

# Death of a nation: The AIDS crisis in Zimbabwe

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The descendants of the Italians who succumbed during the syphilis epidemic of the sixteenth century, or the survivors of the cholera outbreak of the early 1990s in Central and South America, can look back to those times when their ancestors or friends and family perished, shaking their heads both in sorrow and thankfulness that the anarchy did come to a definitive end. I, on the other hand, stare into the bleak future of my people, the people of Zimbabwe, with despair, as deaths from AIDS escalate and threaten to lay us all to rest.

Should I choose to bear a child in Zimbabwe, come the year 2010, my son or daughter could expect to enjoy a mere thirty years upon this earth before AIDS snatched his or her life away.<sup>1</sup> The life expectancy in this, my country of origin, is estimated to have plummeted 22 years in less than a decade. Every week, 300 to 500 people die from complications associated with HIV infection,<sup>2</sup> while 25 to 30 percent of Zimbabwean adults harbor the virus, and can only expect the same fate as those they have buried before.

## **The economy, not AIDS, is the topic of concern in Zimbabwe**

Listening to statistics such as these being reeled off in journals and newspapers here in the United States, one would expect that there must exist, in the country of reference, a looming cloud of panic over prospects for the future, a plethora of voices calling for education on how to preserve one's health. And yet there is no such concern. I am a Zimbabwean by ancestry, and an American by birth, and spent all of my teen years, and almost every summer following, in the land of my parents. Attitudes about personal risk

of infection with HIV in Zimbabwe leave me astonished.

The most pressing problems to the people there are economic. Except for those concerns, life is seen as being peachy. There is a saying that I grew up hearing: "There's no rush in Africa"; and I have found that it bears true. The living is easy in Zimbabwe. Laughter is an integral part of our culture, and today, as always, one can hear women being overcome by joviality in the marketplaces as they gossip amongst themselves, the menfolk justifying their wide-mouthed grins with chuckles as they walk to work or meet at street corners, the children shrieking in abandon as they chase each other in schoolyards or play hopscotch. The sense that this silent killer, AIDS, is lurking among them is nowhere to be found.

## **Why is there this dichotomy between the dire facts of this disease's impact and the affected people's reaction to them?**

Zimbabwe is suffering now for the languid approach taken by the government of the country during the 1980s in response to this new disease, for which some said there was no cure. The country denied that it had a significant problem, unlike Uganda to the northeast, which, in an effort to deal with the problem, opened up the closet doors and declared to the world that its population was being decimated by this virus. The stifling of precious information and deflated infection rates in my country led to the development of a false sense of security.

I remember when I was growing up in Zimbabwe that we used to thank God that our situation was not as bad as that of Uganda, where we would see on the news every night people crumbling under this disease, which was known as "slim," for its wasting effect on the body. Jokes amongst us schoolchildren about the poor Ugandans were rampant. Some in authority assured the people of Zimbabwe that this virus did not exist at all, and the acronym AIDS was jokingly inter-

preted to mean "American Idea for Discouraging Sex."

It was only in 1990, under heavy criticism from across the globe, that the government of Zimbabwe actually admitted publicly that it had a problem, that its AIDS situation was as bad as, if not worse than, that of Uganda. Zimbabwe began to tackle the problem seriously; media campaigns on the taboo subject of condom use became the norm, as did educational initiatives and the passage of the message of prevention in churches.

## **Diagnosis of AIDS in the street – almost a game**

While I was in high school, we all began to recognize the signs of the disease amongst those in our community, signs that had been there all the time, but that ignorance had blinded our eyes to: the "AIDS perm," which was the description used for the reddish, straight hair commonly seen on the head of an infected individual; the swollen lymph nodes behind the ears; the familiar wasting syndrome; the skin infections that ran amok, covering one's body from head to toe in weeping scabs. We took to diagnosing people we saw in the streets, almost as if it were a game. Because deaths from AIDS have now become so common, the statement often heard is, "That one is very sick," meaning, in effect, that the person has AIDS.

