

“Mongols
who are not vaccinated
are not permitted
to enter the capital”

Successful smallpox prevention and inoculation
in China in the 17th and 18th centuries

By Iwo Amelung

Over 100 years before Edward Jenner, people in China were already being inoculated quite successfully against smallpox. The purpose was not only health protection. Dealing with epidemics was a political process.

In 1644, the Manchus began to conquer the whole of China. A momentous event: The Manchus, who had formed out of predominantly Tungusic ethnic groups, were to rule the Chinese Empire as the Qing Dynasty until the 1911 Revolution, whereby in 1644 presumably less than two million Manchus faced a Chinese population of over 130 million. An equally major challenge for the Manchus as this enormous discrepancy were the foreign pathogens for which their immune system was not prepared. Such encounters have repeatedly led to catastrophes, as was the case, for example, with the Native Americans (McNeill, Diamond).

The Manchus' susceptibility to the "civilised" diseases of the Chinese was comparable to that of the Native Americans. Yet how did they manage to escape a similar fate and maintain their role as leaders until the turn of the 20th century? The question of how the Manchus in the late Chinese Empire dealt with smallpox – "the greatest killer" (Donald Hopkins) – deserves our attention, independently of the current pandemic too.

The Manchus' fear of smallpox

Smallpox seems to have been endemic in China since the 4th century. Chinese society attempted to come to terms with its existence early on: It was regarded since the Song period as a periodically erupting, highly contagious and extremely dangerous childhood disease. For the Tungusic peoples living in the northeast, however, smallpox was something referred to as a "virgin soil epidemic" (Crosby). The Manchus and their allies were aware early on of the danger of infection. Their leaders developed concepts to prevent contagion. They even forewent military action if there was any indication of smallpox cases among their opponents. For certain military operations, only troops were deployed that

were already immune. Nevertheless, there was a markedly large number of victims among the Manchurian population as well as among the ruling elite. A Korean visitor to the old Manchu capital Mukden (Shenyang) noted: "Smallpox is the great taboo in this state [...] it is considered a very serious crime if you are discovered to have smallpox and not to have reported it immediately, [...] those who conceal smallpox are sentenced to death."

Preventive measures

Awareness of their own susceptibility led the Manchu leaders to adopt comprehensive and systematic measures. At the beginning of the conquest, these were in the first instance quarantine and segregation. Quarantine here meant that the Emperor and other high dignitaries



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confined themselves to a protected location in the event of a smallpox outbreak. Access to these "smallpox shelters" (*bidousuo*) was only possible with special precautions. The Emperor's ceremonial and administrative obligations were scaled back as far as possible. During the reign of the Shunzhi Emperor (1644–1661), at least nine smallpox outbreaks occurred in the capital Bei-

The Kangxi Emperor at the age of 45, painted in 1699. He was the fourth ruler of the Qing Dynasty and the second Qing emperor to rule China itself. Kangxi's reign lasted 60 years, the longest of any Chinese emperor. Having contracted smallpox himself as a child, he later advocated the inoculation of children.

A statue in front of the Centre for Health and Disease Prevention in Luoyang (Henan Province) shows how variolation was done.

jing; each time the Emperor withdrew to the *bidousuo*. The Kangxi Emperor (the Shunzhi Emperor's son), who reigned from 1662 to 1722, spent the first six years of his life in a *bidousuo* outside the Forbidden City.

Segregation was also part of the safety concept of the early Qing rulers. In 1645, for example, all sick people and their families were obliged to leave the capital – something that led to great suffering. At their destinations at least 40 *li* (20 km) outside the capital, people were unable to find accommodation. Many were so poor that they could not afford to move elsewhere and in some cases were forced to leave their children behind or even sell them. To avoid deportation, some families abandoned their children at the first signs of smallpox. As unrest grew, measures were softened.

