication aspirin was derived from willow bark, which was often used by early Americans to treat headaches, and penicillin famously evolved from a fungus that featured a substance that killed bacteria.

Many of the American founders were familiar with medicinal herbs and their reputed curative powers. They often espoused their own home remedies or “simples” recorded in family “receipt” books, or followed manuals explaining the specifics of mixing and administering herbal remedies. As we will see in later chapters, heads of households, including women like Abigail Adams, Martha Washington, and Dolley Madison and their contemporaries, often grew medicinal plants in their household gardens, learned how to brew their own potions, dress burns and wounds, staunch bleeding, reduce swelling, and treat common illnesses such as colic, measles, and whooping cough. As domestic healers, they often relied on a basic understanding of the humors to make a “diagnosis.”

As one historian has noted, most women in the colonial era practiced some form of medicine, “whether they were housewives making herbal infusions for children or midwives delivering babies for their neighbors.”

In fact, home remedies often competed successfully with the many dubious patent medicines. Jefferson especially favored the healing power of nature and used thyme and lavender from his own garden at Monticello for stomach ailments and headaches. In 1759, Washington ordered drugs from London, including the ubiquitous cathartic calomel (mercurous chloride) and the emetic ipecac, but also purchased herbal tonics such as spirits of lavender and cinnamon water.

In the absence of a reliable medication to relieve her painful symptoms of rheumatism, Abigail Adams recommended the application of cabbage leaves for those who suffered from the aches and pains of the ailment, which she characterized as “our family infirmity.” “Rheumatism” was the broad and general name then given to a variety of aches and pains, which most probably included arthritis, muscular inflammations, and strains. In addition to home remedies, for some people at the time, religion rather than medicine provided solace and the ability to cope with life’s many vicissitudes.

Herbal remedies brought relief to some patients, and opiates were sometimes administered in a haphazard way to address pain. Opium in
the liquid form of laudanum was introduced in England in the sixteenth century and often recommended for discomfort as well as insomnia and diarrhea. It was made from the concentrated juice of the poppy mixed with alcohol; the opium extract was often mixed into brandy. The name “laudanum” was derived from the Latin “laudere,” meaning “to praise,” and the popular remedy was used freely by most early Americans, including some founders. Jefferson, Franklin, and Abigail Adams relied on laudanum in their last years to help them sleep and mitigate severe physical discomfort. Dr. Sydenham maintained that “[m]edicine would be a cripple without it.”

In addition to laudanum, quinine derived from the bark of the cinchona tree (Jesuit’s or Peruvian Bark) was another of the few therapeutically effective available drugs at the time, when it was used to treat malaria. Jesuit missionaries in South America introduced the bark to Europe in the 1630s, and it became the source for the later alkaloid quinine. Although quinine cannot prevent infection, it has the effect of poisoning the malarial parasite and preventing the outbreak of illness or minimizing its effects. Even though proposed cures for malaria have been documented back to the Romans, full understanding of the etiology of the disease did not emerge until 1897, when the British army surgeon Ronald Ross helped discover that the disease was transmitted by mosquitoes. Formerly, it had been thought that a malignant atmosphere produced the illness, and the name “malaria” literally means “bad air,” “mal aria.” Malaria is an insect-born disease, but the mosquito must be infected by a human host, and it was probably imported to the Americas through Europeans.

Still, even the use of the bark was only partially effective as an exact dosage was hard to determine, and quinine was not effectively isolated from cinchona until 1822. The diagnosis of malaria was elusive as its most prominent symptom, intermittent fever, was often confused with other illnesses, especially yellow fever. In many cases quinine was regarded as an efficacious tonic and ended up being used inappropriately for a hodgepodge of diseases.

Jefferson, Franklin, George and Martha Washington, John and Abigail Adams, and James and Dolley Madison certainly had access to popular medical guides, such as Dr. William Buchan’s book Domestic Medicine, published in London in 1769, which appeared in Philadelphia by 1771. The manual offered practical advice and instructions for the
treatment of a variety of diseases and their symptoms written in a clear, commonsense style intended for the general public. It was so popular that it was reprinted numerous times in America.