My fellow medical students here in Boston often tiptoe around the glaring issues raised by the astonishing figures that emanate from the World Health Organization or other sources when discussing issues about Africa and the AIDS epidemic. My country gained, last year, the terrible reputation of possessing the highest prevalence of HIV infection in the world, and I recall tearing out the newspaper article and running to show it to and discuss it with my friends. Most were reluctant to approach the subject out of consideration for the feelings they perceived that I might have about it. But I find that such information is more empowering than regressive; I have seen, as has the entire world, the effects of concealment

and embarrassment over issues such as the AIDS crisis. The only way to deal with a problem of such magnitude is with one's eyes and spirit open, to allow for such statistics to be quoted in their entirety, for once that voice ceases, there comes the question that I find to be most important: What do we do now?

### **Babies and children – the innocent victims**

My heart has always ached over Zimbabwe's predicament, especially when I think of how many young lives are inevitably going to be extinguished by this disease. Children are the most precious beings in African culture, and to have many children born to one is to have received manifold blessings from God. The distribution of AIDS cases in Zimbabwe is bimodal: the most affected are sexually active adults between the ages of twenty and thirty-nine, and the very young under the age of four.<sup>3</sup>

The circumstances are unforgiving. Those babies who do not seroconvert after being born to an HIV-positive mother are likely to acquire the virus through breast milk. Feeding a child with one's own breast milk rather than artificial formula has been sanctioned practice for years, and is beneficial to the child as well as to the many mothers who cannot afford to buy powdered milk, let alone the plastic bottles in which it must be prepared. As mothers lovingly nurse their children, many are unknowingly passing on the virus that will end their child's life. Antiretroviral therapy is an unattainable dream to the majority of Zimbabwean women, most of whom have no idea that such a treatment even exists. Even for the handful of women who are lucky enough to be part of the experimental group in current clinical trials that utilize zidovudine, one wonders what position they will be left in when the investigators pack up and leave for home.

### **Another victim: the wife of a**

### **promiscuous man**

Married couples, ironically, have the highest rate of HIV infection of any demographic group in Zimbabwe. Even with the sacrosanct esteem within which marriage is held in Zimbabwean society, the matrimonial bond confers more danger to an individual's life than does the unmarried state. Unmarried people are looked down upon, especially women, who, it is believed, have obviously been cursed by somebody if they have not found a husband. Although polygamy is officially against the law, the persistence of pre-Christian-era cultural beliefs has remained rooted in the psyche of most Zimbabwean men, causing many of seek gratification outside of marriage. The innocent victim in this slowly changing patriarchal society is, more often than not, the wife, whose power to demand condom use within the marriage is paltry at best.

For a family in Zimbabwe not to have been touched by the effects of the AIDS epidemic may very well have required divine intervention. Almost every time I call home, my parents tell me of yet another neighbor, yet another relative who has just died or is "very sick," yet another funeral they are on their way to attend. One cousin of mine died recently in terrible pain, the husband who exposed her to the virus having disappeared, and her three children having been left to be cared for by her parents. Her oldest son placed first in his class at school that semester, but neither parent was there to praise his achievement. Another cousin visited my father at his office a few months ago, terrified at the progression of the skin lesions that covered his back and chest. Nobody has heard from him since then, and he is not spoken of.

There are stories to tell in every family. People wonder how AIDS can kill so rapidly, so deftly. The idea of persons living with the virus in their system for ten to twelve years, as one might in the West, is absurd to most Zimbabweans. Infected individuals here are usually dead within two years. This pattern has led to radical notions about the cause and progres-

sion of the disease, as people grapple with its inherent malevolence. Is it spread by mosquitoes? Through the air? Does the warm weather quicken one's death? Is witchcraft to blame?

