



## The History of Infectious Disease in Japan: The Answer Is in History — To What Degree Are Protective Hygiene Measures among the Japanese Effective?

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Currently, COVID-19 is spreading so quickly that the situation changes from day to day. This is precisely why we need to step back from the new situation and take a broad view of matters from the perspective of the history of civilization.

I have previously consulted ancient documents on infectious diseases in Japan, but this article is based on the writings of my former teacher, the late Hayami Akira (*Nihon wo osotta Supein infuruenza*; translated as *The Influenza Pandemic in Japan, 1918–1920*) and the environmental journalist Ishi Hiroyuki (*Kansensho no sekaishi [A World History of Infectious Diseases]*). Ishi, who is my uncle by marriage, is also an expert on infectious diseases in Africa and elsewhere.



Prof. Isoda Michifumi

New infectious diseases have assailed mankind any number of times. If we consult history, we may learn lessons and acquire knowledge about the best measures to adopt.

Before Professor Hayami passed away, we discussed the risks that may affect Japanese society. He concluded that the most terrifying risk was a virus pandemic. Another astute man is Bill Gates, the founder of Microsoft. Becoming aware of the risk, he has spent vast assets on countermeasures. We already know from the proliferation of AIDS that a disaster in Africa becomes a disaster for all humanity and that a pandemic is not someone else's problem.

Ishi has also spoken widely of three crises. The first one is a virus pandemic, the second one is a supervolcano eruption, and the third one is a tsunami. Among these, a virus pandemic is the most likely to occur. It is also the crisis that would cause the most fatalities.

A supervolcano eruption, which would have the destructive power to incinerate an area the size of Kyushu, occurs about once every ten thousand years in Japan. If you live to one hundred, the probability of one occurring is one one-hundredth. About once every hundred years, Japan is struck by a tsunami with an anticipated risk of 320,000 fatalities.

In contrast, the virus pandemic of one hundred years ago, the Spanish flu (the new influenza), is estimated to have infected at least one third of the global population, which stood at approximately 1.8 billion at the time. Depending on the region, the fatality rate was as high as 10–20%, and 3–5% of the world population died (*Kansensho no sekaishi*). Global fatalities reached more than fifty million.

The current COVID-19 is one of the human coronaviruses. Until recently only four types of this virus were infectious to human beings, but with the addition of SARS and MERS, seven types of coronavirus that are infectious to human beings have now emerged, leading to the current situation.

Similar to influenza, the coronavirus has been common among wild animals, but the virus is spreading in the human world because it is now transmissible from animals to humans (zoonosis). Infections of the SARS and MERS viruses, which are related to the new virus, have been confirmed in many animals, but the virus is believed to have originated in bats.

## **The Beginning of Livestock Farming and the Coronavirus**

First of all, when did the history of the coronavirus begin?

According to Ishi Hiroyuki, an influential theory based on analyses of six virogenes suggests that the human coronavirus (HCoV) first appeared around 8000 BCE.

What took place at that time? It was the beginning of the agricultural revolution, permanent settlements, and the farming of sheep, goats, and pigs in Western Asia. In short, the virus emerged from close contact between humans and animals. This infectious disease appeared when livestock farming first began.

In this context, I recall a book I read as a child.

In Kumakogen, Ehime Prefecture, images of female deities etched into the surface of stones small enough to be held in the hand have been discovered at the Kamikuroiwa Iwakage Iseki (the Kamikuroiwa rock shelter) archaeological site, which dates to the early Jomon period (10,000 BCE–300 BCE). The figures are probably talismans imbued with female energy in an age when no medical care existed. A children's book that I read describes a scene where a Jomon child has contracted a disease and prays while clasping a stone with an image of a female deity. That was more than ten thousand years ago. I imagine that HCoV, which had appeared in West Asia, might also have struck the Jomon people in the early Jomon period. In any case, infectious diseases must have had a considerable impact on the emergence and evolution of religious beliefs.

Looking back on history, human beings are struck by infectious diseases every time there is some kind of social, technical or economic revolution.

