

# MEDICAL SCHOOL HOTLINE

## The Evolution of the Japanese Medical Education System: A Historical Perspective

Norimitsu Kuwabara MD; Miu Yamashita BS; Keolamau Yee; and David Kurahara MD

*The Medical School Hotline is a monthly column from the John A. Burns School of Medicine and is edited by Satoru Izutsu PhD; HJMPH Contributing Editor. Dr. Izutsu is the vice-dean of the University of Hawai'i John A. Burns School of Medicine and has been the Medical School Hotline editor since 1993.*

### Abstract

*The Japanese Medical Education system has been influenced by political events throughout the country's history. From long periods of isolation from the western world to the effect of world wars, Japan's training system for physicians has had to adapt in many ways and will continue to change. The Japanese medical education system was recently compared to the "Galapagos Islands" for its unusual and singular evolution, in a speech by visiting professor Dr. Gordon L. Noel at the University of Tokyo International Research center.<sup>1</sup> Japanese medical schools are currently working to increase their students' clinical hours or else these students may not be able to train in the United States for residencies. Knowing the history of the Japanese Medical education system is paramount to understanding the current system in place today. Studying the historical foundation of this system will also provide insight on how the system must change in order to produce better clinicians. This article provides a glimpse into the medical system of another nation that may encourage needed reflection on the state of current healthcare training in the United States.*

### Introduction of Western Medicine to Japan

During the Edo period (1603-1867) and starting from 1633, Japan was isolated from the rest of the world.<sup>2</sup> Travelling abroad was forbidden and trade with the outside world was restricted by limited ties to China and the Netherlands.<sup>2</sup> During this time period, Japan learned about western medicine primarily from physicians at the Dutch merchants' office or from Dutch medical books. Japanese medicine otherwise consisted of eastern Chinese medical teachings that utilized crude drug preparations and herbal medications. All foreign books were banned during this time. This mandate lasted nearly a century until the year 1720. When this ban was lifted, the primary influence on literature from Europe was Dutch, as trading patterns were well established with this country even during the period of isolation. Japan realized the importance of the scientific method through exposure to both Dutch and German medicine following the Edo period. In the latter part of this period, interactions with Dutch traders and physicians occurred initially through the port of Nagasaki. The influence of Western medicine was quickly felt all throughout Japan.

During the start of the Meiji restoration of 1868, a new era (1868-1912) began in Japan's history. Trade and interactions with the western world were now encouraged and the government imported German medicine as a national policy. In 1871

they started to invite physicians from Germany to lecture at the precursor of the University of Tokyo. This event demonstrated a significant change from the isolationist policies of the previous regime. The extent of German influence on Japanese medical education can still be seen today. The six-year training system used in Japan today is actually derived from German medical education systems (Figure 1). Many words used in Japanese medical literature are Germanic in origin. For example, German medical terms like adrenalin and allergy have Japanese words similar to them like "adorenarin" and "arerugii."<sup>3</sup> It is interesting to see that some of these words with Germanic origin are also used in American medicine. Following the lifting of the ban on Western books, scientific books were some of the first imported into Japan. As an example of the influence of the Netherlands on Japan and area of study relating to the Dutch language was called "Rangaku," or Dutch Learning.<sup>4</sup> One of the earliest scientific works translated was a book titled "Ontleedkundige Tafelen," a complete work on the subject of anatomy and was translated in 1771-1774 and renamed the "Kaitai Shinsho."<sup>4</sup> The influences on the Japanese training system for physicians by both the Germans and Dutch remain today. During the following years of Japanese medical history western medicine was rapidly introduced into Japan. Using the scientific method Japanese medical doctors worked on treatment for tetanus and syphilis, studied the plague and dysentery bacilli, as well as the neurosyphilis spirochete.<sup>5</sup>

### History of National Medical Examinations in Japan

In 1875, during the Meiji era, the government began to administer national examinations to license medical practitioners.<sup>6</sup> This requirement furthered the shift away from Eastern medicine in favor of a more Western style. With this shift, there began an attempt to standardize medical care in Japan. Surprisingly, this initial exam was available to anyone who wanted to become a doctor whether or not they had undergone any formal training. In 1906, the government mandated that applicants for the national examination must be physicians who had graduated from a medical school-mirroring the Western process of formal medical education before licensing. This licensing exam became