Early Medical Practitioners

Buchan was a learned Scottish physician who had received his training at the famed University of Edinburgh. He hoped his publication would be of assistance primarily in the area of preventative medicine and the treatment of mild illnesses, but Buchan strongly recommended calling in a doctor promptly when more serious disease was suspected. Even regular physicians in America at the time encouraged reprinting of the book in the United States, reflecting contemporary appreciation for the role of domestic involvement in successfully treating illnesses. By 1784, Abigail Adams was studying the volume on her sea voyage to join her husband John in Europe, and she concluded that “[h]e [Buchan] appears a sensible, judicious and rational writer.” The book’s emphasis on prevention and the benefits of exercise, fresh air, clean water, cleanliness, and good nutrition must have been very appealing to Jefferson and Franklin, in particular, but Buchan still considered bleeding an effective treatment tool.

Although doctors like Buchan commanded respect, the formation of medicine was a laborious process, and not until the beginning of the twentieth century would American physicians fully consolidate their respected professional status and authority. Popular feeling is encapsulated in the remarks of an early American observer in the 1750s who opined that “[q]uacks abound [here] like locusts in Egypt.” Understandably, colonial medicine mirrored contemporary practice in England. Physicians, surgeons, and apothecaries jockeyed for predominance in both locations, although the lines between the various health practitioners were often blurred, and many doctors were clearly rank amateurs. During the era, three spheres of medical “practice” held relatively equal sway: domestic household medicine, medicine practiced by doctors, who had undergone “formal” education or apprenticeship, and medicine practiced by experienced lay healers, including midwives and herbalists. To enhance their position, learned colonial doctors often referred disparagingly to medical competitors whom they viewed
as having lesser qualifications or who did not follow the practices of orthodox medicine as mere “empirics” or “quacks,” although the latter term was most often applied to dishonest charlatans who aggressively advertised outlandish treatments for financial gain.\(^6\)

On the eve of the Revolution, there were about thirty-five hundred medical practitioners in America, but only about 10 percent actually held medical degrees.\(^6\) However, by the mid-eighteenth century an academic degree became increasingly desirable, although it did not necessarily guarantee competence. University-trained physicians learned much about prevailing medical theories but often had limited contact with actual patients. Doctors with a university education could command twice the fee of those who had merely apprenticed, a cost that generally only the rich could afford. Scotland housed several respected medical schools, although England and the Continent also provided education for many aspiring colonial physicians.\(^6\) English-born Dr. Robley Dunglison studied medicine in London, Paris, Edinburgh, and Bavaria, and later became a professor at the new University of Virginia in 1824 as well as Jefferson’s personal physician in the former president’s last years.\(^4\)

Washington’s personal physician for most of his adult life was the Scottish-born Dr. James Craik, who had also studied medicine at the University of Edinburgh. Dr. Benjamin Waterhouse, who with the active assistance of Thomas Jefferson introduced the effective and safer Jenner method of smallpox vaccination in America, was born in colonial Rhode Island in 1754. Following the typical pattern for aspiring early American physicians, Waterhouse attended medical school in Edinburgh in 1775, studied with a noted doctor in London in 1776, and received his diploma from Leyden in 1780, before returning to the United States. Waterhouse was revolutionary not only in his public health endeavors but also in his politics. It is said that his enrollment signature in the Leyden medical school was followed by the statement, “A citizen of the free and United States of America.”\(^6\)

The story of Dr. Benjamin Rush of Philadelphia (1745-1813) illuminates the state of medical training and practice in early America and attendant disagreements over therapies. The handsome, garrulous, and energetic Rush was perhaps the foremost American physician of the colonial and early national eras. Rush apprenticed with Dr. John
Redman in Philadelphia and was allowed to follow Redman in his rounds at the local hospital. His duties in Redmond’s “shop,” as he termed the doctor’s medical practice, included “preparing and compounding medicines, visiting the sick and performing many little offices of a nurse to them . . . and exclusive charge of his books and accounts.”