Despite the widespread knowledge of the existence of AIDS, few people other than health officials actually vocalize the acronym in reference to an individual's terminal illness. Children who are orphaned are left to guess at what it was that ended their parents' lives, for the shame that is associated with the disease keeps shut the mouths of the relatives who take over their care. Due to the fact that most of those who fall prey to AIDS are young skilled men and women in their reproductive years, the burden of caring for the children they leave behind has fallen onto novice teenagers and the very old. This shift has placed a strain on the traditional social structure, for those who were once meant to care for children and grandparents are the ones who are now dying in droves.

### **Education of the people is blocked by cultural norms that forbid talk about sex**

The deep-rooted fatalistic attitude common throughout Africa that makes people react to the news of another death with a sigh of resignation rather than of ire, is something that I find both frustrating and comprehensible. Most Zimbabweans really do not realize just how devastating the situation is, regardless of the fact that people are dying incessantly. Each person deals with his or her own family's tragedy in private, and the commonality of the scourge is never discussed openly. The government's efforts to educate people are confounded by cultural norms, which forbid talk between the generations of sexual matters or the possible consequences of the act. Condom use is in direct contradiction to the desirable notion of fertility in this society, and the image of a trained youth worker showing married couples at a workshop how to use a condom properly prompts hands to be brought up to cover eyes in embarrassment.

Youth workers, or students who have been trained in AIDS prevention, are but a few of the individuals who are trying, in spite of the obstacles they encounter, to save people's lives. Organizations have been set up to provide community-based orphan care to parentless children. Theater groups tour the country performing in plays that depict the consequences of unsafe sex and marital infidelity. Popular singers now release songs promoting faithfulness within marriage and the prudent use of condoms. Many of these same entertainers have fallen prey themselves to AIDS, and it is often these victims who seem to bring men and women in the street together in one consciousness, forcing them to realize that AIDS affects everybody, and not just family members whom one can remain mum about.

**It is no great surprise to my peers that I plan to focus on the African AIDS crisis, along with other infectious diseases, in my future practice as a physician**

Nothing else causes me to become as impassioned; nothing else tugs as strongly at my resolve as the predicament of my relatives, my people. I often vacillate, in my need to address this problem that is so dire and urgent, between the different roles that I might be able to assume in the future. Where can I do the greatest and most good? Might it be at the grass roots level, among the people, treating the sick in order to better their health as much as is feasible, while at the same time educating those who are well on how to remain well? Is it at the national level, as a member of governing boards, where I might work with others to bolster lagging prevention efforts? Or might it be at the international level, where my status as an African physician who was educated in the United States might access for me a niche appropriate for what I hope to accomplish?

I study now with the goal to ease the burden of AIDS among the people I call my own. Recently, I heard of a former schoolmate who had died of the disease; he was my age, and we used to play soccer together. His death

brought the situation all that much more close to home. He and I were both intelligent individuals; why did he succumb to a disease that he might have avoided? What could someone have said to him to ensure that he would still be breathing today?

What is happening in Zimbabwe, in Africa, is criminal. It is a crime for which nobody wishes to take the responsibility for its perpetuation and accretion. The notion that the AIDS epidemic in Africa is a third-world problem, although covert, is harbored the world over. Hence, we Africans must make do with what help does come our way, be it zidovudine for a group of pregnant women, or medical personnel from outside Africa who empathize enough to drop everything and come to provide succor.

*I shall be one of those medical professionals one day in the near future. And that day cannot come too soon. I feel this with all my strength. I feel it for the weeping mothers who bury their newborn children. I feel it for the elderly who bury their sons and daughters before their time. And I feel it for the child who wishes to live beyond his thirty-first birthday.*

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**By and about the author**

*The questions are many and the explanations long whenever I am asked to explain where I am from. Above all else, I consider myself African, my parents and relations being from Zimbabwe. During the 1970s, my parents attended university in the midwest United States, and my younger sister and I were born during that time.*