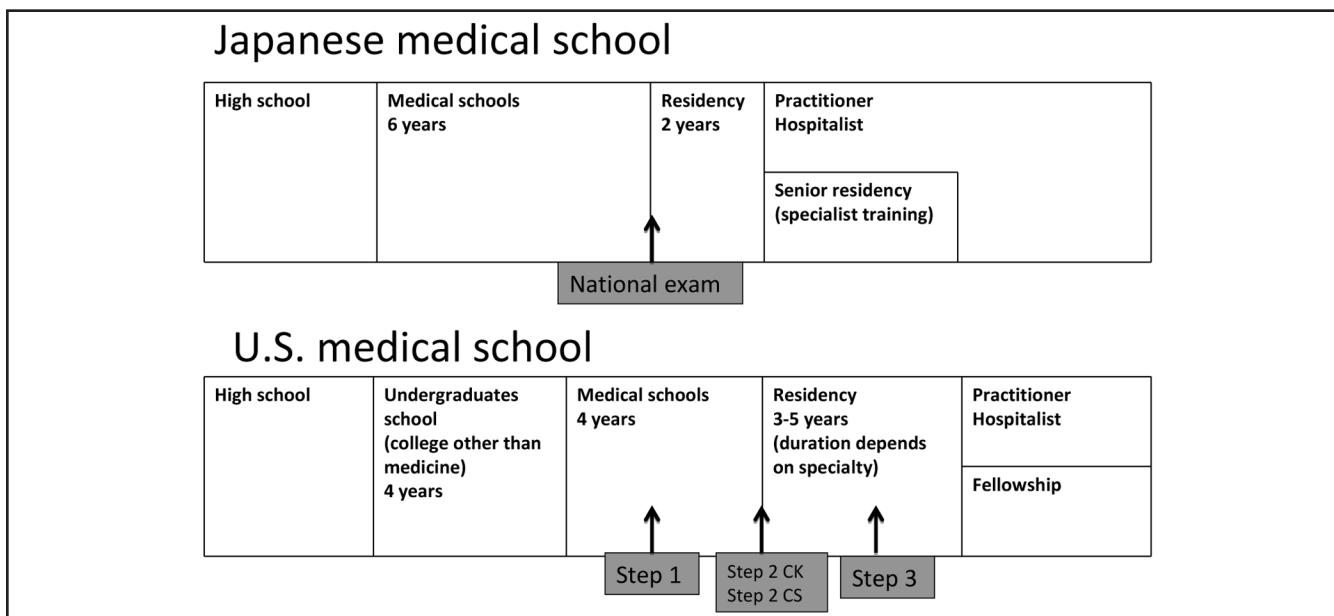


Figure 1. The Framework of Medical Schools and National Exam  
 Japanese medical school is 6 years, when compared to US medical school at 4 years after completion of the undergraduate work. The Japanese national exam is only one step, which is much less than the United States Medical License Exam (USMLE) which is a three step examination. In 2004 the training schedule changed and following this examination, Japanese medical graduates will do a two-year rotating residency where they get much of their hands-on training in the primary care areas, which is much later than US graduates who get this type of training during their 3rd and 4th years of medical school. Once this is completed the Japanese graduates will either go into practice or into further Specialty training. Prior to 2004 medical graduates could go right into Specialty training without any training in primary care areas like Internal Medicine, Pediatrics, OB/GYN, Surgery or Psychiatry.

the predecessor of the current national exam. During this period, the number of Japanese traditional herbal doctors dwindled as the population of modernized doctors grew.

During World War II, the necessity of advanced medical and surgical knowledge became apparent to those on the battlefield. Following this war, with the reparations of Japan directed by the United States, the dominant Western influence on an area of Japanese society was US type Medical care and training of physicians. In 1946, a medical internship system and the current national medical license examinations were introduced. As we will see below, American based resident training programs are increasing in popularity in Japan.