Rush later trained under the famous Scottish physician and professor of medicine Dr. William Cullen, received his medical degree at the University of Edinburgh in 1768, and spent nearly two years in London and Paris gaining experience. Though Rush received strong academic instruction in addition to practical experience, most American physicians in the revolutionary era learned their craft through the apprenticeship system alone, and the medical profession in the United States was not regulated and did not become firmly established until the first half of the nineteenth century. Pragmatic Americans tended to respect not only doctors who had acquired formal theoretical training in a university setting but also those who built reputations as experienced physicians, such as Rush, who had regular daily contact with patients. Those lacking even rudimentary knowledge competed with the more competent at the time, which resulted in a motley and surprisingly large assortment of medical practitioners, for “[t]hough many physicians were ill-trained, even-untrained, there were a good many of them.”

The first medical school founded in America opened in Philadelphia in 1765, with Benjamin Franklin’s central involvement and encouragement, and was followed by a second academy, the King’s College Medical School in New York, the following year. Both institutions were aimed at professionalizing and upgrading the state of medicine. Franklin served as a mentor to Rush and a number of prominent emerging Philadelphia doctors, who revered the older leader. On his return from Europe to Philadelphia in 1769, Rush launched his successful American practice and became a member of the College of Philadelphia medical school faculty as a professor of chemistry. As a measure of his elevated status, twenty years later Rush was elected professor of theory and practice of medicine at the college, and when the school became the University of Pennsylvania, he was named professor of the Institutes of Medicine.

Rush was the first to diagnose what he termed “billious remitting yellow fever” in August 1793, at the beginning of the notorious Philadelphia epidemic. Although he had at first been acclaimed as a popular hero,
Rush was later strongly criticized for his increasingly aggressive medical response by some physicians, particularly those who followed the French school of medicine, which emphasized moderation, the use of bark and a variety of herbal remedies, and the superiority of nature over heroic measures. In the wake of the negative publicity, an embittered Rush later resigned from the College of Physicians, America’s most prestigious medical society at the time and one that he had helped found, and his medical practice declined precipitously by the late 1790s.  

During the duration of the epidemic, Rush exhausted himself working tirelessly to treat the yellow fever victims, often seeing as many as one hundred patients a day. His devotion to his patients during the crisis was exemplary, although ultimately as ineffective as the variety of treatments offered by all local physicians. In fact, Rush's radical depletion therapies, including violent purging with calomel combined with jalap and extreme bleeding, which at times ran to his calculation of four-fifths of the patient’s circulating blood, probably hurried many of the sick to their deaths. His treatments sometimes caused gastrointestinal bleeding and certainly added some level of mercury poisoning and debilitating weakness to their conditions. Rush's view of the treatment of yellow fever is particularly instructive about the state of medicine during the age. Philadelphia at the time was the center of American medicine; at least eighty doctors worked in the city, and Rush, dubbed the “American Sydenham,” was its most respected practitioner. Rush traced all disease to underlying excess stimulation in the blood vessels. As late as 1796, Rush still believed that “there was but one fever in the world . . . and one disease,” the “morbid excitement induced by capillary tension” that responded best to the remedy of bloodletting and purging.  

