

# Introduction

In March 1854, when Commodore Matthew C. Perry of the United States Navy sailed into Edo Bay with a squadron of five ships to demand a commercial treaty with Japan's Tokugawa shogunate, he knew he had done something remarkable. From the standpoint of Western nations in search of new markets, Japan was a "closed" country. Although challenged, this view remains largely intact today. At symposia and workshops held in 2004 on the 150th anniversary of Commodore Perry's "opening" of Japan, scholars debated the significance of complex issues related to Perry's arrival in Japan, and historians still question just how closed or open Japan really was in the final decades of Tokugawa rule.

Until 1868, Japan was ruled by the Tokugawa house, a military family that had established a government in the town of Edo in northeastern Japan in 1600. This government, called the Tokugawa or Edo *bakufu*, was headed by a series of hereditary shogun, fifteen in all, which remained in power for two and a half centuries. Tokugawa Japan was divided into approximately 250 domains: one-fourth of these domains were ruled directly by the

Tokugawa *bakufu*, and three-fourths were ruled by military overlords who had pledged fealty to the Tokugawa house. By 1725, Edo had become the largest city in the world; Kyoto remained the residence of the Japanese Emperor and the formal capital of Japan; and Osaka, on the Inland Sea, developed into a large merchant city. Nagasaki, on the southern island of Kyushu, was the only port permitted to conduct foreign trade. These cities were administered directly by a commissioner appointed by the Tokugawa *bakufu*.

To Western seafaring nations aggressively expanding their mercantile activities into the North Pacific, Japan's refusal to open its ports to foreign ships was extremely irritating. More than two centuries earlier, the Tokugawa shoguns—Japan's military rulers after 1600—closed Japan's ports by government edict in an attempt to limit contact between the Japanese and foreign nationals. The exception was the port of Nagasaki, where Chinese and Dutch merchants were authorized to conduct foreign trade at two tiny trading posts in Nagasaki Bay. Other foreign nationals were forbidden to enter Japan on pain of death, and Japanese nationals were forbidden to leave Japan and then return. Over the next two centuries, ingenious ways were devised to circumvent these directives; but, for the most part, the anti-foreign policies of the Tokugawa government were still firmly in place and operating effectively as late as 1850.

*The Vaccinators* examines Japan's less dramatic "opening" to Western medical knowledge in the half-century before Perry's arrival. It argues that Japanese physicians who were receptive to this knowledge strongly influenced the direction an "open" Japan would take. It focuses on the strategies of Japanese physicians who, in collaboration with Dutch merchants and influential Japanese patrons, forged a national network in support of Jennerian vaccination, a Western technology to prevent smallpox—Japan's most devastating disease. Japan's physicians used the promise of vaccination to forge lasting social and political alliances, professional networks, and public health institutions. They were a catalyst for Japan's rapid and successful modernization a century later.

Why physicians? Japanese physicians were one of the few occupational groups in Tokugawa society with the freedom to look for practical solutions outside Japan. Japan's medical tradition had always relied heavily on foreign sources. Chinese medicine held a place of honor in Japan for centuries, and during the Tokugawa period Chinese-style medicine was the orthodoxy taught in the Tokugawa Medical College and in the schools of Japan's numerous domains as well. Chinese medical books and medicines were imported

regularly from China. In the sixteenth century, Western medical techniques, especially surgery, which was not practiced in China, attracted the most attention in Japan, especially in and around Nagasaki where Western influences were strongest.

In theory, medical knowledge is apolitical. Useful knowledge that can save lives and improve the quality of life can often circumvent political divisions, and political leaders of all sorts may actively seek such knowledge. In the late eighteenth century, a few Edo physicians became interested in Western anatomy books that Dutch merchants had brought to Japan. These men were known as *rangaku*, or Dutch learning, scholars. They could understand the anatomy books, in part, through drawings of the human body, and soon recognized that the drawings in Western books differed markedly from those in Chinese medical books. This discovery spurred greater interest in Western medicine and a realization that the ability to read Dutch would enhance one's comprehension of the Western medical and scientific texts that were being brought to Japan with increasing frequency.