### Early Internship Program

Despite developing this internship system to train physicians there were some significant hardships on the Japanese Interns of this era.<sup>7</sup> These first year residents worked long and arduous hours and were not compensated for their efforts. They were required to work volunteer for a year in order to take the national medical license examination. This system caused many young physicians substantial financial hardship. This system was highly unpopular among young trainees. During the 1960's when many student movements actively denounced the Vietnam War in the United States, a similar type of student protest moved to Japan in 1968. Medical students went on strike demanding to be fairly compensated for their work during their

training programs. The students viewed the internship training as detrimental to good clinical practice. They recognized that the system in place put patient safety at risk due to an increased likelihood of mistakes by exhausted and overwhelmed interns. This patient safety issue remains an active source of debate in the training of physicians for both Japan and the United States, and has led to the mandatory 80 hour work week in American residency training programs.

Protests that began at the University of Tokyo quickly spread to other medical universities.<sup>8</sup> The protests led eventually to a nation-wide boycott of the national medical license examination. This movement also triggered the development of a radical group named "Zenkyoto" (All-Campus Joint Struggle Committee) that also protested the US safety treaty and the Vietnam War. The event ended when Zenkyoto forcibly occupied Yasuda Auditorium which was the symbolic center of the University of Tokyo. Eight thousand riot police were dispatched to secure the Auditorium. A violent battle transpired. Some students lost their lives, and many more were severely injured during this event. Shock and grief over these violent protests radiated across Japan. Following this event, significant changes were made to the internship program. Students could finally take the medical license examination after graduation from their medical university. The year of uncompensated internship was removed from being a part of the training requirements, and was replaced by the current system of residency training in Japan.

## Current National Medical Examination: Japan and the United States

The current national medical license examination in Japan is held once annually during mid-February for three days (Figure 1). It is comprised of 500 questions covering basic medicine, clinical medicine, and social medicine. During the most recent examination (2014) the pass ratio was 90.6%.<sup>9</sup> This examination is held in twelve prefectures: Hokkaido, Miyagi, Tokyo, Niigata, Aichi, Ishikawa, Osaka, Hiroshima, Kagawa, Fukuoka, Kumamoto and Okinawa. The pass ratio in each university is critical to medical schools.<sup>10</sup> The level of government subsidies the universities receive is related to the pass ratio. National financial subsidies to the universities are cut if the pass ratio does not meet 70%. Some private medical universities require students to repeat a year if they are expected to fail the national medical license examination. These universities may benefit financially from the extra tuition fees from these students, however, this may add additional stress to the struggling student as they are forced to finance an additional year of schooling. This pressure to pass the examination provides further incentive for the students to study more diligently through their medical school years. Once the medical students pass this examination they can obtain a medical license to practice.

This exam and the students training do not include clinical skills evaluation like Objective Structured Clinical Examinations (OSCE), which is a part of medical training in the United States. For much of Japanese student's medical school training they are simply observing rather than conducting hands on training as medical students in the United States. This point is of concern to the Educational Commission for Foreign Medical Graduates (ECFMG) in the United States. Changes are being implemented in the requirements for Japanese medical students to apply to US residencies such as having more clinical exposure and testing in Japan.

## The History of the *Ikyoku* System

Once the internship system was abolished, the government recommended but did not require a two-year clinical training program. These apprentice style programs do not have a standardized curriculum nationally as the content of medical education is based on the individual university or department. Most of the Japanese medical graduates went into a training program named *Ikyoku* after graduation from their own or other universities.<sup>11,12</sup> *Ikyoku* translates to: "medicine – office/department." American medical universities develop contracts with teaching hospitals and send medical students and residents to both learn and service the patients in those hospitals. In comparison, every Japanese medical university has its own university hospital and has the *Ikyoku* physician group serving its patients. *Ikyoku* is symbolic of the Japanese university hospital. Grasping the idea of *Ikyoku* is extremely important in understanding the Japanese medical post-graduate training system. Three primary goals of the *Ikyoku* groups are: education, research, and patient care. The *Ikyoku* system originated in Germany.<sup>13</sup> It was introduced in Japan following the Meiji restoration. Many *Ikyoku* based

medical departments viewed this period as the start of the modern medical system, and will thus have self-proclaimed names like the "first department of internal medicine," or the "second department of surgery." However, this can lead to more than one department with the same proclamation making this a bit of an artificial and sometimes redundant description of their department if compared to other hospitals across the country.