*We all returned to our homeland in 1981, and it is there, from the time that I was a precocious eight year old, that I spent the next eleven years of my life. My love of reading began a long time before, and from this passion for words grew a desire to create my own stories. Throughout my years at McGill University, and now at medical school at Tufts, I've used most of my free time to write poetry and short stories, to begin and re-begin that novel I vow one day to finish. My life and my writing both have been affected by the societal turmoil I grew up witnessing in Zimbabwe, the turmoil created by AIDS. I plan to use both my medical and public health degrees to ameliorate, even if in a small way, the suffering of African people affected by this scourge. Enhancing awareness through an essay such as this one will be, I hope, the first step of many to come.*

# Angelical conjunction: Religion, reason, and inoculation in Boston, 1721–1722

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As medicine has become more effective and evidence-based, it has also become divorced from many of its early roots, including religion. Recently, however, there has been increased interest in, and evidence for, the use of spirituality and religion as tools for medicine. This “emergence of spirituality in the examining room is returning physicians to their historic place.”<sup>1 p1896</sup> Interestingly, as medicine and religion began to separate in early eighteenth-century America, a third-generation Puritan minister’s marriage of medicine and faith led to a successful variolation experiment in Massachusetts and helped earn Cotton Mather the distinction as “the first significant figure in American medicine.”<sup>2 p116</sup>

Although the American colonies lagged behind England in many advances, Cotton Mather and an apprentice-trained physician, Zabdiel Boylston, began variolation in the colonies independent of, and prior to, its public introduction into England. Reports of these trials, written by Mather and Boylston and published in England, “had a decisive effect on British opinion and practice.”<sup>3 p268</sup> This inoculation experiment took place amid great controversy in Boston, Massachusetts during the period of 1721 to 1722.

While Boylston actually carried out the inoculation, he received the idea, the method, and the needed support and encouragement from Mather. The controversy that subsequently erupted divided the most educated men in Boston — the physicians (except Boylston), who opposed inoculation, and the ministers, who strongly favored it. In the twentieth century, it seems odd that clergy would interfere with physicians in matters of public health. The seventeenth-century tradi-

tion of the clergyman/physician in Puritan New England had not completely dwindled away by 1721, when Cotton Mather argued for the radical notion of inoculation with smallpox. Mather, a conservative cleric but liberal philosopher, attuned the scientist and theist parts of himself to amass the courage and knowledge necessary to pioneer inoculation in the colonies.

## The ministry and medicine — common dual careers

Cotton Mather’s interests in medicine in 1721 were conditioned by a hundred-year-old tradition in New England of ministers who had involvement with medicine. Samuel Fuller, deacon and physician, arrived on the *Mayflower* that first brought Puritans to Massachusetts in 1620. Another deacon, Giles Firmin, arrived in Boston in 1632. He had been trained at Emmanuel College at Cambridge University, and he practiced medicine in Ipswich, Massachusetts, after leaving his position at the First Church in Boston.

After Fuller’s death in 1633, the colonists turned to the most educated among them for medical advice. These men included magistrates such as Governor John Winthrop, and educators such as Charles Chauncy (also a pastor), Leonard Hoar, and John Rogers, all practitioners of medicine and eventually presidents of Harvard College. Harvard College was the center of education in the Massachusetts Bay Colony, and turned out the majority of the colony’s ministers and physicians. These two roles often overlapped. Chauncy’s six sons graduated from Harvard and became either physicians or ministers. Thomas Thacher, who received his education under Chauncy’s tutelage prior to the latter’s term as president of Harvard, became both. Thacher was chosen as pastor of the Olde South Church (Third Church), Boston, in 1669.<sup>4</sup> During his ministry, he was intimately involved in medicine and published the first medical work in the English colonies.<sup>5</sup>

Thomas Robie graduated from Harvard in 1708 and “preached on trial

in several towns” while he “seriously considered entering the ministry.”<sup>6 p474</sup> He accepted a tutorship at Cambridge University in 1713. He later returned to Massachusetts and distinguished himself as a scientist and fellow at Harvard. He resigned from Harvard in 1722 and moved to nearby Salem where he practiced medicine until his death in 1729. Unlike the physicians of Boston, Robie supported Mather and Boylston’s work and inoculated eleven persons during the epidemic.<sup>6</sup>