IN A NUTSHELL

- When the Manchus started their conquest of China in 1644, they not only had to gain control over a population far superior to themselves in terms of numbers but also faced challenges as a result of smallpox, for which their immune system was not prepared.
- The Manchurian Qing Dynasty, which occupied the Chinese imperial throne until 1911, developed comprehensive measures to prevent the disease. In particular, the emperor and other dignitaries were strictly segregated. Sick people were obliged to leave the capital; the Chinese inhabitants were resettled elsewhere.
- The Chinese have known a kind of inoculation since the 16th century: The aim was to achieve immunity through deliberate infection with weakened smallpox pathogens, a method known as variolation. The Kangxi Emperor was the first Manchu to use this practice on his own children.
- The treatment was successful – even if not comparable to today's vaccinations in terms of its effectiveness. Through the members of the Royal Society of London and Lady Montagu, wife of the British Ambassador in Constantinople, variolation became known in Europe.
- The successful and resolute handling of smallpox was an important pillar that enabled the Qing Dynasty to further expand its strong rule over China.

The Manchus had already implemented similarly strict and ruthless measures during smallpox epidemics in their home territories. In the new capital Beijing, tensions between the local population and the Manchu banner armies grew. As a consequence, the Chinese population was resettled away from what was referred to as the “inner city” to the southern part, which also reduced the risk of infection.

Even before conquering all China, the Manchus had already established their own administrative body for measures intended, in the narrower sense, to prevent epidemics. Its members, as what were known as “smallpox investigation officers” (*cha dou zhangjing*), held responsibility and power after 1644 too. Despite all these precautions, the future Kangxi Emperor contracted the virus as a child, yet survived the disease largely unscathed. By contrast, his father, the Shunzhi Emperor, caught it and died of smallpox at the age of 22. Seven-year-old Kangxi succeeded him. Adam Schall von Bell, the Emperor's Jesuit advisor, had recommended that only a child who had already survived smallpox should be made ruler. We know from written sources that Kangxi had smallpox scars, which are not, however, visible in portraits painted of him.

Inoculation

During his 60-year reign, the Kangxi Emperor created the foundation for China's incredible boom in the 18th century. In 1680, his son Yin-reng fell ill with smallpox. He learnt from a low-ranking official called Fu Weige about the method of human-to-human transmission of smallpox pathogens with the intention of inducing a controlled infection to create immunity, a method known as variolation, which in China today is referred to as *rendou jiezhong fa* (“inoculation method with human smallpox”, but frequently in early sources as *dou zhong* – “implanting smallpox”). Variolation had been known in China since the 1560s and was used above all in the south. The Emperor had his own children successfully inoculated with this method.

Science historian Joseph Needham, who is inclined towards the superlative, considers “variolation” to be the origin of immunology. Indeed, knowledge of the immunity created by overcoming a disease forms the basis for the assumption that an intentionally induced infection could serve the same purpose. However, variolation is far from being a precursor of modern immunology. Traditional Chinese physicians mostly assumed that smallpox developed out of a “foetal toxin” (*taidu*), meaning that the pathogens were in the body from birth. One popular, morality-steeped conjecture targeted excessive

sexual desire at the time of conception as the cause, while another brought into play poisoning from meconium. "There are people who claim that if you give a child a particular medicine, it will never in its whole life fall ill with smallpox. How could that be? Smallpox is at rest in the body from the beginning and does not move," physicians argued. The counterargument given to these early anti-vaxxers: Yes, the pathogens are indeed located in the body, but certain circumstances are necessary in order to trigger an uncontrollable outbreak of the disease. Inoculation, they said, was about prompting existing pathogens to cause a controlled infection and thus creating lifelong protection against smallpox.

In the Qing period, four methods can be distinguished:

1. *Wet inoculation method:*

Wet cotton is impregnated with an extract of pulverised smallpox scabs and inserted for six hours in a nostril of the child to be inoculated.

2. *Dry inoculation method:*

Slowly dried smallpox scabs are ground to a fine powder and then inserted in the nose with the help of a silver tube 20 cm long; the right nostril for girls and the left one for boys.

