Jennerian Vaccination and the Creation of a National Public Health Agenda in Japan, 1850–1900

ANN JANNETTA

SUMMARY: Vaccination played a leading role in transforming the social and political status of medicine in Japanese society in the second half of the nineteenth century. The process began well before the Meiji Restoration of 1868 created a centralized government under the Japanese emperor. At the beginning of the century, medicine was a private business. There was no oversight from an interested government, and there were no medical societies or journals in which to debate and formulate opinion about medical practice. Medical knowledge was transmitted privately through personal lineage structures whose members jealously guarded their medical techniques. For almost a half century before live vaccine could be imported, knowledge of vaccination was limited to a small group of Japanese physicians who could read Dutch. This special knowledge created a medical elite whose members managed the transmission of vaccination after the vaccine arrived, and dominated the new medical and public health bureaucracies created by the Meiji state. By the end of the century, a rigorous vaccination program was in place, smallpox mortality had fallen, and Japan’s Western-oriented physicians were in control of a national public health bureaucracy that could monitor the vaccination status of individuals in households throughout Japan.

KEYWORDS: Nagasaki, variolation, Jennerian vaccination, arm-to-arm method, Vaccination Proclamation, Nagayo Sensai, Eisei Kyoku, ranpō, rangaku, Otamagaike, public health in Japan, Baba Sajurō, Jan Cock Blomhoff, Otto Mohnike, Levysshon, A. J. C. Geertz

In the summer of 1849, more than half a century after Edward Jenner published his famous Inquiry claiming that inoculation with cowpox virus would prevent smallpox, a select group of Japanese physicians welcomed

I wish to acknowledge the invaluable role of Professor Shizu Sakai, professor of medical history, Juntendō University, Tokyo, who convinced me of the importance of Jennerian vaccination in the development of modern medicine in Japan.

the arrival of live cowpox vaccine at Nagasaki.\(^1\) During the intervening half century, the technique known as Jennerian vaccination was introduced into virtually every country in the world. Japan was a notable exception. Early in the seventeenth century, the ruling Tokugawa shogun had ordered Japan’s ports closed to all foreign ships, and for 250 years, the Japanese had maintained extremely limited contact with foreign nationals and foreign information. Officially only merchant companies from China and the Netherlands that had been granted a special charter to trade with Japan were permitted to enter the port of Nagasaki. In Nagasaki, Chinese and Dutch traders were confined to separate trading compounds so as to prevent contacts between foreigners and the Japanese.

These restrictions meant that information about developments in the West reached Japan mainly through imported books or through conversations between the resident Dutch merchants and the very limited number of Japanese officials and interpreters assigned to the Dutch Factory in Nagasaki. Remarkably, considering the circumstances, news of Jenner’s discovery reached the Dutch compound in Nagasaki in 1803, about the same time it reached other Asian countries.\(^2\) But it proved far more difficult for the Japanese to acquire the vaccine—live cowpox virus—required to perform vaccination.

The impediments were formidable. First, cowpox was not indigenous to Japan, which meant that live virus had to be imported. Second, the direction of the Pacific Ocean’s monsoon trade winds dictated that ships coming from the southwest could sail to Japan only in the summer months. Third, the cowpox virus was highly susceptible to heat and did

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1. A social history of the introduction of vaccination to Japan can be found in Ann Jannetta, *The Vaccinators: Smallpox, Medical Knowledge, and the “Opening” of Japan* (Stanford, Calif.: Stanford University Press, 2007). This article provides a short narrative covering events concerning vaccination that took place in Japan under the rule of the Tokugawa shogunate; it then turns to a discussion of the ways in which the vaccination policies promulgated by Japan’s Meiji government produced the foundation for a national public health agenda by the end of the nineteenth century.

2. The American ship *Rebecca*, a neutral ship chartered by the Dutch East Indies to carry the Japan trade in 1803, brought news of Jenner’s discovery to the Dutch Factory at Nagasaki. A young Dutch interpreter, Baba Sajūrō, learned about vaccination from Hendrik Doeff, the director of the Dutch Factory from 1803 to 1817. In 1820 Baba completed *Tonka hiketsu* [The Way to Avoid Smallpox], a translation of a Russian vaccination tract, published in 1805, that reached Japan in 1812. Baba Sajūrō’s translation remained unpublished during his lifetime, but it was copied and circulated privately until 1850, when it was edited and published by Toshimitsu Sen’ian as *Roshia gyūtō zensho* [Treatise on Russian Cowpox] (Edo, 1850). For additional information about Japanese translations of Western medical writings on vaccination, see Jannetta, *The Vaccinators* (n. 1), chap. 3.
not travel well in the summer months. In other instances, merchants had kept the virus alive on long transoceanic voyages by vaccinating children sequentially, using the arm-to-arm method, but under no circumstances were children permitted to enter Japan. Finally, in the early years of the nineteenth century, when the new technique of vaccination was making its way around the world, very few foreign ships came to Nagasaki, because Dutch trade in the Pacific had been seriously disrupted by the Napoleonic Wars. Vaccine had arrived in the Dutch East Indies, the Philippines, Macao, and China by 1804, brought on Dutch, Spanish, Portuguese, and British ships. But no ships brought vaccine to Japan during this period.

When Dutch–Japanese trade resumed after the war, the Dutch began an earnest effort to introduce vaccination to Japan from Batavia (Java). Dutch ships carried cowpox lymph and lancets to Japan every year between 1821 and 1826, and at least several times during the 1830s and 1840s, but the vaccine was always ineffective by the time it reached Nagasaki. The problem was the long, hot voyage between the Dutch East Indies and Nagasaki.

However, Japanese physicians already were learning about vaccination by means of Western medical books. Foreign books were subject to censorship, but medical books—both Chinese- and Western-language books—had a special status and generally were welcomed. Medical knowledge was regarded as nonpolitical and potentially useful, and medical writings that described Jennerian vaccination and its successes elsewhere in the world began to reach Japan after 1810. These writings came from Russia, England, Germany, Holland, and China, all countries that were using vaccination to prevent smallpox; however, most of the information about Jennerian vaccination that reached Japan came from European books written in Dutch and brought by Dutch ships.