As one historian observed, Rush and his fellow physicians “stood between medieval and modern medicine.” The era's greatest minds in American medicine were divided on the causes and treatment of yellow fever, some asserting that it was “imported” through foreigners arriving on ships from the West Indies and others blaming domestic conditions such as local climate and miasmas. Rush believed incorrectly that the disease stemmed from local “sensible and insensible qualities of the air.” One solution put forward by members of the local legislature to rid Philadelphia of the fever was to set off cannons to clear the air, and at one point Rush pointed to exhalations from spoiled coffee on the
local wharves as the culprit for the start of the epidemic! Rush noted
the great infestation of mosquitoes that fateful summer, but made no
connection between the insects and the spread of the disease.\footnote{72}

Walter Reed’s discovery in the early 1900s that yellow fever was
transmitted by biting mosquitoes and not by personal contact with
people who had been infected by “noxious” air was still over a century
away. Therefore, the illness could not be effectively prevented or treated
by simply turning away foreigners, quarantine, fumigation, the large
doses of bark and wine advocated by some doctors, or radical bleeding
and purging.\footnote{73} Rush himself became ill but survived. As the epidemic
continued to rage, he advised Philadelphia residents to flee the city if
possible to escape contagion. The numbers of deaths only increased in
September until the yellow fever slowly tapered out with the coming
of colder weather, heralding the end of mosquito season, and finally
ended in late November, when many Philadelphians who had left the
city returned home.

Although Rush was tragically wrong about the yellow fever epi-
demic, he had many other positive attributes to commend him as both
a physician and a patriot, one of the many early American physicians
who became involved in politics. Rush, an American founding father
in his own right, was active in the Continental Congress and signed
the Declaration of Independence. As a surgeon general in the Conti-
nental Army from 1777 to 1778, he authored a tract about preventative
health instructions for soldiers. A firmly committed republican,
like most of the founders examined in this book, he believed that edu-
cated American citizens could take a direct role in managing their own
health and once declared “the people rule here in medicine as well as
government.”\footnote{74}

In that view, Rush was reflecting republican thought that empha-
sized a connection between ably and sensibly managing one’s own
health and regulating and promoting the well-being of the nation as a
whole. This philosophy was surely a driving force in Jefferson’s efforts
in his twilight years to introduce a medical curriculum at the Univer-
sity of Virginia, which he helped found. Jefferson’s goal was not only to
help provide high-level scientific training in medicine for future physi-
cians but also to educate general students so that the “common” man
would acquire basic knowledge about illness and treatment, which
could be applied practically to help guide the health of their families and communities. Moreover, for America’s founders, the “health” of the nation referred to far more than simply the physical state of its inhabitants and was inextricably linked to the country’s political, economic, social, and cultural vitality.

A close friend of Franklin, Jefferson, and Abigail and John Adams, Rush played a pivotal role in the reconciliation of Adams and Jefferson in their later years after Jefferson defeated Adams for the presidency and their political differences had driven a wedge between the two American leaders. Because of his medical reputation and close relationship with the Adameses, Rush was consulted when their daughter Nabby was diagnosed with breast cancer when she was in her midforties. He was the physician who made the recommendation that Nabby Adams Smith undergo a mastectomy as her best chance for cure. Unfortunately, despite the operation, it was too late for Nabby, whose cancer had already spread. In old age, Jefferson turned to Rush for medical advice about a severe attack of rheumatism. Sensitive to the fact that Jefferson abhorred most drugs, Rush conservatively recommended botanical medications, including doses of sassafras tea and spirits of turpentine, and sent the former American president castile soap, opium, and camphor among other remedies to relieve the discomfort. Another time, Rush advised Jefferson that his feet be kept warm for they were “the avenues of half the paroxysms of all chronic diseases when cold.”

As an eminent and captivating teacher and a graceful medical writer, Rush was also fundamentally a champion of humanitarian social reform. He was a strong advocate for high-level academic medical education, the education of women, the abolition of slavery, alcohol temperance, and humane care for the mentally ill and the impoverished, many of whom he treated free of charge. He is often regarded as the father of modern American psychiatry. In his autobiography Rush recalled, “My shop [practice] was crowded with the poor in the morning and at meal time. . . . I often remained [in the houses of the poor] to administer my prescriptions, particularly bleeding and glisters, with my own hands.”