The agricultural revolution of the Middle Ages provided the context for the widespread pest pandemic in medieval Europe. Focused on Britain, Germany and France, the population increased rapidly with the increase in iron manufacturing, which led to the widespread availability of farming tools and water wheels, and sufficient food supplies. When there is an excess supply of food, towns and villages increase in size. The towns were a plentiful source of dung and scraps that rats feed on. Since natural predators such as hawks, foxes and wolves decrease when development is indiscriminate, there was an explosive increase in rats in close proximity to human beings. It stands to reason that the rats were intermediaries for the pest.

From the perspective of the long history of humanity, the crisis of infectious diseases is something new. In the hunter-gatherer age when population density was low and people lived in small settlements, the extent of infectious diseases and the speed at which they spread must have been controlled.

However, when contact between human beings and animals increased with livestock farming, and permanent settlements grew into towns due to the beginnings of agriculture, there were frequent outbreaks of infectious diseases such as tuberculosis, cholera, smallpox, malaria, plague or influenza. In addition, when human migration intensified as it did in the Age of Exploration, infectious diseases also wreaked havoc across continents. It was a phase when infectious diseases caused more fatalities in the global population than disasters or wars.

## Infectious Diseases also Spread from Nagasaki

Matchlock guns and Christianity were not the only arrivals in Japan during the Age of Exploration. Sexually transmitted diseases also entered the country from Europe.

When Toyotomi Hideyoshi (1537–1598) gathered troops from all over Japan at Hizen Nagoya Castle for his attempted invasion of Korea, a sexually transmitted disease referred to as *Hizen no wazurai* (the Hizen disease) spread throughout Japan.

The disease was syphilis and, unfortunately, Hideyasu (1574–1607), lord of the Echizen Fukui domain (currently, Fukui Prefecture) and the son of Tokugawa Ieyasu (1543–1616), was also infected. When Ieyasu asked Hideyasu if his nose had not changed its shape, Hideyasu replied that he had applied medicated patches to hide the fact that his nose was missing. (*Iwabuchi Yawa besshu* [An appendix to *Night Stories of Iwabuchi*]). It is thought that Hidetada, Hideyasu's younger brother, became the second Tokugawa shogun because of issues with Hideyasu's health.

When examining the remains of Japanese people from the early modern period, traces of syphilis have been found in two-thirds of the men and one-third of the women. The Japanese people of today are the descendants of those who survived the rampant spread of syphilis.

The subsequent policy of national isolation should have deterred the spread of infectious diseases to some degree. However, smallpox, cholera and other diseases penetrated Japan even during the period of isolation. About two hundred years ago in 1822, the global cholera epidemic also struck Japan. At the time, an infectious disease with no known cause spread from Kyushu. Subsequently, when it was understood that the disease had entered the country with Dutch merchants, it was called “*korera*” or “*korori*” (a transcription of cholera).

According to reports, many people in Tokyo are infected with the current COVID-19 virus because of the large number of people who have returned from overseas, but in the nineteenth century, Nagasaki, the window to the outside world, became the gateway for infectious diseases. According to Higashi Noboru, Associate Professor at Kyoto Prefectural University, the residents of Takahama on the Amakusa islands near Nagasaki had built quarantine huts. I researched this village together with Professor Higashi a long time ago.

In 1858, cholera struck Japan again. At this time, the infection spread from Perry's squadron when the ships made a port of call at Nagasaki. Ishi Hiroyuki comments:

“(It is said that) in 1858, there was a cholera outbreak after a port of call in Nagasaki because one of the crew on the *Mississippi*, a U.S. Naval ship belonging to Perry's squadron, was infected with cholera. By August, the contagion had spread to Edo [Tokyo] where it is said fatalities numbered between 30,000 and 260,000. The epidemic continued for the next three years. As a result, the black ships [foreign ships] and people from overseas were a target of resentment, which contributed to the ideology of the expulsion of foreigners on the basis that infectious diseases were brought into the country when Japan opened its borders.” (*Kansensho no sekaishi*)

The thinking that “the West equals pathogenic bacteria” provided the context for advocating the expulsion of foreigners, an aspect that became part of the energy that drove the history of Japan.