Japanese physicians interested in Western medicine were known as ranpō (Dutch method) physicians. They had learned about Jennerian vaccination by reading and translating imported Dutch medical books. They had also read Chinese medical books about both variolation and vaccination and had become familiar with Chinese and Western ways of immunizing against smallpox. The practice of variolation—inoculation

5. Jan Cock Blomhoff, director of the Dutch Factory in Nagasaki between 1817 and 1823, initiated the effort to acquire vaccine from the Medical Service at Batavia in 1820. Vaccine lymph was sent in 1821, 1822, and 1823. In 1823, Blomhoff recruited two Japanese physicians to assist the factory doctor, Nicholas Tullingh, but this and all subsequent attempts at vaccination with imported lymph failed. National Archive in The Hague, Nederlandsche Japan Factorij (hereafter NFJ), 1609–1860, Dutch Factory in Japan, 1609–1860, p. 695: outgoing letter from Jan Cock Blomhoff to Council at Batavia, no date, 1821.
using smallpox virus—was older and more highly developed in China than it was in the West, and the Chinese had learned through several centuries of experimentation that smallpox virus (Variola major) remained viable for longer periods when stored as scabs than when stored as lymph. This information would later help the Japan import live cowpox virus (Variolae vaccinae).4

At the beginning of the nineteenth century, the content of Western medical books was accessible to only a small number of individuals who could read Dutch; however, by 1820 the number of ranpô physicians studying and translating Dutch books had grown exponentially.5 The most influential among these physicians established private medical schools in Japan’s major cities and towns, where they supervised the translation of many important Western texts. These schools, called rangaku (Dutch learning) schools, became points of contact for a generation of physicians who advocated Western medical techniques.6 By the 1840s Western medicine was attracting not only a large number of physicians but the patronage of merchants and regional overlords as well.

Smallpox was the single most important cause of death among Japanese children in the nineteenth century; consequently, it is not surprising that books about Jennerian vaccination attracted a great deal of interest. Writings about vaccination by European physicians were copied and translated into Japanese by doctors who were interested in ways to prevent smallpox. Although few of these translations were published, they circulated as manuscripts and were shared with teachers, students, and colleagues. As a result, long before the vaccine virus arrived in Japan, Japanese physicians knew a great deal about vaccination: how to perform the technique, how to preserve the vaccine, and how to judge a successful vaccination. As they learned about the successes of vaccination elsewhere, they grew confident that vaccination would not only prevent the dreaded disease of smallpox but would demonstrate the superiority of Western medical techniques as well.

Ranpô physicians and rangaku scholars regarded the arrival of live cowpox vaccine in the summer of 1849 as a major triumph. The circumstances

were extraordinary. Cowpox lymph had been sent in 1848 but, as in earlier years, it was not effective when it arrived. The Japanese, familiar with the Chinese method of preserving smallpox and cowpox matter as scabs, made a special request. They asked the Dutch to send vaccine virus in the form of cowpox scabs the following year. In 1849 Batavia sent samples of the vaccine virus as both lymph and scabs. Three Japanese children were vaccinated, two with the lymph and one with a vaccine reconstituted from the scabs; but only the child vaccinated using the cowpox scabs produced a successful vaccination lesion. Japan’s newly imported supply of live cowpox vaccine was limited to the virus contained in the pocks on this one child’s arm.

Despite the fact that the amount of live vaccine virus received in 1849 was extremely small, the national transmission of vaccine and vaccination in Japan was exceedingly rapid. The vulnerability of the virus was well known, and great efforts were made to keep the vaccine alive. The first order of business was to expand the supply of vaccine: Nagasaki city officials and physicians, in collaboration with the Dutch Factory physician, Otto Mohnike, arranged to bring children from domains throughout Kyushu to Nagasaki to be vaccinated. Having been vaccinated with the arm-to-arm method, vaccinated children were returned to their home districts to distribute vaccine virus to other children from the pocks on their arms. The arm-to-arm method was the key to increasing the supply of vaccine and to the successful transmission of vaccination in Japan. Beginning with the tiny supply of virus in Nagasaki, within six months vaccination was being performed in clinics throughout the entire length of the Japanese Islands.

As Otto Mohnike wrote to the director of the Dutch Factory, Henrij Levysshon:

I am pleased to inform Your Honour [Levysshon] that at Nagasaki and in the other towns and districts of the island of Kyushu vaccination has taken root so well that we may hope that this wonderful invention will not only never be lost, but even that it will spread over the entire Japanese empire. At Nagasaki vaccine pocks already exist in their thirteenth generation—in nineteen children whom I have inoculated today—and the entire number of children inoculated by me from week to week since 14 August until now has reached

8. The child was Narabayashi Kenzaburō, the third son of Narabayashi Sōken, a Nagasaki ranpō physician. Soekawa, Nihon tōbyō shi (n. 4), p. 45.
9. For a detailed account of the rapid transmission of cowpox vaccine in Japan in 1849, see Jannetta, The Vaccinators (n. 1), chap. 6.
176. Apart from this, I have had Japanese physicians inoculate children in the areas outside Nagasaki.\textsuperscript{11}

Ranpō physicians quickly mobilized personal connections to organize the distribution of vaccine beyond Kyushu.\textsuperscript{12} These connections included father–son, teacher–student, and lord–retainer relationships spanning the length and breadth of the Japanese Islands. Prominent regional lords participated actively in the distribution, hand-carrying vaccine from their domains to the capital and beyond. The shogun’s government in Edo remained entirely aloof from the process, but its absence of interest was no deterrent. By the end of the year, vaccination clinics had been opened in doctors’ offices throughout the entire length of the Japanese Islands.\textsuperscript{13}

The circumstances of the late arrival of vaccine were important. Unlike the introduction of vaccination elsewhere in Asia, in Japan vaccination was not a foreign technology imposed by a colonial power. In the Dutch East Indies and the Philippines, vaccination was introduced and administered by Dutch and Spanish colonial governments, respectively; in China, it was promoted by the British. In Japan, however, vaccination was actively sought by Japanese physicians and their patrons. The Japanese could proceed with confidence, because the efficacy of vaccination had been proved elsewhere many years before. Nor was vaccination a technology imposed from above. In Japan, vaccination was promoted and introduced by physicians from peripheral domains far from Edo. Another decade would pass before the shogun’s government offered any support whatsoever.