Clearly, Cotton Mather was aware of the role that ministers, particularly ministers in Massachusetts, played in medicine. Mather’s eulogy of Thomas Thatcher includes the following:

The last that I shall mention of the excellencies that signalized this worthy man shall be his claim to the accomplishments of an excellent physician. He that for his lively ministry was justly reckoned among “the angels of the churches,” might for his medical acquaintances, experiences, and performances, be truly called a Raphael. Ever since the days of Luke the evangelist, skill in physick has been frequently professed and practised by persons whose more declared business was the study of divinity. . . . our English nation has commonly afforded eminent physicians, who were also ministers of the gospel.

But I suppose the greatest frequency of the angelical conjunction, has been seen in these parts of America, where they are mostly “the poor to whom the gospel is preached,” by pastors whose compassion to them in their poverty invites them to supply the want of able physicians among them, and such an universally serviceable pastor was our Thatcher.<sup>7</sup>

Mather’s intellectual interests prepared him for his own “angelical conjunction.” He debated between becoming a minister or physician, and studied some medicine while attending Harvard College. Although he chose the clergy, his interests and influence in medical matters permeated his ministry.

## The return of smallpox

After a nineteen-year absence, smallpox returned to Boston in April 1721 aboard the HMS Seahorse. Cotton Mather's approach to the resulting epidemic was based on personal observations, scientific literature, and a reasonable hypothesis.

Mather first encountered the idea of inoculation when a slave, given to him by some of his congregation in 1706, described

a Method frequently used in Africa, and which had been practis'd on himself, to procure an easy Small-Pox, and a perpetual security of neither dying by it, nor being again infected with it.<sup>8p1</sup>

Mather confirmed his slave's account by comparing it with those of a number of other Africans who, "without any Combination or Correspondence,"<sup>8p1</sup> agreed on the methods and success of inoculation in Africa. These accounts, wrote Mather, gave him

as evident Proof of the Practice, Safety, and Success of this Operation, as we have that there are Lions in Africa.<sup>8p2</sup>

While these combined accounts may have given Mather "evident proof," it was the advice of "Superiour Persons" that he considered most.<sup>9p107</sup> In December 1713, Emanuel Timoni, M.D. sent *An Account, or History, of the Procuring of the SMALL POX by Incision, or Inoculation; as it has for some time been practised at Constantinople.*<sup>10</sup> This letter reached John Woodward, M.D., who sent an excerpt to the Royal Society of London. It was published in *Philosophical Transactions* in 1714.<sup>10</sup> Mather explained that the information in these

divers Communications from the Levant [the lands bordering the Eastern shores of the Mediterranean Sea] . . . to our Surprize, agreed with what he had from Africa.<sup>8p2</sup>

Two years later, in March 1716, another article concerning smallpox inoculation reached the pages of *Philosophical Transactions*. This one was written by Jacob Pylarini, M.D., the Venetian Consul at Smyrna (a seaport in

Western Turkey, currently known as Izmir).<sup>11</sup> Mather considered this report "from an Eminent Person," a second witness, explaining

it is in the Mouth of Two or Three Witnesses, that the Thing must be Established.<sup>9p109</sup>

Here illustrating the syntheses of his rational and doctrinal thought, Mather used scientific writings to fulfill the Biblical law of witnesses found in the writings of Moses (Deuteronomy 19:15<sup>12</sup>), Matthew (Matthew 18:16<sup>13</sup>), and Paul (2 Corinthians 13:1<sup>14</sup>). Although in England they sought to apply the test to convicted criminals, Mather needed no tests. According to scriptural law, the matter had been established.