Although a caring man devoted to the cause of social welfare, and a physician who helped make Philadelphia a leader in American medicine, he was also, as we have seen, a proponent of radical heroic medical practices, particularly in times of serious epidemics—treatments that
certainly caused much harm. Yet it is important to note that Rush, like most trained physicians at the time, was just as certain as doctors today that his therapeutics were effective and an improvement over the past and reflected legitimate treatment based on empirical evidence. Rush sincerely believed he acted in an enlightened and scientific manner and that he followed the most advanced medical practices of his time. Furthermore, once Rush administered what he viewed as the initial required therapies of bleeding, purging, and puking (vomiting), he generally followed a philosophy of letting nature take its course through the rest of the healing process. Rush neither introduced heroic medical measures to America (where they had been popular for nearly two centuries), nor was he unusually extreme in his stand on bloodletting. His position as perhaps the leading physician in America at the time may have simply made him the most visible proponent of venesection.

Rush’s contemporary, Thomas Jefferson, had long displayed a keen interest in medicine. Probably influenced by his stay in France and admiration of French medicine, he understood before most American doctors the harmful effects of commonly practiced heroic measures employed in medicine at the time, such as the frequent use of the poisonous chemical mercury (calomel). While Jefferson staunchly opposed bleeding, even after the yellow fever epidemic, Rush still continued to believe strongly in its efficacy; when one of his “beloved” pupils later died, he maintained in his diary that “[h]is fever became fatal from the neglect of bleeding in one paroxysm of his fever.” Jefferson enjoyed a long friendship with Rush, but he sharply criticized the doctor’s penchant for drastic measures. In 1814, Jefferson recalled that “in his theory of bleeding . . . I was ever opposed to my friend Rush, whom I greatly loved; but who has done much harm, in the sincerest persuasion that he was preserving life.” Yet, triumphantly reviewing “The Improvements, Progress and State of Medicine” in the eighteenth century, as late as 1800 the eminent American physician and politician Dr. David Ramsay praised Rush as the “pride and boast of his country.”

Although Jefferson valued the potential of the prestigious Philadelphia College to advance the state of medicine, that did not prevent him from scoffing at the doctors the school produced: “Our country is overrun with young lads from the Philadelphia school who, with their mercury and lancet in hand, are vying with the word of Bonaparte which
shall shed the most human blood.” Despite his criticism of many of Rush’s therapies, when Rush died in 1813, Thomas Jefferson wrote to Adams, “Another of our friends of 76 is gone. . . . And a better man than Rush, could not have left us, more benevolent, more learned, of a finer genius, or more honest.” Similarly, John Adams concluded, “I know of no Character living or dead, who has done more real good in America [than Rush].”

Rush and most physicians in the colonies seemed to be somewhat more willing than English physicians to incorporate both traditional and emerging ideas, and doctors in both areas were often called in to treat a variety of illnesses, from treating infections to setting bones and pulling teeth. Surgery was generally limited to relatively minor procedures such as lancing boils and abscesses and bloodletting, and for the more daring and experienced, amputation, removing urinary tract stones, and aspirating fluids. At the same time, responsibility for medical care often fell to family members, who nursed the ill, often garnering their rudimentary expertise from books, newspapers, almanacs, or local experts such as midwives, apothecaries, and doctors.

Abigail Adams’s sister reported tending to her dying nephew through many anxious days and nights, relieved at times by her young daughter and a paid “watcher.” Founding father Benjamin Franklin, always receptive to new ideas, played a pivotal role in American medicine during the colonial and revolutionary periods through his own experimentation and inventions and dissemination of medical information through his Poor Richard’s Almanac and newspaper. His medical expertise earned him the respect of many physicians both in America and in Europe, where he received many honorary degrees and mentored many of America’s rising young physicians studying on the Continent.