In the *Ikyoku* system, the professor is at the top of the hierarchical totem pole, and the professor will not only make the tough clinical decisions for the trainees but will also make many personal decisions for the trainees. Professors decide where the trainees can practice and live. In contrast, the American medical system allows its residents to make these types of career decisions in an autonomous fashion. The assistant professors, lecturers, and young trainees follow the professor down the hierarchical totem pole. The professor has enormous influence, and decides where to place personnel in the medical community which is sometimes based on political contracts with other hospitals and clinics, and not a choice of the individual trainee. Medical students and residents in the United States are accustomed to choosing where they want to live and practice within the country. In the *Ikyoku* system, the medical resident's autonomy is limited. The professor will make the decision for the trainee that will affect job placement not only in the university system, but also in any affiliated hospital. These decisions may affect the entirety of the trainees' career. The professor decides where the trainees will find a job, where they will work, and what populations they will treat. The Japanese best-selling book *White Big Tower* is based on an *Ikyoku* group in Osaka University.<sup>14</sup> It is about a fictional surgeon Dr. Goro Zaizen who becomes a professor of surgery by ruthlessly gaining power within an Osaka *Ikyoku* group. Meanwhile, a classmate of Dr. Zaizen's, who was more interested in caring for his patients, does not reach a similar level of prominence. *White Big Tower* was written more than forty years ago. The contents still remains relevant to understanding the Japanese medical system today. Both a novel and later a television series based on *White Big Tower* became acclaimed critically in both Japan and South Korea.

In Japan, the *Ikyoku* group at times will send doctors to affiliated hospitals based on political reasons rather than their individual skills. Under universal health insurance coverage, patients pay a specified amount for their care. This fee is not based on the doctor's skill or experience level. Even being board-certified does not increase the compensation for a physician's care. Physicians are instead often paid based on how many years of clinical experience they had following their graduation from medical universities. Unlike the American system, pay scales between specialties are not appreciably different. Some hospitals prefer to hire young staff rather than experienced doctors in an attempt to cut costs. The *Ikyoku* group determines the placement of young doctors based on hospital demands. These decisions are based on political and financial issues rather than on the training level of the clinicians. Young inexperienced doctors ordered by the *Ikyoku* system, may be sent to rural or small local clinics or hospitals where they may not get the exposure or training

they need. Physicians that would benefit from learning at large urban institutions are denied this opportunity and are instead placed in smaller clinics. This is often called “exile,” within trainee circles, and this may happen to a resident especially if they do not get along with certain professors. This differs from the American concept of some well-trained doctors choosing to go to a remote area to service a rural community once they acquire knowledge and experience after completing residency in a larger urban center. Increasing numbers of medical students are choosing to bypass the *Ikyoku* system of training and train in medical systems that are similar to those in the United States (Figure 2).

### The Rise of Non-University Hospital Training (Non-*Ikyoku*)

Besides the *Ikyoku* residency training system, there are a number of non-university hospitals that are offering medical students in Japan a training program similar to that offered in the United States. These non-university hospitals include Okinawa Chubu Hospital, Tokusuyukai Hospital group, St. Luke Hospital, and Kameda Medical Center, which have long histories of offering US type residency programs. The John A. Burns school of Medicine in Hawai‘i has a long relationship with Okinawa Chubu Hospital.<sup>15</sup> Visiting Professors and students from select medical schools have traveled reciprocally each way to enhance the training programs in both countries. This option of training in a residency program similar to a US residency initially attracted a minority of the medical school graduates. Subsequently, this type of residency is growing in popularity and is providing an opportunity for Japanese medical school graduates seeking to train in the American system.

The *Ikyoku* system presence has diminished since 2004 when the new residency system was established. Recently, the number of doctors who choose non-University/non-*Ikyoku* training programs has been increasing see Figure 2. Over half of medical school graduates chose non-university hospitals in part to become exposed to increased clinical exposure, evidence based medicine, and education.