## Mather's rationale for smallpox inoculation

Mather's first description of his reasoning process before urging inoculation on the doctors of Boston is found in his letter, *An Account of the Method and Success of Inoculating the Small-Pox in Boston in New-England*. Meant for the Royal College of Physicians in London, this description is carefully free of reference to scripture or religion. Only the latter part of the letter that deals with arguments against inoculation on theological grounds, and the rebuttals of Boston's ministers, is concerned with theology. The sections dealing with the development of Mather's thought, from the first account from his slave until the experiment was tried, are devoid of religious reference. The letter was written by Mather to a friend, a Mr. Dummer in London, who published it to "Sir HANS SLOANE, President. And to the Rest of the COLLEGE of PHYSICIANS." In his introduction Dummer explained that the account was "from a Person . . . of great Learning and Probity, who desir'd his Name might be conceal'd."<sup>8</sup> Although Mather himself was comfortable with the seventeenth-century practice of mixing religion with medical science, he may have recognized that gaining wide acceptance for his ideas among the physicians of eighteenth-century London necessi-

tated presenting them in a form devoid of religious references and without the stigma of the authorship of a prominent Puritan divine. One physician that Mather may have sought as a supporter was Hans Sloane, who championed smallpox inoculation in London. He supervised trials on prisoners and counseled the Prince and Princess of Wales to inoculate their two daughters, which led to the popularization of inoculation in London. Although Sloane had supported inoculation before he received Mather's February 1722 account, the news of the recent success in New England may have influenced his advice to the royal family the following April.<sup>15pp28-33</sup>

In contrast to Mather's February 1722 account, a later version found in Mather's medical treatise, *The Angel of Bethesda*, included the scriptural references to witnesses noted above and even mentioned a "third witness," Peter Kennedy, a London surgeon who briefly visited Turkey and subsequently published an essay about inoculation in 1715.<sup>9p111</sup> Mather went so far as to speculate that Pylarini "seems to look on [inoculation], as a marvellous Gift of a Good God, unto a miserable World," although Pylarini had made no such direct statement. Here Mather projected his own religious views onto his witness. Mather's entire treatise, named for the events recorded in the gospel of John 5:2-4,<sup>16</sup> is an excellent example of his synthesis of religion and medicine.

## After 1716 — waiting for smallpox to return to the colonies

The matter having been established as scripture dictated, Mather concluded that the practice of inoculation could well prove beneficial. In July 1716, Mather wrote to Dr. John Woodward, the professor of physic at Gresham College who had submitted Timoni's works to the Royal Society. Mather questioned why inoculation had not yet been tried in England where smallpox occurred more frequently than in the colonies. He then wrote,

if I should live to see ye *Small-Pox* again enter into [our] City, I would

immediately procure a Consult of [our] Physicians, to Introduce a Practice, which may be of so very happy a Tendency.<sup>17p5</sup>

It is not clear whether Mather had seen the recent report by Pylarini or the essay by Kennedy when he wrote to Woodward. It is likely that these writings of additional “witnesses” came to the colony only after Mather had already determined his course of action, and thus strengthened his resolve rather than contributed to its genesis.

At some point, Mather generated a reasonable, if not entirely correct hypothesis (according to our current hypothesis — which others 279 years from now may find even more outrageous than Mather’s) about why inoculation protected from future smallpox infection. In September 1721, Mather wrote:

Behold the Enemy at once got into the very *Center* of the Citadel; and the invaded Party must be very strong indeed, if it can struggle with him, and after all entirely expel and conquer him: Whereas the *Miasms* of the *Small-Pox*, being admitted in the *Way of Inoculation*, their Approaches are made only by the *Out-Works* of the *Citadel*, and at a considerable Distance from it. The Enemy, ’tis true, gets in so far, as to make some *Spoil*, even so much as to satisfy him, and to leave no *prey* in the Body of the Patient, for him ever afterwards to seize upon; but the *vital Powers* are kept so clear from his Assaults, that they can manage the *Combat* bravely; and tho’ not without a *Surrender* of those Humours in the *Blood*, which the Invader makes a Seizure on, they oblige him to *march out the same Way he came in*, and are sure of never being troubled with him any more. If the *Vermicular Hypothesis* of the *Small-Pox* be receiv’d with us, (and it be, as many now think, an *animaculated Business*) there is less of *Metaphor* in our Account, than may be at first imagin’d.<sup>8pp7-8</sup>