## Ogata Koan and the Struggle with Cholera

We must admire the Rangaku (Western learning) physicians of the late Edo period who struggled with

cholera at the time. Ogata Koan (1810–1863), who had opened a private academy of Western learning and contributed to smallpox prevention, encouraged his students not to become mean-spirited no matter what they were faced with. His students made house calls and some of them died. Koan received one letter after another informing him that such-and-such a person had died.

Physicians are on the frontlines when there is a pandemic. When there is a fire, the fire department does not refuse to turn up because it is dangerous. Similarly, according to Article 19 of the Medical Practitioners' Act, a physician cannot refuse examination or treatment “without just cause.” However, these days there are reports of physicians refusing to treat patients with fever and referring them to other hospitals. With the prevalence of COVID-19, I have also heard firsthand stories about patients with a high fever having been refused treatment at several hospitals when they say they have returned to Tokyo from elsewhere.

Simply censuring the physicians is not the solution. There are lessons to be learned from the strenuous efforts of the students of Ogata Koan. It is important to protect primary care and to protect the physicians who make the first diagnosis. Hospitals will be overwhelmed unless there are policies in place to shield physicians and hospitals by properly allocating protective clothing, N95 masks, and other medical resources.

In Italy, the inadequacy of such protection caused many medical personnel to become infected, turning the overwhelmed hospitals into centers of the epidemic, which resulted in many fatalities. To prevent such a situation, it is essential to introduce hospital zoning that separates clean areas from dirty areas. Experienced hospital workers must also actively introduce protective measures.

## **Requests for Self-Restraint by the Meiji Government**

Emerging out of the movement that equaled the West with pathogenic bacteria and advocated the expulsion of foreigners, the Meiji government was immediately exposed to the threat of infectious diseases. Specifically, the rinderpest, a contagious and highly fatal viral disease among domestic cattle.

At the time, the alarm was first sounded by the US Consul in Shanghai. In 1871, rinderpest was prevalent on the coast of Siberia. The contagious disease had inflicted extensive damage in Europe, and if it entered Japan, it would likely kill livestock across the country. An American doctor in Shanghai dispatched a letter containing information that he felt the Japanese government should have to the US minister to Japan.

As a result, the Meiji government issued a *dajokan fukoku* (proclamation by the Grand Council of State) in the same year prohibiting imports of live animals and hides. If cattle suspected of rinderpest contagion were found, they had to be destroyed immediately and the carcasses had to be incinerated.

Rinderpest does not actually infect human beings, but this *dajokan fukoku* intruded into the details of the lives of the citizens and, as a result, the proclamation pioneered modern measures to counter infectious diseases. In contemporary terms, it was a request to the nation to exercise self-restraint in daily life.

The proclamation appealed to the nation to keep their clothes clean, to keep the body clean, to clean their homes, to keep windows open for ventilation, to refrain from heavy drinking, and amazingly, to refrain from sexual intercourse and to reduce the instances of sexual activity.

Then, one hundred years ago, Japan was struck by the Spanish flu which spread around the world in

1918 to 1920. According to research by Professor Hayami, the Spanish flu is probably the most important reference example for any consideration of the current COVID-19 contagion.

However, while there are lessons to be learned, there are also biases because there are also differences between the situation of one hundred years ago and the present one.

Currently, large-scale passenger jets have turned the whole world into a single travel zone. Today, the potential number of Chinese visitors to Japan is 150 million (out of a population of approximately 1.4 billion) due to higher incomes. In another ten years, as many as 400 million Chinese people may be able to travel abroad. If that were the case, the number of visitors to Japan, which is currently 30 million, might exceed the entire Japanese population of 120 million in another ten years' time. We would have a situation where the nonresident population exceeds the resident population. The risk of outbreaks of pandemic disease would increase to the same extent.

One hundred years ago when the nonresident population was far smaller than it is today, the Spanish flu caused tremendous damage.