During the late eighteenth century, *rangaku* scholars, most of whom were physicians, became the major repository of knowledge about the West. Many *rangaku* scholars were retainers of the Tokugawa *bakufu*, while others were retainers of *daimyō*, regional lords who also maintained permanent residences in Edo. Their official function as retainers was to stay informed about useful foreign medical knowledge. Sources of such knowledge were extremely limited, however—limited to medical books randomly brought to Japan by the Dutch and Chinese, and occasional conversations with Dutch merchants who came to Edo each year to pay their respects to the shogun. Even so, by the nineteenth century, *rangaku* scholars were energetically engaged in consulting both of these sources.

Physicians who practiced Western-style medicine were called *ranpō* (Dutch-method) physicians. In the early nineteenth century, both *rangaku* scholars and *ranpō* physicians began to form social and intellectual connections and to gain influence in Edo. While the distinction between *rangaku* scholars and *ranpō* physicians is not always clear cut, it is analytically useful to distinguish between those who were predominantly scholars and those who were medical practitioners. The term *ranpō* physician is used here to refer to private, practicing physicians who treated patients and taught students for a fee, as opposed to *rangaku* scholars who held an office and were paid a stipend. However, unlike most other Japanese at this time, physicians were relatively

free to study and practice medicine as they saw fit. As long as they avoided offering critical political opinions, they could study what and where they wished with little interference.

*The Vaccinators* tracks the global transmission of Jennerian vaccination from its origins in rural England to Japan half a century later. The available sources for studying this transmission are abundant because the process of procuring the necessary vaccine produced a remarkable paper trail: personal letters, government reports, requests for vaccine, ships' logs, and so on. These sources reveal the structure of human and institutional connections that underlay the global diffusion of a medical technology that had the potential to save millions of lives. A widespread understanding of the promise of vaccination rapidly created a global demand for the precious vaccine. And this demand, in turn, forged personal relationships between physicians and patients, churches and parishioners; diplomatic relationships between allies and foes; commercial relationships between trading partners; and power relationships between colonizers and colonized.

The effective control of any infectious disease has three main requirements:

1. The sharing of knowledge, resources, and personnel among individuals and nations.
2. The collection, storing, and accessibility of evidence demonstrating both success and failure.
3. Recognition of the public's health as an element of national power, and the development of institutions to control disease and lower mortality rates.

Few societies could meet all of these requirements at the beginning of the nineteenth century. However, by the end of the century, several countries, including Japan, were meeting many of them.

The open borders that enabled European physicians and surgeons to study medicine at universities, and to serve in armies and hospitals throughout Europe, meant that the exchange of medical information was an integral part of medical education. French Huguenots studied in Edinburgh, and German nationals studied in the Netherlands. Publishing played a major role in disseminating information across political boundaries: medical texts and journals were widely read and quickly translated into both Latin and the vernacular European languages, and medical and scientific societies provided

a forum where physicians could present their findings and debate theoretical and practical issues related to the practice of medicine. This intra-European cross-fertilization produced a medical culture that encouraged experimentation and the sharing of information, a culture that later was exported to the colonies of the various European nation-states.

The institutions that supported this Western medical culture were entirely absent in Japan. There were no universities or medical societies, and the Tokagawa *bakufu* regarded groups that assembled to discuss common problems as a threat. There were no medical journals, and most medical treatises remained in manuscript form and were circulated privately. The sons of the *daimyō* retainers were eligible to study medicine at domain schools, but medical training normally was acquired by attending a private medical school, or *juku*, or by taking an apprenticeship with a medical practitioner. Although this does not signify the absence of a strong medical tradition in Japan, there were no academic medical institutions, in the European sense, to connect physicians from different parts of Japan. Medical knowledge was transmitted vertically through hereditary medical lineages that were inclined to guard their secrets jealously. The transmission of medical knowledge in Japan was almost entirely a private matter.

Smallpox, on the other hand, was a public matter. Smallpox was everyman's disease, and its eradication required a public health mentality—access to professional expertise, the exercise of governmental authority, coordination between multiple jurisdictions, good record keeping, and the support of the public, all of which required sharing medical knowledge and open access to information within society. In Japan the defeat of smallpox required a social transformation. To a large extent, this transformation was well underway by the end of the nineteenth century. Social networks had been transformed into universities, publishing houses, professional societies, and a new government bureaucracy attuned to the importance of the public's health.