Three important points of this hypothesis warrant specific mention. First, Mather believed that the difference in

outcome between cases of smallpox acquired by inoculation and by natural infection was due not to attenuation, but to the location of the initial infection. This is correct according to the current hypothesis. Naturally-acquired smallpox was generally inhaled, replicating in the respiratory mucosa and moving to regional lymph nodes, next resulting in viremia as the virus moved to the internal organs, and finally to the skin to generate the pox, where the virus was shed. The cause of death was normally damage to internal organs, “the very *Center* of the Citadel.” With inoculation, the virus was introduced directly into the skin and did not have the opportunity to replicate in the mucosa and lymphoid system before invasion of the blood. Thus a generally milder disease developed, with the pox erupting sooner in inoculated cases — the virus “*march[ed] out the same Way he came in.*”<sup>8p8</sup>

The second noteworthy point of Mather’s hypothesis is the statement that the virus left “no *prey* in the Body of the Patient, for him ever afterwards to seize upon.”<sup>8p8</sup> This illustrates that Mather believed in a depletion theory of immunity. Although this theory is incorrect according to our current understanding, it was certainly a reasonable hypothesis at the time. Others arrived at similar conclusions, including Louis Pasteur, who in 1880 hypothesized a depletion theory after inducing immunity to fowl cholera by using an attenuated vaccine.<sup>15p13-16</sup>

Finally, it is noteworthy that Mather mentions the animacular [germ] theory of infectious disease. Medical historian Otho Beall summarized,

The significance of Mather’s knowledge of the animacular theory becomes clear when it is realized that not until about 1880 was it a generally accepted theory in America and that Mather’s statement antedates by eighty-three years what appears to be the earliest animacular hypothesis published in America — that of John Crawford of Baltimore . . . in 1807.<sup>2</sup>

These three elements of Mather’s hypothesis clearly indicate it was both

reasonable and ahead of its time. All of Mather’s medical writings are also deeply theological. As an archetypical Puritan, he typified the characteristics identified and praised by an unsympathetic historian:

It is a tribute to the intellectual honesty and to the clear thinking of the Puritan scientists that in most cases they would not let preconceived religious interpretations or belief in supernatural occurrences interfere with their observations or falsify their conclusions.<sup>3</sup>

### The clinical trial — Mather inoculates his sons and manservant

True to his word, when smallpox returned to Boston in the spring of 1721,

Dr. Mather, in *Compassion to the Lives of the People*, transcrib’d from the *Philosophical Transactions of the Royal Society*, the Accounts sent them by Dr. *Timonius* and *Pyllarimus* of inoculating the *Small-Pox* in the *Levant*, and sent them to the Practitioners of the Town, for their Consideration thereon.<sup>18pp1-2</sup>

This first letter went unheeded by the physicians in town, but a personal letter to Zabdiel Boylston was apparently convincing.<sup>19pp55-56</sup> Two days after this letter was written, Boylston

resolv’d in [his] mind to try the Experiment; well remembering the Destruction the *Small-Pox* made 19 Years before, when last in *Boston*.