Launching the Battle against Smallpox

The introduction of variolation, popularly known as inoculation, against smallpox was probably the most significant advance in colonial medicine and occurred simultaneously with its early use in England. As one historian put it succinctly, “Probably nothing in the field of early American medicine was more revolutionary.” Variolation could be traced back to ancient times in China, India, and Africa, but the first
documented instance in England took place in 1718. Boston's erudite minister-physician Cotton Mather, who lost his wife and three of his children in 1713 in one episode of the many severe waves of the disease, was one of the first Americans to successfully advocate for the introduction of inoculation in the colonies. As John Adams's grandson, historian Charles Francis Adams, observed, the clergy were especially revered in early Massachusetts and they “not infrequently became the family physician,” but many clergy opposed inoculation because they believed it went against the will of God.\textsuperscript{91}

Mather had a genuine desire to improve social welfare through medical advances. He followed contemporary scientific developments closely and seems to have adhered to an early protean concept of “animalcultural” or “germ theory” in his belief in the existence of tiny “animal” material causing disease.\textsuperscript{92} Mather was also a strong voice for moderation in medical treatment, particularly decrying the excessive bloodletting of the day: “Before we go any farther, let this Advice for the Sick, be principally attended to: \textit{Don’t kill ’em!} That is to say, With mischievous Kindness.” \textsuperscript{93}

Mather was assisted in his pioneering preventative smallpox campaign of 1721 by Dr. Zabdiel Boylston, the great-uncle of John Adams. Boylston inoculated himself and his only son Thomas, who was six years old at the time, as well as Mather’s younger children to demonstrate the efficacy and safety of the procedure. By the end of the outbreak, a total of 247 people underwent variolation, which involved inserting a small amount of live smallpox matter into the skin of a healthy person. Many contemporary doctors in Massachusetts, such as the university-trained William Douglass, initially opposed the procedure as both dangerous and medically unproven. Inoculation was so controversial at the time that Boylston was threatened with hanging and Mather’s house was bombed (unsuccessfully) by an irate critic. Many colonies passed laws to prohibit inoculation, which over time gave way to regulation as its benefits became more appreciated.\textsuperscript{94} Benjamin Franklin later observed that “the practice of Inoculation always divided the people into parties, some contending warmly for it, and the others against it.” \textsuperscript{95}

Still, inoculation was both risky and expensive at the time. The death rate for the procedure ranged from one to five in a hundred. To compound matters, the vulnerable poor sometimes found themselves infected by those who could afford inoculation and moved about
in public while still contagious. Smallpox had an incubation period between ten and fourteen days before symptoms became noticeable. Dangers such as these prompted many conservative doctors to decry the inoculation process altogether because of the potential to spread smallpox if quarantines were not strictly enforced.

Then, as now, only those who could afford the cost received the best medical care, but most of America’s founders were comfortably off if not actually affluent. Adams underwent the still-controversial procedure in 1764 in Boston when he was in his late twenties, and two years later, in 1766, Jefferson traveled from Virginia to Philadelphia at the age of twenty-three to be inoculated, signaling their forward outlook on disease prevention. Smallpox was one of the most serious threats to the health of early Americans. The widespread smallpox epidemic that ravaged the country from 1775 to 1782 killed more than a hundred thousand people and snuffed out many more lives than the British Army during the Revolutionary War, a phenomenon that prompted Washington to formulate his own public health policy of requiring inoculation among his troops and stressing overall good sanitation and other preventative measures for his soldiers. New recruits from more isolated country areas who had not developed immunity to diseases like typhoid and smallpox were especially vulnerable given the crowded and often unsanitary army conditions.

