

The response to the recent COVID pandemic has been marked by sometimes virulent opposition to vaccination. Many regard the widespread skepticism of an effective medical treatment (and vaccines, in particular) to be not only alarming but also unprecedented—this month's Sacred Bovine.

A brief excursion into the scourge of smallpox in the 18th century, however, may prove informative (Carrell, 2003; Remillard-Hagen, 2012). The episode from history offers some fascinating insights into how many people, even some doctors, have responded in surprisingly cautious ways to potentially life-saving therapies. Their perspectives help illustrate the complex psychology of the public reception to medical claims and the factors that shape how people assess scientific credibility, expertise, and empirical evidence. (For accompanying classroom visuals, see <http://shipseducation.net/smallpox>.)

○ Smallpox, Complexion & Children

Let us join the story in 1717 in Constantinople (present-day Istanbul, Turkey), the heart of the Ottoman Empire. There, Lady Mary Wortley Montagu, the wife of the newly arrived British ambassador, encounters the local women and greatly admires their pristine complexions. Lady Mary's awareness has been shaped by her own experience. Just over a year earlier, she contracted smallpox, a disease that had swept through England and left one in five infected patients dead. While Lady Mary survived, the disease had left her face pockmarked. For an elite woman in 18th-century England, beauty was an utmost treasure, integral to social stature and regard among men. But uncomfortable with her disfigurement, Lady Mary had become accustomed to masking her face in public.

Yet here in Turkey, the women at the baths seem uniformly unblemished. How had they all apparently escaped the ravaging effects of smallpox, so devastating across the continent? Lady Mary learns that they rely on a medical procedure largely unrecognized in western Europe: *variolation*. She describes it in a letter to a friend:

A propos of distempers, I am going to tell you a thing, that will make you wish yourself here. The small-pox, so fatal, and so general amongst us, is here entirely harmless, by the invention of engrafting, which is the term they give it. There is a set of old women, who make it their business to perform the operation, every autumn, in the month of September, when the great heat is abated. People send to one another to know if any of their family has a mind to have the small-pox; they make parties for this purpose, and when they are met (commonly fifteen or sixteen together) the old woman comes with a nut-shell full of the matter of



the best sort of small-pox [pus from a patient's pustule], and asks what vein you please to have opened. She immediately rips open that you offer to her, with a large needle (which gives you no more pain than a common scratch) and puts into the vein as much matter as can lie upon the head of her needle, and after that, binds up the little wound with a hollow bit of shell, and in this manner opens four or five veins. . . . The children or young patients play together all the rest of the day, and are in perfect health to the eighth. Then the fever begins to seize them, and they keep their beds two days, very seldom three. They have very rarely above twenty or thirty [pocks] in their faces, which never mark, and in eight days time they are as well as before their illness. Where they are wounded, there remains running sores during the distemper, which I don't doubt is a great relief to it. Every year, thousands undergo this operation, and the French Ambassador says pleasantly, that they take the small-pox here by way of diversion, as they take the waters in other countries. There is no example of any one that has died in it. (Montagu, 1784)

Nowadays, of course, we recognize this process as induced immunization. Namely, variolation was an early form of vaccination using natural sources.

Lady Mary has already lost her brother to smallpox in 1713. She is now concerned about protecting her own son, almost age five. But is the procedure safe and effective? What are the risks? (Here is an excellent opportunity to engage students in inquiry and discussion: “Placed in this position, what will guide your reasoning? How will you assess the credibility of the local Turkish practice? What evidence is sufficient to warrant action?”)

Here, one may begin to appreciate the many factors that contribute to assessing the scientific merit of a claim. Empirical evidence is surely important, yes. But what counts as evidence, or sufficient evidence, or adequate documentation of results over many years, or perhaps even generations of collective experience? The Turks report no deaths. But who can be trusted to speak for the evidence? For a Christian (such as Lady Mary), should the testimony of a non-Christian be trusted unquestionably, or possibly even discounted? The engrafting is not even performed by professional physicians. Who is an expert and why? How does one measure their expertise? How does one establish the relevant trust? What would justify a final decision?

Ultimately, Lady Mary deems the available evidence—primarily the low incidence of smallpox among the Turks—as sufficient. She has her son variolated, although by an English physician who has accompanied them on their journey East.

We know now that the procedure is effective, but one may wonder if perhaps Lady Mary was unduly biased by her own fears at the time. Was it appropriate for her to extend trust to nonphysicians as experts in this case, and to trust anecdotal, rather than systematically collected, quantitative evidence?