For almost two decades, vaccination remained under local control. Local physicians maintained vaccination clinics as part of their private practices; they reproduced vaccine lymph by means of arm-to-arm vaccination. Physician networks and local authorities also managed the distribution of vaccine from place to place. The logistical problems were enormous; possibly local knowledge and close local supervision of the scarce vaccine was an asset in the early years of vaccination. An announcement that vaccine had been received at a local doctor’s clinic would prompt a call for a certain number of children to report to a specified clinic at a specific time. The vaccinated children were required to return to the clinic several days later so that the doctor could determine the success of their vaccination lesions and take live virus from those lesions to vacci-

\textsuperscript{11} NFJ (n. 3), 1632/36, letter from Mohnike to Levyssohn, 11 November 1849.
\textsuperscript{12} Many people participated in the transmission of the vaccine virus. It was hand-carried to physicians in major cities and distributed from cities to nearby towns and villages. A chronology of the 1849 transmission is found in Jannetta, \textit{The Vaccinators} (n. 1), pp. 146–47.
\textsuperscript{13} \textit{Tennentō no zero e no michi} (n. 10), p. 36.
nate other children. Vaccination certificates were issued by local clinics, which recorded the successes and failures of vaccination, in part as a way of monitoring the effectiveness of the vaccine. By documenting successes and failures over time, it was possible to monitor a community’s immunity to smallpox, but success depended on the interest and diligence of local participants and would have varied from community to community.

From Private to Public Sponsorship of Vaccination

Smallpox, however, was a national not a local problem, and it had no respect for jurisdictional boundaries. Personal networks and arm-to-arm transmission may have facilitated vaccine production and distribution in the early decades of vaccination, but neither personal networks nor local institutions had the capacity to build and sustain a comprehensive vaccination program over the long term. As long as vaccination depended on the recruitment of children, arm-to-arm transmission, and limited local resources, smallpox would continue to claim the lives of Japanese children.

A transition from private to public sponsorship of vaccination began in the final years of Tokugawa governance with the creation of new institutions dedicated to immunizing children against smallpox. The first sign of serious interest in vaccination by the Tokugawa government followed an outbreak of epidemic smallpox in 1857 in the northern island of Ezo (Hokkaido). At the request of local officials in Ezo, the Tokugawa government recruited and sent two experienced vaccinators to the northern island, where they vaccinated several thousand children. The second sign was the opening of the first vaccination clinic in Edo the same year. A group of Edo physicians petitioned the shogun for permission to open a private clinic in 1857, and the Otamagaike Vaccination Clinic opened early the following year.

The Otamagaike Vaccination Clinic was privately built, financed, staffed, and managed by the sponsoring physicians, but in 1860 the Tokugawa government took over the clinic’s finances and the appointment of key personnel. From that time, the clinic and its successor institutions were managed and operated by the government. Rather quickly, these

successor institutions—the Seiyō Igakusho (Western Medical Institute) and the Igakusho (Medical Institute)—expanded their activities beyond vaccination services to take on the additional functions of a medical school, laboratory, and research institution. The ultimate institution produced through this progression was the Medical School of the Imperial University of Tokyo.

After many centuries of military rule, the Tokugawa family relinquished its claim to rule Japan, and an oligarchy of regional leaders reinstated the Japanese emperor as head of state. The young Emperor Meiji moved from the ancient capital of Kyoto to the new capital in Tokyo (formerly Edo) to become the ruler of Japan. The oligarchs who had formed the new government in the Emperor’s name became the de facto rulers of the new nation. A significant number of these new leaders had been trained in Western-style medicine, and their modernization agenda included strong support for Western medicine. Interested in finding ways to combat disease, improve the health of the population, and build a strong nation, the new Meiji leaders were active supporters of Jennerian vaccination.

As they began the task of building a national government from scratch, there were important reasons why the Meiji leaders saw disease control as a central concern of the central government. Following the forced opening of Japan’s ports to international contact in the late 1850s, morbidity and mortality rates rose sharply. In addition to endemic smallpox and other indigenous diseases, new diseases unleashed an upsurge of unusually severe epidemics. Japan’s new leaders considered it their responsibility to develop policies to prevent or contain the diseases that caused these epidemics. An urgent need to bring what was a highly visible threat to the country’s well-being under control was obvious, and one of the new government’s first acts was the creation of a bureau within the Meiji government that would defend the public’s health.

In 1874, the Meiji government created the Eisei Kyoku (Central Sanitary Bureau) in Tokyo and appointed a physician from Kyushu’s Ōmura domain, Nagayo Sensai, as its first director. This key appointment

18. Devastating epidemics of cholera and measles struck Japan soon after the ports opened to foreign traders in 1858, and these were followed by epidemic typhus and bubonic plague, which heretofore had been unknown in Japan: Jannetta, Epidemics and Mortality (n. 7), pp. 189–207.
ensured that support for vaccination would be given the highest official 
priority. Nagayo Sensai was a third-generation ranpō physician; his grand-
father, Nagayo Shuntatsu, had been a smallpox doctor and an advocate 
of Jennerian vaccination long before cowpox vaccine was available in 
Japan. In 1849 Shuntatsu had personally transported cowpox lymph from 
Nagasaki to Ōmura, and he had immediately opened a vaccination clinic 
there.20 His grandson, Sensai, had known about the merits of Jennerian 
vaccination from his earliest childhood.21

Nagayo Sensai was educated in Osaka at Japan’s most prestigious West-
ern learning academy in the 1850s.22 In the 1860s he returned to Kyushu 
to study under the Dutch physicians hired by the Tokugawa government 
to establish a Western medical school and hospital in Nagasaki.23 With the 
change of government in 1868, Nagayo was appointed the first director 
of this new hospital, and vaccination was standard medical practice from 
its inception. In 1871 Nagayo was chosen to join the prestigious Iwakura 
Mission to the United States and Europe, where he was able to visit West-
ern medical schools and hospitals.24 In Germany he was introduced to the 
new ideas about public health that were being discussed, in particular, the 
importance of collecting health statistics as a way to monitor and control 
disease. On his return to Japan in 1872, Nagayo was appointed director 
of the Meiji government’s newly created Eisei Kyoku in Tokyo.