Even for civilians, the war disrupted normal life across the colonies and promoted the spread of a variety of infectious illnesses. Despite its drawbacks and potential for spreading contagion, overall, inoculation played a significant role in reducing future outbreaks of smallpox. But a decade later, smallpox still disrupted American life. In 1794 Madison complained to Jefferson that a wave of smallpox in Virginia had not only caused fatalities but also delayed the mail. Later, with the memory of war devastation in his mind and propelled by his keen interest in infectious diseases and public health, in the beginning of the nineteenth century Jefferson would play a pivotal role in the American introduction of the Jenner cowpox-based method of vaccination, first introduced in England in 1798. Influenced by the successful work of Boston’s Dr. Waterhouse, Jefferson used his political power as president to make the government a major player in encouraging better preventative health care through providing smallpox vaccination around the country.
Madison followed in his mentor Jefferson’s footsteps in addressing the threat of smallpox. During Madison’s presidency, on the eve of the War of 1812, smallpox vaccination of soldiers was ordered by the War Department. More significantly, in 1813 Madison went one step beyond Jefferson when he signed into law a statute to encourage wider smallpox vaccination, one of the nation’s earliest public health bills. The legislation was aimed at regulating the Jenner vaccine to protect American citizens from unscrupulous purveyors who offered adulterated versions. The Vaccine Act of 1813 was the first federal law to oversee drug purity with an eye toward consumer protection. It also gave the president the power to “appoint an agent to preserve the genuine vaccine matter, and to furnish the same to any citizen of the United States.” The medical officer was instructed to send packages of vaccine weighing under a half an ounce free of charge through the U.S. mail to all interested parties. The act was repealed in 1822, when the authority...
to regulate vaccine was transferred to the states, but it established an important precedent.\textsuperscript{98}

From the beginning, America’s founders were willing to consider the benefits of health innovations. The spirit of the Age of Reason encouraged medical and scientific experiments, but they were not conducted in sterile laboratories with test tubes in the manner we are accustomed to today. Rather, as we have seen, humans served to verify procedures, and many medical innovators used themselves and their families as the test cases. Smallpox inoculation with human matter could be a dangerous business, but the willingness of Jefferson, Abigail and John Adams, and Franklin, among other American founders, to undergo the procedure is a testament to both their faith in scientific progress and their personal courage. American medicine was in transition during the late-eighteenth and early-nineteenth centuries, beginning slowly, as the first decades of the nineteenth century passed, to move away from age-old practices of heroic therapeutics. Considering that there was no real comprehension and acceptance of germ theory until the late nineteenth century, and no agreement that it was specific pathogens that caused particular illnesses, medical science was just beginning to emerge from the darkness. America’s founders were among the small group of medical visionaries, although unfortunately many of their advanced ideas were lost over the next several decades.

The stories of America’s founding fathers and mothers as they developed over the backdrop of eighteenth-century medicine reminds us that evolving science is not only complex but even today always subject to uncertainties, and medical progress continues to be challenged. Despite the advances of modern medicine in producing parasite-killing antimalarial drugs to combat the illness and in eliminating the deadly mosquitoes through chemical warfare in the form of DDT, or avoidance of insect bites, malaria is still a serious threat, primarily in the world’s poorest countries, particularly in Southeast Asia, parts of South America, and sub-Saharan Africa.\textsuperscript{99} Mosquitoes have gradually grown resistant to DDT, and some species of the wily malarial parasites have become more lethal. Others have adapted and become resistant to the most popular modern drugs that were thought to be superior to quinine, such as atebrin. Recent success in reducing mortality from malaria in Africa has resulted from an infusion of funds to pay for mosquito
nets to prevent bites during sleep and the distribution of free antiviral drugs. Today, malaria-carrying mosquitoes infect between 250 million and 500 million people yearly, killing close to one million victims.\textsuperscript{100} It is noteworthy that even in the era of modern medicine smallpox is the only major disease that has been eradicated.

America’s founders not only helped navigate the road to independence, but in a variety of ways began to lay a framework for improvements in medicine and the development of a national public health program. As noted previously, in their minds republican ideals fostered a reciprocal connection between individual and national health. The founders’ regular encounters with personal illness and the specter of epidemics and plagues that could and did devastate entire communities made men and women like George and Martha Washington, Benjamin Franklin, Thomas Jefferson, John and Abigail Adams, and James and Dolley Madison acutely sensitive to health issues. The state of medicine and public health today is still a work in progress, but these founders played a significant role in the conversation that helped shaped the contours of its development. Certainly the ongoing debate over American health care is hardly a new discussion.