### The Need for Medical Education in Japan to Require More Clinical Experience

A major change in the amount of clinical exposure is going to be required in Japanese medical schools by the year 2023. With close to 25% of all practicing physicians in the United States being comprised of international medical graduates (IMG), the Educational Commission for Foreign Medical Graduates (ECFMG) announced that IMGs applying for ECFMG certification will be required to have graduated from a medical school that has been accredited through a formal process similar to those used by the Liaison Committee on Medical Education (LCME).<sup>16</sup> Other accepted criteria like The World Federation for Medical Education (WFME) standards will also be recognized. This announcement has a huge impact on Japanese medical education, as currently they will need to increase significantly the number of clinical rotation hours. New guidelines stipulate that students must train at a minimum of 72 weeks of clinical rotations. The average number of clinical rotation hours in Japanese medical universities is now at only 50 weeks.<sup>17</sup> Japanese graduates will not be allowed to participate in US training programs in the future if this lack of clinical hours continues. The first graduates who are expected to graduate in 2023 will enter medical universities in 2017, which is very close at hand. Many of these

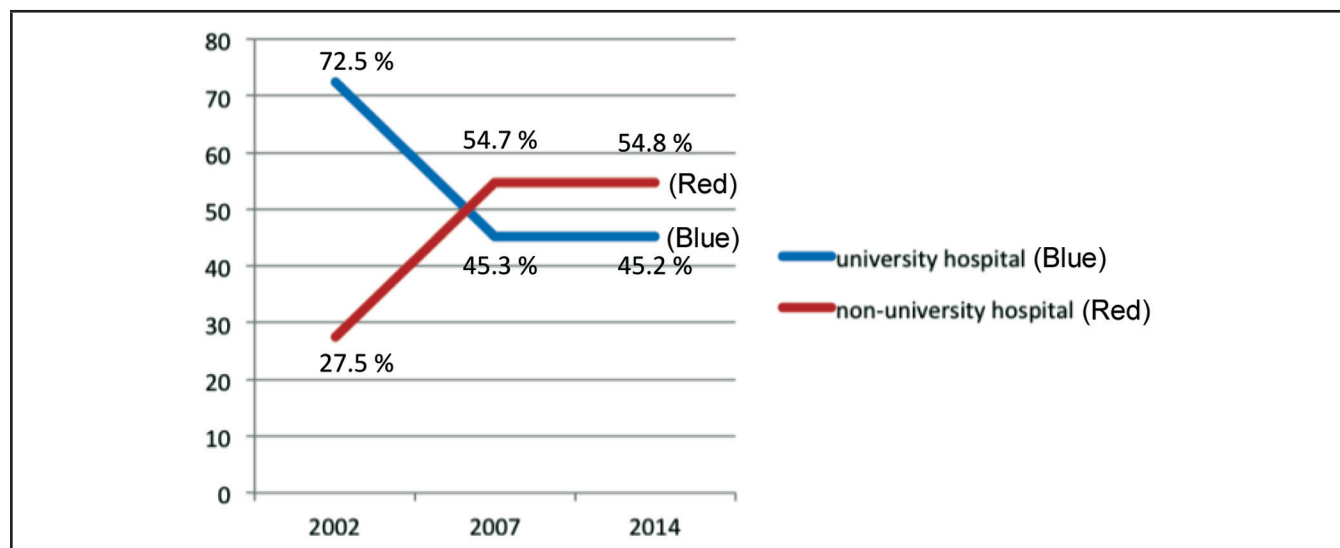


Figure 2. The Impact of Japan's 2004 Postgraduate Training for University Hospital Training (*Ikyoku*)  
 The blue line is the percentage of the graduates choosing the traditional university hospital (*Ikyoku*) training system compared to the red line which are those choosing the non-university hospital training (non-*Ikyoku*) system. There have been an increasing percentage of Japanese medical students choosing non-University/non-*Ikyoku* post graduate programs which are patterned after US residencies since 2004.

schools are scrambling to meet the ECFMG criteria. If these requirements are not met, Japanese Medical school graduates will lose their opportunities to train in US residency training programs following 2023.