The advent of this transformation can be seen in the early decades of the nineteenth century by analyzing the activities of Japan's vaccinators, *ranpō* physicians who acted on foreign medical knowledge to alleviate the centuries-old problem of smallpox.

Chapter 1, "Confronting Smallpox," introduces the universal problem of smallpox in early modern societies. It reviews methods of combatting this devastating disease before 1800, focusing on an "Eastern innovation," a technique known as "variolation," knowledge of which spread from East to West

in the seventeenth and eighteenth centuries. Variolation used live smallpox virus to immunize children against smallpox, but fighting smallpox with smallpox was a dangerous business. Hence, the discovery of an alternative method by Edward Jenner at the end of the eighteenth century revolutionized medical thinking and mobilized advocates, and opponents, everywhere.

Chapter 2, “Jenner’s Cowpox Vaccine,” considers the social, political, and institutional frameworks within which Edward Jenner conceived and presented his hypothesis to a receptive world—that cowpox virus, *Variolae vaccinae*, could be used to prevent smallpox. This chapter demonstrates the vital importance of transnational networks in the early transmission of vaccination, which would prove to be a revolutionary new medical technology. The global diffusion of *V. vaccinae* relied on loosely connected, often personal networks that could respond quickly to different circumstances. In less than a decade, a human web—seamen, diplomats, soldiers, merchants, officials, doctors, scientists—had transmitted the virus virtually everywhere in the world. The most notable exception was Japan, where *V. vaccinae* would not penetrate Japan’s *cordon sanitaire* for another half-century. The remaining chapters analyze the reasons for this delay and for the remarkable reception that attended the arrival of vaccination in Japan at mid-century.

Chapter 3, “Engaging the Periphery,” examines the circumstances in which knowledge of vaccination reached Japan at the beginning of the nineteenth century. It introduces the writings of Baba Sajūrō, a young and talented Dutch interpreter, whose unusual linguistic abilities enabled him to interact with foreigners who spoke Dutch, Russian, French, and English. Baba Sajūrō would be the first person to write about vaccination in Japanese. This chapter concludes that internal, structural barriers, not Japan’s foreign policy *per se*, prevented the movement of useful knowledge from Japan’s periphery to the Tokugawa shogun’s government in Edo.

Chapter 4, “The Dutch Connection: Batavia, Nagasaki, and Edo,” examines the ways in which internal barriers to foreign knowledge began to fall in the early decades of the nineteenth century. The Napoleonic Wars stranded the Dutch merchants stationed on Dejima in Nagasaki for many years, a circumstance that permitted much greater interaction between the Dutch and Japanese than previously had been possible—interactions that had long-term consequences. This chapter documents numerous attempts by the Dutch to export cowpox vaccine from the Dutch East Indies to Japan, and shows the close collaboration that developed between Japan’s *rانبō* physicians and the

Dutch factory personnel. It demonstrates the importance of the Dutch presence in Japan as a catalyst in the opening of Japan to Western knowledge.

Chapter 5, “Constructing a Network: The *Ranpō* Physicians,” introduces seven practitioners of Western-style medicine who became staunch advocates of vaccination before cowpox vaccine became available. These men were newcomers to medicine who relied on strong social networks—teacher-student bonds, marriage and adoption alliances, and the support of powerful patrons—to build successful careers in Western-style medicine. Adopting Jennerian vaccination as their *cause célèbre*, they created a national network of activists open to foreign ideas.

Chapter 6, “The Vaccinators,” tracks the rapid transmission of cowpox vaccine throughout the Japanese Islands in the summer and fall of 1849. A detailed chronology shows how *ranpō* physicians employed the social networks they had created over a period of thirty years to distribute cowpox vaccine, to educate physicians about how to use it, and, within six months, to establish private vaccination clinics throughout the archipelago. The speed and extent of this transmission reveal the national scale of Japan’s vaccination network.

Chapter 7, “Engaging the Center,” analyzes the ways in which Japan’s vaccinators finally engaged the Tokugawa *bakufu* in their efforts to promote vaccination in the city of Edo. With the opening of the Otamagaïke Vaccination Clinic in Edo in 1858, the sponsors of the Clinic and their descendents established themselves as the founding generation of modern medicine and public health in Japan. The private initiatives of Japan’s *ranpō* physicians had become the public policy of the Japanese state.