Nagayo had returned from Europe with a firm commitment to con-
structing a national public health system. One of his first official acts as 
director of the Eisei Kyoku was to issue a Vaccination Proclamation that 
made Jennerian vaccination the only legal way to protect against small-
pox. Variolation (inoculation with smallpox virus) was declared illegal. 
Vaccinations were to be given free of charge and inspected for success, 
and successful vaccinations were to be certified with a red stamp on an 
oficial document. Vaccinees whose vaccinations were unsuccessful had 
to be revaccinated, and those whose vaccinations were successful were to 
be revaccinated every seven years. Vaccinating physicians had to be certified 
by the government and were required to report vaccination statistics to

21. Nagayo Sensai, Shōkō shishi [An Autobiography], in Matsumoto Jun and Nagayo Sensai, 
23. Ibid., p. 199.
24. The Iwakura Mission was a Meiji government–sponsored tour of European countries 
and the United States, headed by Iwakura Tomomi (1825–83), a court noble who had sup-
ported the Meiji Restoration. Its purpose was to learn about the operations of industries 
and governments in the West.
the government every six months. Perhaps most striking of all was the provision that all children were required, by law, to be vaccinated between seventy-five and one hundred days after birth.25

Nagayo’s visionary Vaccination Proclamation was a long-term commitment to free and universal vaccination, but the difficulties were formidable. First, there was still a severe shortage of viable cowpox vaccine; vaccinators still depended on arm-to-arm vaccination to supply fresh cowpox lymph. Second, the required certifications, documentation, and reporting requirements placed onerous new responsibilities on physicians. Heretofore, they had been accountable only to their patients and to local officials; now they were expected to report to a distant bureaucracy that was still being created. If successfully administered, the mandate articulated in the Vaccination Proclamation would link individuals and communities throughout Japan to the new central government in Tokyo.

Initially, the Eisei Kyoku was situated in the Education Ministry, but it was soon moved to the Home Ministry, which was the most powerful ministry in the Meiji government. The Eisei Kyoku comprised four departments: General Administration, Bureau of Statistics, Bureau of Vaccination, and Bureau for Control of Medicines. With respect to Japan’s vaccination rate, Nagayo promptly set out to accomplish two major objectives: (1) to increase the quantity and quality of Japan’s vaccine supply to accommodate the vaccination mandates now required by law and (2) to create a data collection system to monitor how well vaccination policies were being carried out.

From Local to National Control of Vaccination: Vaccine Production

If the Eisei Kyoku was to successfully enforce the provisions of the Vaccination Proclamation, it was essential to establish a national system of vaccine production and distribution; that is, to move vaccine production from the arms of young children to government laboratories with the capacity to produce large quantities of vaccine directly from cows. Because of the rarity of cows in Japan, vaccine production was a special problem, but the idea of using cows to produce a vaccine was not new to the Japanese. As early as the 1830s, Japanese physicians had tried to produce a cowpox vaccine by inoculating a cow with the smallpox virus.26 Despite their lack

of success, experiments on cows continued until the vaccine was imported from abroad in 1849.

A consideration of problems concerning the quality and quantity of Japan’s vaccine virus supply can be found in the very first report of the *Eisei Kyoku Nenpô* (Annual Report of the Central Sanitary Bureau), which covers the period from July 1875 through June 1879. Although arm-to-arm transmission with good vaccine virus from a known source was still regarded as the most reliable vaccination technique, the report duly notes that vaccine which had been passed through a long sequence of individuals using the arm-to-arm method became increasingly ineffective over time. The same was true for vaccine transported frequently from one jurisdiction to another. Moreover, the report notes that the quality of cowpox vaccine was adversely affected by seasonal variations in temperature. It was clear that, if smallpox was to be eradicated, vaccine must be produced on a considerably larger scale and with much greater quality control.

This growing demand for vaccine prompted both private and public initiatives designed to produce cowpox vaccine from cows. Nagayo Sensai had personally observed the calf lymph production method practiced in The Hague in 1871. He purchased the necessary equipment, and by 1873 he had successfully reproduced the Dutch vaccine production method. In 1874 the Eisei Kyoku opened a Vaccine Distribution Center (Shuto Keisho) in Tokyo to meet the growing demand for a higher quality vaccine. This center operated a vaccine laboratory that housed female cows to propagate fresh cowpox vaccine. Initially, both foreign and domestic cows were used, but in June 1880 the laboratory stopped using domestic cows. The reason given was that domestic cows had thick, rough skin, whereas foreign cows had smooth skin that produced a consistently better quality vaccine.

Using calves for vaccine production made it possible for the Vaccine Distribution Center to function as a national production, distribution, and vaccination center. The government’s goal was to immunize as many children as possible at the earliest possible age: it granted the center the authority to vaccinate healthy infants under one year of age and to schedule vaccinations for infants in different Tokyo wards. The center later set

27. Annual reports of the Eisei Kyoku covered calendar years from 1 July through 30 June beginning in July 1875. These reports have been reprinted as *Meiji-ki, eisei kyoku nenpô, 1875–1900*, 7 vols. (Tokyo: Harashobô, 1992).
29. Ibid., p. 83.
up branch offices in the city’s districts—Yotsuya, Shiba, and Hongo—to accommodate infants who lived an inconvenient distance from the main office. The center supplied vaccine to the Ministry of Education and the Ministry of the Army and responded to special requests for vaccine when smallpox cases broke out elsewhere in the country. It also sent vaccine to the Ryukyu Islands, which recently had been brought under Japanese administration. The increased production of vaccine using the calf inoculation method made it possible to greatly expand vaccine distribution and the delivery of vaccination services in Japan.