### **The Three Waves of the Spanish Flu**

When Professor Hayami adjusted the statistics, he found that the number of Spanish flu fatalities on mainland Japan was 450,000 (0.8% of the population). Fatalities numbered 3,800 on Sakhalin (3.5% of the population), 230,000 in Korea (1.4%) and 49,000 on Taiwan (1.3%). When fatalities in the overseas territories are added to the 450,000 fatalities in mainland Japan, the figure is 740,000 fatalities.

Even more importantly than the scale of the damage, the Spanish flu came in three waves. According to Professor Hayami:

“In Japan, the Spanish flu came around three times. The first wave lasted from May to July 1918. Some people were laid up with a high fever, but there were no fatalities. We refer to this as the “spring portent.”

The second wave lasted from October 1918 to May 1919 and resulted in 260,000 fatalities. We refer to this as the pre-epidemic. The flu wreaked the most havoc in November 1918. Schools were closed, traffic and communications were impaired. Fatalities were concentrated in January 1919 when crematoria became overcrowded.

The third wave (the post-epidemic) with 187,000 fatalities lasted from December 1919 to May 1920. The pre-epidemic fatality rate had been relatively low, but the number of fatalities was high due to the large number of affected individuals. During the post-epidemic, there were few affected individuals, but the fatality rate was 5%. Thus, influenza never finishes in one year, but the epidemic is repeated and changes its nature.”

The lessons to be learned for the current COVID-19 pandemic are that even if the pandemic is temporarily remedied, we will see a resurgence on an annual basis, and that there is potential for two or three waves. It is also possible that it will become more virulent as the virus mutates. Therefore, vaccine research is essential preparation for the second wave.

### **The Harm Is Greater without Codes of Behavior**

Looking through the contemporary newspaper articles about the Spanish flu that Professor Hayami worked hard to collect, it seems that the lack of an early warning from the government or the media about “a special infectious disease” may be linked to the escalating contagion and harm. This is a major lesson from the Spanish flu.

In 2020, the March Grand Sumo Tournament was conducted without spectators. In May 1918, however, so many wrestlers withdrew from the Tokyo summer tournament due to influenza (the designation for the Spanish flu at the time) that the illness was referred to as the *sumo kaze* (*Nihon wo osotta Supein infuruenza*). In the preceding month of April, three wrestlers had died and several others had been hospitalized during a tour of Taiwan, which was governed by Japan at the time.

The infection had spread in the sumo stables, but it was not limited to sumo as there were hardly any controls on meetings and events at the time of Spanish flu a hundred years ago. Yosano Akiko (author, poet and social reformer, 1878–1942) criticized the lack of government measures on this point.

With regard to the current request for self-restraint, some quarters have observed that “closing the theaters is the death of drama.” The first prominent figure to fall victim to the Spanish flu was the playwright and director Shimamura Hogetsu (1871–1918). When he died, the severity of the infectious disease became widely understood. It is a historical fact that rather than the death of drama, it was the people working in the theater who died. Sadly, this time, the person who died was the famous comedian, Shimura Ken (1950–2020).

In the case of human-to-human transmission of COVID-19, the tap is turned on with one infected person. There is no question that we must take measures to turn off the tap. Regardless of the Olympics, visits by dignitaries, or tourism earnings, it is correct to immediately intercept travel. In the long term, the political and economic damage will be less.

Okada Harue, Professor of Hakuoh University, has pointed to a worst-case scenario of overwhelmed hospitals even at a fatality rate of 2% (*Bungeishunju*, April, 2020). However, at the time of the Spanish flu, fatality rates differed greatly between the city of St. Louis in the United States, which promptly introduced restrictions on gatherings and codes of behavior, prohibited funerals and wedding ceremonies, and closed down schools, theaters, churches, large stores, entertainment facilities and other facilities, compared to Philadelphia, which was a step behind. St. Louis was able to reduce fatalities by half. The lesson learned is that self-restraint with regard to going out and gatherings is effective even if the economy suffers.