He recorded,

June the 26th, 1721, I inoculated my Son *Thomas*, of about six, my Negro Man, *Jack*, thirty six, and *Jackey*, two and an half Years old.<sup>18p2</sup>

This inoculation took place less than three months after Charles Maitland inoculated Lady Mary Montague’s daughter, the first inoculation in London.<sup>15p28</sup> Controversy immediately erupted, but Boylston, observing successful inoculation with his first patients and urged on by Mather, inoculated again on July 12, 14, 17, and 19.<sup>19p56</sup> By August 9, 1721 when six prisoners were inoculated to test the

procedure in London,<sup>15p30</sup> Boylston had inoculated fourteen persons, including two of his own sons. Within a week Cotton Mather had his son Samuel inoculated. Boylston continued to inoculate as many as could be cared for throughout the epidemic until he had inoculated 248 individuals. Of the 287 persons inoculated in Boston and its environs, only six died, and these may have succumbed to causes other than smallpox.<sup>18pp243-45</sup>

While Mather remained confident about his scientific, or at least his philosophical, approach to smallpox, his synthesis of this approach with religion was illustrated when his son was inoculated. Samuel was inoculated by Boylston on August 12, 1721 and Mather wrote in his diary on August 25 that he

had a dangerous threatening Fever come upon him, which [was] beyond what the *Inoculation of the Small-Pox* [had] hitherto brought upon . . . Subjects of it.<sup>20p639</sup>

When Boylston's son, Thomas's, fever "grew to an Heighth, beyond [Boylston's] Expectation," Mather recorded that Boylston

had Recourse to the common Remedies of Blisters, and gave the Child a *Vomit*, and presently all the Fright was over.<sup>8p10</sup>

In contrast, and reminiscent of his choice of the ministry of religion over the administry of medicine, Mather chose a different approach to treat Samuel. While Boylston left no record of treating Samuel's fever, Mather recorded,

In this Distress, I have cried unto the Lord; and He has answered with a Measure of Restraint upon the Fever.<sup>20pp639-40</sup>

### Faith and empiricism working together

Thus, Mather's thoughts and actions concerning smallpox inoculation demonstrated both confidence in a reasonable hypothesis and empirical experimentation, and faith in religious ministry and practice. These thoughts

and actions spawned an experiment in which 248 people were infected with one of the most dangerous producers of death and deformity in the history of mankind. Had inoculation been a failure, or worse, resulted in some of the problems predicted by its opponents, it would be remembered now only as a grave blunder by Mather, a far worse error in judgment than his prosecution of alleged witches. The experiment, however, was a tremendous success, with a case fatality ratio of those inoculated at 21 per thousand. This is remarkable when compared to the case fatality ratios of those who acquired smallpox naturally (almost everyone susceptible), of 146 per thousand, and that of the entire population of Boston at that time, of 77 per thousand. The relative mortality risk of not being inoculated among these groups was 6.95 and 3.7, respectively. The popularity of inoculation increased with each successive outbreak in Boston until 1764 when "for the first time a small-pox year failed to stand out as one of unusual mortality." While inoculation was neither as safe nor convenient as vaccination, "it was indeed a blessing."<sup>21</sup> Moreover, historians recognize that this blessing "paved the way for the immediate acceptance of Edward Jenner's discovery of vaccination" because Europeans and Americans were familiar with inoculation.<sup>22p39</sup>

This blessing was introduced to Boston, eventually to spread throughout the colonies and England, by a man whose religion and reason formed an "angelical conjunction" and who must be commended for his part in combating a dreadful disease and preparing the world for vaccination.

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13. Matthew 18:16. But if he will not hear thee, then take with thee one or two more, that in the mouth of two or three witnesses every word may be established.

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### **By and about the author**

*I was born and raised in Blackfoot, Idaho, graduating from the local high school in 1990. My ambitions to play college football were dashed by a knee injury in my junior year. Like seven siblings before me and two after, I entered Brigham Young University. After briefly studying engineering, history, and philosophy, and taking a two-year sabbatical to proselytize Mormonism, I completed a degree in molecular biology in the same week that my wife completed a masters degree in accounting and our first daughter was born. To support our growing family as well as my ambitions in medicine, I accepted a commission as a second lieutenant in the United States Army and a position in the first-year class at the F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences. I have just completed my second year and celebrated the birth of our second daughter. In the future, I plan to pursue a path in medicine that will integrate clinical practice and the emerging technologies of molecular biology, and honor my obligations and duties to the armed services.*