Not long after the Japanese government developed the procedures to manufacture and store cowpox vaccine, the Tokyo Vaccine Distribution Center was approached by other countries seeking vaccine and information about vaccination. In 1880 an emissary from Korea visited the Tokyo Vaccine Distribution Center to learn how to perform vaccination and how to manufacture vaccine using the calf lymph production method.31 The following year, a request for vaccine from the Russian Embassy in Tokyo was met with a supply of newly implanted calf vaccine.

In its 1881–82 annual report, the Vaccine Distribution Center reported what it called its “regular” and “irregular” distribution of vaccine: 14,015 vials for regular distribution to prefectures, 7,660 vials for irregular distribution to prefectures, and 4,740 vials to individual citizens for a production total of 26,415 vials. Vaccine production and distribution had more than doubled since 1874, when the first reports were issued.32 Fresh vaccine was being produced every month, and vaccinations in Tokyo were being offered every day of the week except Sundays and holidays.33

In 1882, the Vaccine Center received a gift of six “seedlings” from the United States, and they were tested on both calves and children without success. The Japanese concluded that the seedlings were too old and had lost their vitality, which suggests that the international transmission of the cowpox virus was still a problem. By then Japan’s Vaccine Center was producing and distributing vaccine nationally on a regular basis: in 1882–83 it reported a production total of more than 40,000 vials distributed to Japan’s prefectures, the Ministry of the Army, and the Ministry of Education, plus private sales to physicians and foreigners.34

The manufacture of vaccine from calf lymph did not mean that the arm-to-arm method of vaccination was abandoned. It continued to serve a
useful purpose in villages and towns throughout Japan for the rest of the nineteenth century. Nor did the new public bureaucracy replace personal and private networks, which continued to play an important role in vaccine distribution. Private physicians and local institutions were the nodes of a loose network that continued to communicate information about the local whereabouts of viable vaccine. These local networks were a valuable human resource for the new public health bureaucracy, and they would continue to be an essential part of the national system as it expanded.

From Vaccination to the Creation of a Public Health Agenda

When the Eisei Kyoku was created, vaccination had been practiced and documented locally for over twenty years; consequently, it was logical to begin the compilation of national health statistics by collecting local and regional data on vaccinations and smallpox cases. Vaccination statistics were the first public health statistics to be systematically collected by the Meiji government, with the Eisei Kyoku publishing its first tabulation of smallpox cases, deaths, and vaccinations for the period 1874–79. The resulting report gave both positive and negative vaccination results, by prefecture, for first vaccinations and revaccinations. During the first twelve-month period covered in this report, more than one million persons, mostly children, were vaccinated. Vaccination statistics became more detailed over time, and data collection expanded to include many more jurisdictions. The reporting methods used to collect statistics on smallpox and vaccination would become the prototype for the collection of data on the incidence of other acute infectious diseases.

In 1885 new public health regulations required all citizens to record the vaccination of family members in the koseki, an official household register newly required by the Meiji state. Physicians who issued vaccination certificates were now required to report to the government, each month, the names and addresses of the individuals to whom they had issued certificates. The local police were authorized to check the birth and vaccination certificates of all households in their jurisdictions, and a new smallpox case would prompt a visit from a police officer, who would determine whether there were other unvaccinated children in the family or neighborhood. Within a decade, vaccination policy had accomplished

35. Ibid., vol. 1, 1 July 1875 (Meiji 8)–30 June 1880 (Meiji 13), pp. 24a–24b. The first reports came from Japan’s three cities—Tokyo, Osaka, and Kyoto—later followed by data reported by prefecture to the Eisei Kyoku in Tokyo.

a striking measure of social control: the Meiji government could now reach down to monitor individuals in Japan’s smallest social unit—the Japanese household.

The national health system relied on the records kept by individual vaccinators and local clinics as well to learn when and where children were being vaccinated and whether vaccine in different parts of the country was proving effective, as well as information about numbers of vaccinations, revaccinations, and subsequent successes and failures.

How successful was the Eisei Kyoku in nationalizing Japan’s vaccination policy? A. J. C. Geertz, a Dutch physician and pharmacist from Utrecht, considered Japan’s immunization policies to be both effective and advanced for their time. Geertz had worked with Nagayo Sensai in Nagasaki to help set up an academic curriculum for the Nagasaki Medical School, and he had then secured a prominent place in the Meiji government’s new public health bureaucracy in Tokyo. In a letter to *The Japan Mail* in June 1879, Geertz commented on the importance of extending central government control over Japan’s vaccination program:

> a large number of physicians . . . each in his own immediate neighbourhood, contributed their share to the work [of vaccination], but this would never have produced such quick and excellent results, if the system had not been governed and controlled by an able hand. For, although . . . vaccination was in a limited degree practiced in the years before 1874, it was not until that time that there appeared regularity, system, order and control in the matter. To Dr. Nagayo Sensai, the chief of the Central Sanitary Office, under the Naimusho [Home Ministry], by far the largest share of praise is incontestably due.37

The success of the early Meiji government’s rigorous vaccination program is also apparent in Table 1, which shows the impressive decline of smallpox deaths after 1885. Japan’s last major epidemic in 1905 witnessed 10,704 cases and 3,388 deaths in Japan’s population of 48 million people, a significant decrease in the number of deaths in a major epidemic year.