○ The Royal Family & the Prisoners of Newgate

Lady Mary returns to England two years later. She tries to share her experience with others. She becomes an advocate for variolation, although publishing under a pseudonym. In 1721, another epidemic of smallpox spreads through London and Lady Mary decides to have her four-year-old daughter inoculated. The physician who had earlier inoculated her son, Charles Maitland, is now reluctant. He fears for his reputation. While the effectiveness of variolation was reported to the premier scientific institution in England, the Royal Society, by foreign correspondents in 1713 and 1716, the procedure has not yet been accepted by the medical establishment. And so the event is witnessed by three other members of the Royal College of Physicians, including its president, Hans Sloane, the very doctor who had tended Lady Mary during her own bout of smallpox in 1716. The variolation procedure proves effective again.

Lady Mary continues her promotion of variolation. She encourages Caroline, the princess of Wales, to have her children inoculated. But here the significance of the decision is greatly amplified. Any decision regarding the royal family needs to be approved by the king! (This occasion offers a second opportunity to invite students to reflect on the case in a historical perspective: As a member of the royal family in 1721, what will you do, and why?)

Some individuals are persuaded by the successful demonstration with Lady Mary's daughter. For example, one of the physician-witnesses soon has his own children inoculated. Others are skeptical. Despite Lady Mary's status in British society, many regard

the procedure as foreign, a practice of a less civilized culture, and thus inherently untrustworthy. What was the evidence? (Without reputable medical journals easily accessible via the internet, what would even constitute a reliable report of the relevant evidence?) Is one case performed in England sufficient? Whose testimony, based on what expertise, matters? Despite her enthusiasm, Lady Mary is certainly not a trained physician. Did the physicians who witnessed the one recent case really develop enough experience to vouch for the procedure? In this new context, and under these slightly different circumstances, what are the appropriate criteria for establishing credible claims and for guiding judgments?

Princess Caroline is favorably disposed to the prospect, but the king less so. He is ultimately persuaded, however, to approve a formal experiment. They enlist Hans Sloane (who is also a physician to the royal family) to test prisoners from the notorious Newgate Prison. Six individuals sentenced to execution are offered the prospect of a full pardon if they “volunteer” to participate in a trial inoculation. They are compared with another prisoner who has already survived smallpox. In addition, one prisoner (a female) is exposed to a contagious smallpox patient afterward, to ensure that the procedure is not only safe but also effective. For greater assurance on the safety with young children, Caroline has a handful of orphans from the local parish inoculated (in this case, no consent is sought). Notwithstanding the now unacceptable ethics of testing, the results indicate that, as before, the procedure is safe. And the prisoners are freed. Ultimately, the king grants permission for inoculating Caroline's daughters. But not the sons. Perhaps that is just too risky for the royal lineage?

Controversy continues. Many of society's elite who have lost family members or friends to smallpox enroll their children. Dr. Maitland, who has performed the procedure throughout, publishes a small booklet on the virtues of variolation. Other tracts soon follow, condemning it (and Maitland). For example, William Wagstaffe, a physician at the distinguished St. Bartholomew's Hospital in London declares

Posterity will scarcely be brought to believe that a method practiced only by a few *Ignorant Women*, amongst an illiterate and unthinking People should on a sudden, and upon slender Experience, so far obtain in one of the most Learned and Polite Nations in the World as to be received into the *Royal Palace*. (quoted in Hopkins, 2002, p. 47)

For some, gender and culture seem to shape the interpretation of the evidence. Others contend that the procedure violates God's intentions: religious perspectives at work. Again, the question arises (for students to address explicitly): What constitutes sufficient evidence, scientifically? Do the results from the Newgate Prison experiment alter the balance? In what ways might a scientific view differ from individual perspectives, based on psychological, social, or cultural factors?

By 1730, fewer than 900 individuals in England have been inoculated. Smallpox epidemics reappear in 1731, 1734, and 1736, and again with exceptional virulence in 1752. Tens of thousands die. The Royal College of Physicians finally endorses inoculation in 1754, but death rates do not decline significantly until well into the next century. Skepticism about inoculation, it seems, has a long and complex (and fascinating) history.

In retrospect, the case of Lady Mary Wortley and smallpox variolation invites us to reflect: What factors should, ideally, guide our judgments about scientific claims, and what factors, by contrast, actually do shape those judgments, for better or worse? How might the story of the skeptics of 1721 inform an understanding of the public reception—and our own views—of vaccines today?

References

- Carrell, J.L. (2003). *The Speckled Monster: A Historical Tale of Battling Smallpox*. Dutton/Penguin.
- Hopkins, D.R. (2002). *The Greatest Killer: Smallpox in History*. University of Chicago Press.
- Montagu, M.W. (1784). *Letters of Lady Wortley Montagu*. London: Cadell, Evans, Murray and Baldwin.
- Remillard-Hagen, E. (2012). Lady Mary Wortley Montagu and Smallpox Inoculation in 18th-century England. St. Paul, MN: SHiPS Resource Center. <http://shipseducation.net/modules/biol/smallpox.htm>.