Epidemics get a foothold in hospitals, schools, railways, ships, the army and other places where people are crowded together or on the move. One hundred years ago, the danger points were the ferry port at Aomori and the trade port at Kobe; today the risk is in Tokyo, where passengers pass through the airport and the train stations.

In the case of COVID-19, there have been early reports of infections among railroad staff and bus drivers. This was also the case at the time of the Spanish flu. The infection spread from soldiers, students, post office staff, railway staff and sailors. According to a newspaper article at the time, there was an epidemic in all areas along the railways, which suggests that the epidemic spread with the movement of people. We need to be bold and intercept movement. The lesson is that in the long run, this will best serve the interests of the nation.

### **The Incident on the Japanese Cruiser *Yahagi***

Another lesson from a hundred years ago is that it is particularly difficult to stop contagion on a ship. Professor Hayami has covered the logbook of the cruiser *Yahagi* in detail. The *Yahagi* was a light cruiser with its homeport in Kure, Hiroshima Prefecture. In November 1918, the *Yahagi* docked in Singapore

before returning to Japan. At first, the captain was wary of the influenza epidemic and did not allow anyone to disembark, but possibly out of concerns about low morale among the crew, he eventually allowed them to leave the ship with some conditions. As a result, they brought the virus back to the *Yahagi* where the contagion spread explosively in the cramped quarters aboard the cruiser. Forty-eight out of 469 crew died (a fatality rate of 10%).

But, as luck would have it, crew from the cruiser *Akashi* also boarded the *Yahagi* at Singapore. They had been dispatched to the Mediterranean and had already contracted the Spanish flu. As one after another of the *Yahagi* crew collapsed and the cruiser was on the verge of engine stoppage and drifting, the crew from the *Akashi* handled the navigation of the *Yahagi*. This incident also taught us that once you have contracted the disease and obtained immunity, you will not immediately catch it a second time.

Compared to the armed forces in those days, the Self-Defense Forces of today are thoroughly prepared with measures to counter infectious diseases. Officers from the Ministry of Health, Labour and Welfare wearing light protective gear were infected when they boarded cruise ships with cases of travelers infected with COVID-19. It is disappointing that the ministry with responsibility for infectious diseases did not protect its own staff. In fact, problems were found in the directives from top officials. On the other hand, the Ground Self-Defense Forces, which handled the situation admirably and enforced thorough protective measures, did not have a single infected person.

The high level of awareness among the population of infectious diseases is another advantage compared to a hundred years ago.

## Requests and Self-restraint in Japan

The introduction of restrictions on gatherings and going out has been relatively smooth, which was not the case at the time of the Spanish flu. Unlike the compulsory measures introduced in Europe, Japan has issued requests for self-restraint. The approach has been requests from the authorities and voluntary restraint by the public. There has been some criticism from lawyers about the ambiguity of the legal grounds, but there has also been flexibility. We do not yet know if this approach is for the better or worse.

A poem by Goto Shinpei (1857–1929), who is well-known for inaugurating public health measures, goes like this: *Nezame yoki / kotokoso nasame / yonohitono / yooshi to ashito wa / iuni makasete*. To paraphrase, he says that we must act in a way that allows us to wake up with a good conscience, and that people may say that you did well or badly, but let them say what they like. I keep a hanging scroll with this poem before me as I write. Leaders in a time of emergency need to disregard public opinion and take decisive action based on compassion and conscience.

Of course, we need to research BCG immunization coverage and so forth, but one of the reasons for the slower spread of the epidemic in Japan than in the West may be the daily habits of the Japanese. We wash our hands and gargle, and we take baths and wash our hair every day.

We also wear masks. A single virus is minute and will pass through a mask, but as long as the quantities are minuscule, the natural immunity of the body will eliminate it. Masks are beneficial in the sense that they block the transmission of large droplets of the virus from others, and they stop you from coughing on others

## Infectious Diseases and the Strong Zoning Culture

In Japanese culture, we bow when we greet each other, we do not kiss or hug. The frequency of gathering

at religious institutions is lower than in Iran and Italy. In Western cultures, people wear their outdoor shoes in the home, but in Japan, we take off our shoes in the entryway. Normally, we also hang our coats at the entrance and people who are extra careful use alcohol spray to disinfect. If we also sterilize hands, doorknobs, switches, toilet seats, tables, mobile phones, and banknotes, the effectiveness of the contagion prevention strategy will likely increase.