Vaccination played a leading role in creating a social and political environment in which a comprehensive public health agenda could emerge as a government priority. The process began well before Japan’s political leaders created a central government and restored the emperor as head of state in 1868. At the beginning of the nineteenth century, medicine

37. A. J. C. Geertz, “Vaccination in Japan,” *Japan Weekly Mail*, Yokohama, 12 June 1879. Geertz’s letter provides statistics showing the number of vaccinations and revaccinations performed in Japan during the period from 1 July 1875 to 31 December 1877. Geertz’s letter includes an English translation of the eight articles in the Eisei Kyoku’s Sanitary Code that pertain to vaccination regulation.
had been a private business with little oversight from a disinterested government, and Japan’s advocacy for vaccination came from private physicians who learned about Western medical techniques by studying foreign medical books. The half-century delay in acquiring live cowpox virus gave Japan’s ranpō physicians time to build a strong case for Jennerian vaccination on the basis of its successes and acceptance elsewhere in the world. Foreign knowledge had created a medical elite whose members managed the transmission of vaccination after the vaccine arrived and quickly dominated the new public health bureaucracy created by the Meiji state in the 1870s. Central government control of vaccine production and a national data collection system soon followed. By the end of the century, a rigorous vaccination program was in place, smallpox mortality had fallen, and Japan’s Western-oriented physicians were in control of a national public health bureaucracy with the ability to monitor the vaccination status of individuals in households throughout Japan. These initiatives gave Japan’s national government the tools it needed to build a strong public health agenda and, in the twentieth century, to expand this agenda into its colonial empire in Asia.

Table 1. Smallpox Cases and Deaths, by Year, 1885–1900

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<thead>
<tr>
<th>Year</th>
<th>No. Cases</th>
<th>No. Deaths</th>
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<tbody>
<tr>
<td>1885</td>
<td>12,618</td>
<td>3,299</td>
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<td>1886</td>
<td>73,337</td>
<td>18,676</td>
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<td>1887</td>
<td>39,779</td>
<td>9,967</td>
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<td>1888</td>
<td>4,052</td>
<td>853</td>
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<td>1889</td>
<td>1,324</td>
<td>328</td>
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<tr>
<td>1890</td>
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<td>25</td>
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<tr>
<td>1891</td>
<td>3,608</td>
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<tr>
<td>1892</td>
<td>33,779</td>
<td>8,409</td>
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<td>41,898</td>
<td>11,852</td>
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<tr>
<td>1894</td>
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<td>3,342</td>
</tr>
<tr>
<td>1895</td>
<td>1,287</td>
<td>268</td>
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<tr>
<td>1896</td>
<td>10,704</td>
<td>3,388</td>
</tr>
<tr>
<td>1897</td>
<td>41,946</td>
<td>12,276</td>
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<td>1898</td>
<td>1,752</td>
<td>362</td>
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<td>1899</td>
<td>1,215</td>
<td>245</td>
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<td>1900</td>
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</tbody>
</table>

ANN JANNETTA is Professor Emerita of Japanese history at the University of Pittsburgh. Her publications include *Epidemics and Mortality in Early Modern Japan* (Princeton, 1987), *The Vaccinators: Smallpox, Medical Knowledge, and the “Opening” of Japan* (Stanford, 2007), and articles on disease and demography in *The Cambridge World History of Human Disease* and *Encyclopedia of Social History*. In her new research, she examines the role of the medical journal in creating national and international communities of medical practitioners in the nineteenth century.
アインスはなぜ「山に逃げた」か？

――関東大震災において「我が国初の強制避難」の奥行――

香西 豊子

『思想』1017号
2008年，岩波書店
本実験へと応用するためには、あらゆる条件において適応し、その観察結果を踏まえた上で実験を行うことが重要である。しかし、実験においては予想外の異常が発生することもあり、これらの問題を解決するために新たな方法を試みることが求められる。実験結果を踏まえて、適切な対策を講じが必要である。
「プルーラリズム」

岩波書店

この時代のわれわれに、多元主義が
なぜ必要なのか、どのようにして可
能なのかを生産者である世界の複
雑な時代に支えるための、あたな
多元主義の可能性を提案する。
「フレンチ」の言葉は、通常、「フランス」を表すが、この文脈では、「フランス」という場合を指す。この文脈で「フレンチ」という言葉が使われているのは、「フレンチ」の意味である。
Smallpox and the Epidemiological Heritage of Modern Japan: Towards a Total History

AKIHITO SUZUKI*

Keywords: Epidemiology; Public Health; Comparative History; Japan; Smallpox; Plague; Cholera

This article examines one of the long-term structural forces that contributed to the making of public health in Modern Japan. My overall argument is that the history of public health should be conceived as a total history, encompassing not just political, administrative, and scientific factors but also natural, social, and economic factors. Elsewhere I have discussed two of these factors in some detail, both of which were long-term structural forces resulting from the interactions of different realms: 1) the effect of the topography and the pattern of the use of land; and 2) the effect of the market as a medium for people’s behaviour seeking the prevention of the disease.1 Here I will argue that the Japanese long-term experience of diseases provided another structural force that shaped public health in Japan. The long-term cumulative factor can be called the ‘epidemiological heritage’ of Japan.

Although the phrase ‘epidemiological heritage’ is my own coinage, the concept has been articulated and developed most clearly by Peter Baldwin in his Contagion and the State in Europe 1830–1930 (1990).2 Baldwin has shown that mediaeval and early modern experience of plague provided the basis from which nineteenth-century public health in Europe was developed. Repeated visitations of plague prompted European states to establish public-health measures, first in Italian cities and then in states in northern Europe. The anti-plague measures consisted mainly of spatial limits imposed on the movement of people and goods: quarantine, cordon sanitaire, confinement of patients in lazarettos, and disinfection of goods and letters at borders. These spatial measures entered the vocabulary of public health in the late mediaeval and early modern periods and remained there even after plague disappeared from Europe in the eighteenth century. When cholera hit Europe in the 1820s, European states resuscitated their anti-plague measures to combat cholera: ‘most regimes dusted off their files on bubonic plague and put what were by now fairly traditional policing measures into operation: military

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1 This paper does not discuss these two forces in detail. See Akihito Suzuki and Mika Suzuki,


cordons sanitaires, quarantine, fumigation, disinfection, isolation. This set of time-old anti-plague measures served as a prototype from which anti-cholera measures were developed in Europe in the nineteenth century to become the core of modern public health. Several centuries of visitations of plague thus provided Europe with the crucial part of the epidemiological heritage to develop its modern public health.