3. *Clothing method:*

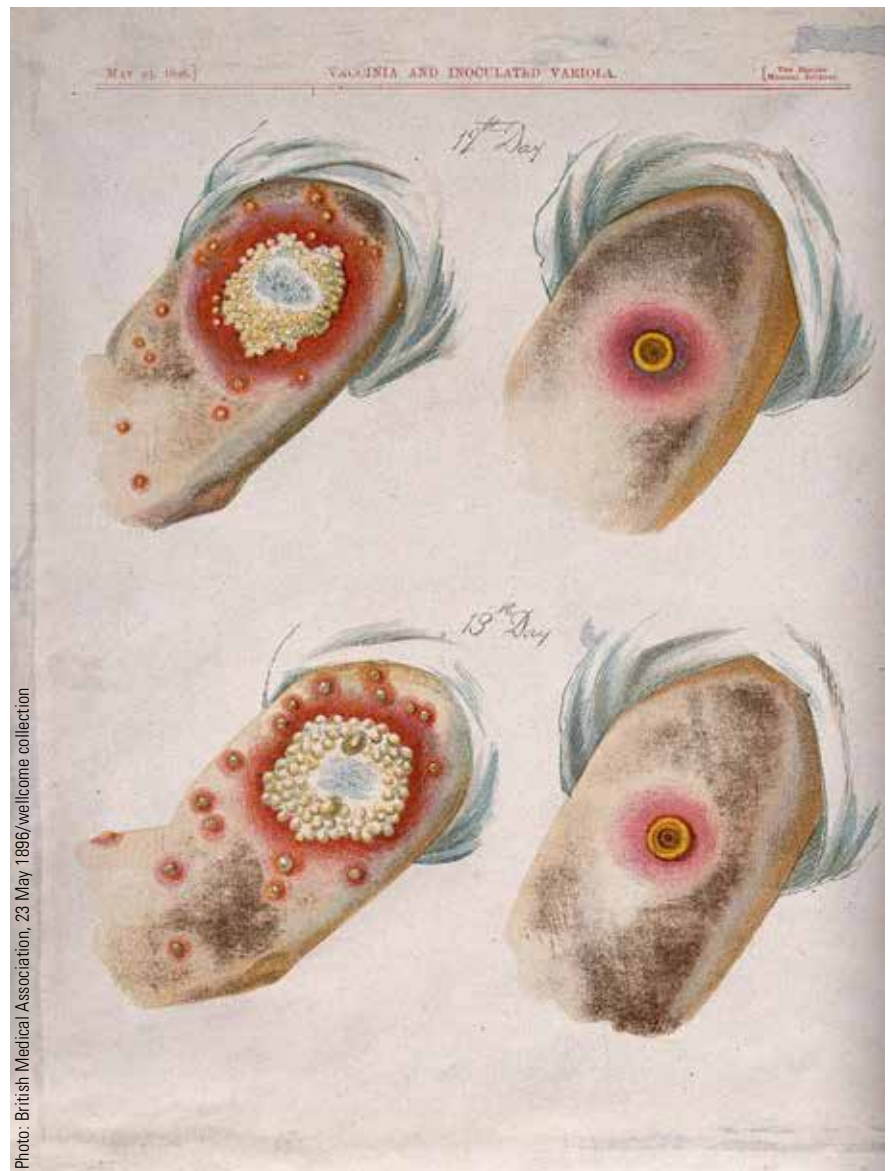
The vaccinee is wrapped in the clothing of a person with smallpox.

4. *Lymph method:*

Cotton is soaked in pus from smallpox blisters and inserted in the nostril.

The *Imperially Commissioned Golden Mirror of the Orthodox Lineage of Medicine* compiled in the middle of the 18th century considered the second inoculation method to be the most tried and tested. However, all the procedures were handed down orally and exclusively by experienced physicians. The origin of this secret knowledge is not known. At the end of the 18th century, Jiao Xun, a renowned scholar, commented as follows: "This technique is indeed extremely subtle. It equates with the idea contained in the 'Inner Canon of the Yellow Emperor' that the holy being cures a disease before it breaks out. But ignorant people do not share this opinion and wait until the poison breaks out on its own, depending on the seasons, [other] epidemics and the spirits. [...] Why do we not destroy it before it flourishes and chase it away to a place where it can be prevented?"

Only children were inoculated, the risk for adults was too high. The quality of the material used for inoculation was crucial: "Once you have collected the smallpox scabs, they should be carefully wrapped in paper and put in a small bottle. This should be closed tightly with a cork so that the *qi* does not escape. The bottle



should not be exposed to sunlight nor heated up near a fire. It is best for a person to wear it on the body so that the scabs dry naturally." A widely used method was to obtain vaccine from the scabs and blisters of successfully inoculated individuals. Here too, the vaccinator's experience was of vital importance. Scabs from smallpox on the head were of the best quality, those from the hands, feet or chest area should not be used.