These daily habits have been engrained in Japanese culture since ancient times. It is the *misogi* culture of ritual purification by ablutions with water and the “zoning culture” that makes a rigorous distinction between inside and outside. The outside is regarded as a dirty space while the inside (the home) is a clean space. This distinction may be effective for controlling contagion.

Until the Edo period, it was the Imperial Court that took this culture to its utmost limits.

The paper used at the Imperial Court was the color of diluted ink (*shukushi*). Paper was remade any number of times at the Imperial Court because it would come into contact with the dirty outside air once you stepped outside.

This also connected with the culture of soiled and clean. A piece of paper was polluted if it as much as fell to the floor. The head was clean and the feet were soiled. Anything that had been in contact with the floor would not be placed on the head. The parts of the body were also subject to zoning.

In former times, luxury futon bedding would have tassels attached to the corners on one side. These tassels indicated the position of the head. My grandmother was very particular and told me not to mistake the tassels. At the time, it seemed like some kind of superstition, but the culture of clean and soiled is not something to trifle with.

Though later withdrawn, Britain first tried to achieve a kind of herd immunity, but this is not a good measure to counter contagion. It is nearly the equivalent of letting the contagion spread until the majority of the population have developed immunity. Even in Wuhan city, the official rate of infection among the population was a low 1%. The premise that the majority of the population will develop immunity is also risky. With COVID-19, the fatality rate is high among people aged 75 and older. In Japan, where approximately thirty percent of the population are aged over 65 (ca. 35 million people), it is not possible to take measures that would lead to high fatality rates among the elderly.

Some people are of the opinion that containment is not effective, but in the context of a population with high levels of hygiene measures ingrained in the culture since ancient times, we need to continue with delay tactics to slow down the speed of contagion. It is possible that a year and a half from now reinforcement in the form of a vaccine will come, but until then we will have to be patient.

Compared to influenza, COVID-19 is a relatively tenacious survivor outside the body. Since the virus proliferates at a slow speed in the body and the incubation period is long, there is comparatively ample time to trace clusters. A test kit that is easier to use than PCR testing is available from Kurabo Industries, Ltd. To stabilize the amount of PCR testing, the first step is to screen with a simple test kit. Promptly identifying patients at risk of developing severe illness means that they can be treated early at hospitals with on-site measures to prevent contagion. Unless prompt testing and measures to prevent hospital contagion are in place, the fatality rates and secondary contagion will not decrease.

## **What Is the New National Defense?**

The reality is that the probability of a pandemic depriving the population of their lives is far higher than



the probability of a military attack on Japan by some imaginary enemy. Politicians must confront this reality and make both tangible and intangible preparations.

There is currently a shortage of masks. The situation is difficult in medical settings because eighty percent of masks were imported from China. The high-performance N95 masks cost about 1,000 yen for a pack of five masks. It would cost 120 billion yen to provide the entire population with masks. Currently, no one is criticizing the 600 billion yen expenditure on two Aegis Ashore systems, or the more than one trillion yen spent on imports of F35 fighter planes, but buying masks is a far cheaper purchase. We need to conceive of a new twenty-first-century style of national defense where the whole population is provided with masks.

The important point is that the greatest threat of this century is a virus rather than some imaginary enemy nation.

Professor Hayami added the subtitle *The First World War between Humankind and a Virus* to his book *The Influenza Pandemic in Japan, 1918–1920 (Nihon wo osotta Supein infuruenza)*. The number of fatalities in the First World War is thought to be around ten million, but around half (more than five million people) actually died from the virus, not the war.

Therefore, I would like to encourage world leaders to open their eyes. Humanity is not the enemy of humanity. I would like to see them join hands to reduce military expenditure in order to contain the virus, which is our shared opponent. This is my sincere hope.

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