Japan, on the other hand, had not experienced plague in the late mediaeval and early modern period. What formed, then, the epidemiological heritage of Japan? Which disease served as the prototypical epidemic disease when cholera struck the country in the nineteenth century? This paper argues that smallpox held the key and the epidemiological profile of the disease moulded and conditioned people’s response to epidemic diseases in general. Centuries of smallpox epidemics had formed the basis, from which had developed anti-cholera measures and other public health policies in modern Japan. One should thus examine the long-term context of these smallpox epidemics in Japan from the ancient and mediaeval periods through to the early modern period.

The first recorded smallpox epidemic in Japan was in the eighth century. The smallpox that started in 735 ravaged the country and killed probably about one-third of the entire population. Almost certainly this was a virgin soil epidemic. Later, twenty-eight smallpox epidemics were recorded until 1206. Among these epidemics, there was a clear trend of progressive shortening of the interval between two epidemics: until the year 1000, smallpox visited Japan with the interval of twenty-four years on average, while between 1001 and 1206 the interval became thirteen years. (Table 1) By the Tokugawa Period or the early modern period in Japan, smallpox was firmly settled as an endemic disease. Statistics from a village show that the village experienced major outbreaks of smallpox about every ten years. (Figure 1) They also show that about ninety-five per cent of the deaths from smallpox were those who were under ten-years-of-age. (Table 2)

This epidemiological profile of smallpox in early modern Japan had an important societal consequence. Since victims were almost exclusively children, the management of smallpox became the business of each household. Medical advice-books for lay people published during the Edo Period often included how to protect one’s child from malignant smallpox. Likewise, suffering and recovering from smallpox became an important part of the ritual celebrating the growth of one’s child. The ritual was called sasayu, and became an important occasion to throw a family party, inviting friends and relatives. The management of the smallpox of one’s child was integrated into the management of the household during the Tokugawa Period.

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4 Early epidemics of smallpox have been explained in detail in William Wayne Farris, Population, Disease, and Land in Early Japan, 645–900 (Cambridge, MA: Harvard University Press, 1985).
Another profile of the epidemiology of smallpox from the seventeenth century was the spatial fragmentation of the diffusion. While in the ancient period an epidemic of smallpox covered the entire country in a single wave, during the Tokugawa Period the disease lost its nationwide coverage. Smallpox became spatially limited in its diffusion, ceasing to be an event for the state under shogunate or the domain rule by daimyōs. Instead it became the affair of local villages. Diffusion maps from the eighteenth and nineteenth centuries show mosaic-like patterns of affected settlements and unaffected settlements in each outbreak. Under such a situation, there was little reason for the state or the domains to think that controlling smallpox was their business. The changing spatial profile of smallpox thus separated anti-smallpox measures from the worldviews of elites of the state and the domains and integrated them into those of common villagers. People in the village were left free to inscribe their belief onto anti-smallpox measures. Folkloric religions and local customs became backbones of the rituals for smallpox: people made offerings of food to the demons of the disease and danced to music to guide them out of the villages. The fragmentation of the diffusion of smallpox in the Tokugawa Period put the control of the disease out of the power of wide-area administration and administration and

Table 1
Number of years between outbreaks of smallpox in Japan

<table>
<thead>
<tr>
<th>Outbreak no.</th>
<th>735–1000 Year</th>
<th>Interval (years)</th>
<th>1001–1206 Year</th>
<th>Interval (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>735</td>
<td>–</td>
<td>13</td>
<td>1001</td>
</tr>
<tr>
<td>2</td>
<td>763</td>
<td>28</td>
<td>14</td>
<td>1020</td>
</tr>
<tr>
<td>3</td>
<td>790</td>
<td>27</td>
<td>15</td>
<td>1025</td>
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<td>4</td>
<td>810</td>
<td>20</td>
<td>16</td>
<td>1036</td>
</tr>
<tr>
<td>5</td>
<td>853</td>
<td>43</td>
<td>17</td>
<td>1072</td>
</tr>
<tr>
<td>6</td>
<td>879</td>
<td>26</td>
<td>18</td>
<td>1077</td>
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<tr>
<td>7</td>
<td>915</td>
<td>36</td>
<td>19</td>
<td>1085</td>
</tr>
<tr>
<td>8</td>
<td>925</td>
<td>10</td>
<td>20</td>
<td>1093</td>
</tr>
<tr>
<td>9</td>
<td>947</td>
<td>22</td>
<td>21</td>
<td>1113</td>
</tr>
<tr>
<td>10</td>
<td>974</td>
<td>27</td>
<td>22</td>
<td>1126</td>
</tr>
<tr>
<td>11</td>
<td>993</td>
<td>19</td>
<td>23</td>
<td>1143</td>
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<td>12</td>
<td>998</td>
<td>5</td>
<td>24</td>
<td>1161</td>
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<td></td>
<td>25</td>
<td>1175</td>
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<td></td>
<td></td>
<td>26</td>
<td>1177</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>27</td>
<td>1192</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>28</td>
<td>1206</td>
</tr>
</tbody>
</table>

Average interval 23.9


Another profile of the epidemiology of smallpox from the seventeenth century was the spatial fragmentation of the diffusion. While in the ancient period an epidemic of smallpox covered the entire country in a single wave, during the Tokugawa Period the disease lost its nationwide coverage. Smallpox became spatially limited in its diffusion, ceasing to be an event for the state under shogunate or the domain rule by daimyōs. Instead it became the affair of local villages. Diffusion maps from the eighteenth and nineteenth centuries show mosaic-like patterns of affected settlements and unaffected settlements in each outbreak. Under such a situation, there was little reason for the state or the domains to think that controlling smallpox was their business. The changing spatial profile of smallpox thus separated anti-smallpox measures from the worldviews of elites of the state and the domains and integrated them into those of common villagers. People in the village were left free to inscribe their belief onto anti-smallpox measures. Folkloric religions and local customs became backbones of the rituals for smallpox: people made offerings of food to the demons of the disease and danced to music to guide them out of the villages. The fragmentation of the diffusion of smallpox in the Tokugawa Period put the control of the disease out of the power of wide-area administration and
Table 2