In view of the existential threat, the whole topic was linked to religious notions from an early stage. The folkloric belief in the smallpox goddess *Doushen niangniang* spread as far as the Imperial Court. Sacrifices had to be made to the goddess both in the event of a smallpox infection as well as for inoculation. For inoculation, an auspicious day had to be chosen, paper money had to be sacrificed and the family had to avoid inauspicious words so as not to displease the smallpox goddess.

Comparison of blisters after inoculation with human smallpox and cowpox on the 12th and 13th day after administration.



An officer of the Qing Army.
Ink and paint on silk,
Metropolitan Museum of Art,
New York.

How efficient and safe were the vaccines?

Renowned physician Zhang Yan said in the 18th century: "I've travelled throughout the whole country and inoculated no less than 8,000 or 9,000 people. All in all, it was no more than 20 or 30 that I was unable to save," and Zhu Chungu, who was in charge of administering vaccinations on behalf of the Qing Court, reported a death rate of less than one person per hundred people inoculated. Given the 30 per cent lethality of smallpox and the social impact of smallpox epidemics, these figures represented tremendous progress. However, inoculation could also trigger epidemics in the first place. There are reports, for example, of an attempt to inoculate a family's children that led to the annihilation of the entire family.

A smallpox department was added to the Imperial Academy of Medicine as early as the 17th century, and it was staff from this department who administered vaccinations to Manchus and Mongols – something especially close to the Emperor's heart. In 1708, the Kangxi Emperor informed the Mongols in a certain region that vaccinators would go there and that the Mongols should have all children aged six and seven inoculated. "Those among the Mongols who are not vaccinated are not permitted to enter the capital. If they are later infected during a natural smallpox epidemic, they must die without question."

Indeed, this imperial activism in relation to vaccinations contributed significantly to reducing infant mortality and thus, as historian Zhang Jiafeng assumes, also to consolidating Manchurian rule. From the middle of the Kangxi reign onwards, there is no longer any evidence of the complex measures to prevent smallpox beyond inoculation that had still characterised the Shunzhi Emperor's reign. Nonetheless, another Manchurian emperor, the Tongzhi Emperor, is said to have died of smallpox at the end of the 19th century – although it could also have been syphilis. More difficult to determine is the inoculation status of the population as a whole. In the 18th century, presumably 80 to 90 per cent of the elite in the south of the Empire were inoculated. For ordinary people, having their children inoculated seems to have been too expensive. On the other hand, there are reports of philanthropic institutions that financed the inoculation of poorer classes, like in England.

Even today, it has not yet been conclusively decided whether variolation was indeed developed in China, as postulated by Needham and Chinese historians, or whether it in fact originated in India. Equally controversial is the question of how the "Chinese" method influenced developments in other parts of the world. It is known that the variolation method rapidly

gained currency in Europe in the 18th century and that various ruling houses there ensured that their members were inoculated. This is often credited to Lady Montagu, wife of the British Ambassador in Constantinople. She had seen a local physician practising the method there and then had her own children vaccinated, which saw to the popularisation of the method in Europe from 1714 onwards. In fact, however, a letter from China describing the Chinese practice had already reached the Royal Society of London in 1700, and a lecture on the subject was given at the Society in the same year.

How the method could have reached Turkey from China is also unclear. Perhaps from Russia: Shortly after the Treaty of Nerchinsk of 1689, which established the borders between the Qing Empire and Tsarist Russia, Russian students had travelled to Beijing to learn not only the language but also the practice of smallpox inoculation. Variolation quickly spread around the world and was also used in America from 1721 onwards. In December 1721, a fierce debate erupted in New England between “anti-inoculators” and “inoculators”. In the 1760s, the Catholic Church in France spoke out explicitly against inoculation, partly because it saw it as playing with God’s will.

Nonetheless, variolation in Europe and America in some ways paved the way for the spectacular success of Jenner’s smallpox vac-

ination. In China, however, there was still a preference for variolation in many places even in the 19th century – something now criticised as a dangerous “superstition” by Western observers endeavouring to propagate the smallpox vaccination based on cowpox.

The history of smallpox inoculation in China is a fascinating example of the historical handling of epidemics that shows: This is an eminently political process. Given their great susceptibility, for the Manchus it was, of course, a matter of pure survival. But the methodical and resolute handling of the threat in the early phase of their rule also attested to the Manchus’ political capacity to act – which facilitated their rule over China and large areas of Inner and East Asia that lasted for over 260 years. ●

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