Mortality figures and causes divided up by under/over 10 years of age in Hida, 1795–1852

<table>
<thead>
<tr>
<th>Cause</th>
<th>Deaths under 10</th>
<th>Deaths over 10</th>
<th>Percentage of under 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td>735</td>
<td>38</td>
<td>95.1</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>217</td>
<td>41</td>
<td>84.1</td>
</tr>
<tr>
<td>Measles</td>
<td>29</td>
<td>6</td>
<td>82.9</td>
</tr>
<tr>
<td>‘Wind’ disease</td>
<td>10</td>
<td>198</td>
<td>4.8</td>
</tr>
<tr>
<td>‘Epidemics’</td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>‘Temporal Disease’</td>
<td>5</td>
<td>111</td>
<td>4.3</td>
</tr>
<tr>
<td>Subtotal</td>
<td>996</td>
<td>413</td>
<td>70.7</td>
</tr>
<tr>
<td>Unknown</td>
<td>967</td>
<td>337</td>
<td>74.2</td>
</tr>
<tr>
<td>Other causes</td>
<td>1770</td>
<td>2772</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>3733</td>
<td>3562</td>
<td>51.2</td>
</tr>
</tbody>
</table>

enlightened rationality, and set it into the realm of the business of village, using magical and religious methods most familiar to them.

The epidemiology of smallpox in early modern Japan thus prompted small-scale units of families and villages to take the responsibility of its control. This epidemiology was buttressed by Tokugawa ideologies: didactic emphasis on Confucian family values encouraged the family’s self-help, and the administrative system of the self-government of villages contributed to the making of family- and village-based ‘public’ health. The large-scale units of the state or the domains, who were actors representing rational, bureaucratic, and systematic values in early modern Japan, were largely absent from the smallpox control.

It is a mistake, however, to regard this family- and village-based public health movement as representing something backward in the context of early modern Japan. On the contrary, this is the point I would like to emphasise: those who practised the management of smallpox in the household and the village believed this was a civilised way of dealing with the disease, if compared with other forms of managing smallpox practised in the peripheral and isolated parts of Japan, such as small islands and regions isolated by steep mountains.8 In these remote places, smallpox visited only rarely and retained its virgin soil characteristics. Contemporary observers clearly noticed the contrast between ‘central’ regions where smallpox was endemic and semi-endemic, and those ‘peripheral’ regions where smallpox behaved like virgin soil infections. When observing the visitation of the disease in peripheral places, people from central regions were not only stunned at the magnitude of the damage but also struck at the ways in which the residents of the remote regions behaved during the epidemic: unlike the residents in cities or ordinary villages, those in the peripheral regions fled the place or practised spatial quarantine. These behaviours caused emotions ranging from curious bewilderment to moral condemnation from observers from cities, towns and villages, where smallpox had become endemic or semi-endemic. What horrified them most was the discarding of the children and family members suffering from smallpox and fleeing the village, which represented an unthinkable barbarity by the standards of those who had already experienced endemic or semi-endemic smallpox. Note well that different epidemiological profiles moulded different patterns of behaviour or even different moral standards.

The endemicity of early modern smallpox in Japan thus held the key for the family- and village-based public health measures against the disease. Immunity of adults, the restriction of the victims to children, and the fragmentation of the diffusion allowed most of Japanese society to deal with the disease with the small-scale social units of the family and the villages. Where the outbreak retained the violence of virgin-soil epidemic, the smallpox was treated using a different set of strategies: isolation, quarantine, breaking up the family, and fleeing from the place. The epidemiological heritage of experiencing smallpox as an endemic or semi-endemic disease with shorter intervals

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8 For smallpox epidemics in peripheral parts of Japan, see two excellent papers by Kozai Toyoko, ‘Isetsu no nakano Hachijojima’ ['Hachijo Island in Medical Discourses'], Shisō, 1025 (2009), 46–71; idem, ‘Ainu ha naze ‘yamani nigeta’ ka’ ['Why Did the Ainu Flee to the Mountain?'], Shisō, 1017 (2008), 78–101; see also, Kawamura Jun’ichi, Bungaku ni miru Tosō [Smallpox in Literature] (Kyoto: Shibunkaku, 2006), 140–8, 180–2.
provided early modern Japanese society with the public health system centred around the family and the village, with the state and the domains largely absent.

In this article, I have argued that the attitudes toward smallpox in early modern Japan were forged in the ecological balance between humans and microbes. The balance shifted historically, moving from infrequent but destructive visitations to frequent and manageable ones. It also differed geographically, with peripheral regions retaining the savagery of older epidemiological regimes of infrequent epidemics. Japanese ways of managing smallpox through household and villages fitted well to the epidemiological regime of smallpox that existed for the most part of early modern Japan. Perhaps most important in the making of the epidemiological heritage was the absence of plague. While plague prompted European states in the mediaeval and early modern period to assume strong power for its prevention, Japanese society had been, for the most part, allowed to leave its management of epidemics to families and villages. The early modern public-health model in Japan was thus deeply influenced by the ecology of diseases, particularly endemic smallpox and the absence of plague. This is the ‘epidemiological heritage’ of nineteenth-century Japan faced with the new epidemics of cholera, the new states ambitious to Westernise the nation, and the new model of public health and medicine imported from the West. The establishment of modern public health in Japan, which has been told as a story of importing Western systems by the government, turned out to be a far more complex phenomenon involving many factors, and the most important of them being the epidemiological heritage forged through the long-term process of experiencing smallpox as a child’s disease.