### Conclusion

Historical context is crucial in understanding the development of any health care training system. The Japanese medical system is a product of both historical and societal changes that have occurred over the last two centuries. From the isolationist governmental philosophy of the Edo period with crude herbal preparations to the present day modern hospitals with foundations in science and technology demonstrate the enormous changes in the practice of medicine in Japan. The national license examination has gone through an evolutionary process and now provides some standardization of medical training and knowledge. However, an emphasis on primary care and on introducing clinical medicine teaching earlier to trainees will be required in the next few years if Japan's physicians are to remain competitive in the global market. The Japanese Medical Education system must fundamentally change some of its educational curriculum and standardize aspects of its post-graduate training in order to better serve its population in an effective and efficient manner.

### Conflict of Interest

None of the authors identify a conflict of interest.

### Authors' Affiliation:

- Department of Pediatrics, John A. Burns School of Medicine, University of Hawai'i, Honolulu, HI

### References

1. Noel G. Changing Japanese Medical Education [in Japanese]. Tokyo, Kanehara Co, Ltd, 2004, p. 232.
2. Japan history: Edo period. Available at: <http://www.japan-guide.com/e/e2128.html>. Accessed November 17, 2014.
3. Which Japanese words come from German? Available at: <http://www.sjfaq.org/faq/german.html>. Accessed November 17, 2014. Dutch Japanese-Netherlands relationships: Netherlands Missions Japan. Available at: <http://japan.nlembassy.org/you-and-netherlands/dutch-japanese-relations.html>. Accessed November 17, 2014.
4. Dutch Japanese-Netherlands relationships: Netherlands Missions Japan. Available at: <http://japan.nlembassy.org/you-and-netherlands/dutch-japanese-relations.html>. Accessed November 17, 2014.
5. Izumi Y, Isozumi K. Modern Japanese medical history and the European influence. *Keio J Med*. 2001;50(2):91-9.
6. Hashimoto, K. Doctors and low education group [in Japanese]. *National Institute of Multimedia Education*. 1994. Available at [https://ouj.repo.nii.ac.jp/?action=repository\\_action\\_common\\_download&item\\_id=4662&item\\_no=1&attribute\\_id=18&file\\_no=1](https://ouj.repo.nii.ac.jp/?action=repository_action_common_download&item_id=4662&item_no=1&attribute_id=18&file_no=1). Accessed October 16, 2014.
7. The History of Clinical training in Japan [in Japanese]. *Shukan Igakukai Shimbun Wkly Med Community Newsp*. 2004. Available at: [http://www.igaku-shoin.co.jp/nwsp/rn2004dir/n2566dir/n2566\\_02.pdf](http://www.igaku-shoin.co.jp/nwsp/rn2004dir/n2566dir/n2566_02.pdf). Accessed November 17, 2014.
8. Steinhoff, P. Student Protest in 1960's. *Social Science Japan*. 1999;15(3):3-7.
9. National Medical Examination pass rate [in Japanese]. <https://www.tecomgroup.jp/igaku/top-ics/108.asp>. Accessed November 16, 2014.
10. Sugihara M. The issue of mass students who repeat a year [in Japanese]. *Medical Research Information Center*. 2010. Available at: <http://medg.jp/mt/2010/08/vol-258.html#more>. Accessed November 17, 2014.
11. Otaki J. Considering primary care in Japan. *Academic Medicine*. 1998;73:662-668.
12. Yoshida A. What is the problem in Japanese medicine [in Japanese]. Tokyo, NTT Publishing Co, Ltd, 2009, p. 320.
13. The Ikyoku system [in Japanese]. *The Hokkaido News Paper*. Published May 17, 2003.
14. Yamazaki T. Shiroi Kyotou (*White Big Tower*) [in Japanese]. Published 1965.
15. Maeshiro M, Izutsu S, Connolly KK. A History of the University of Hawai'i Postgraduate Medical Education Program at Okinawa Chubu Hospital, 1966-2012. *Hawaii J Med Public Health*. 2014;73(6):191-4.
16. United States Educational Commission for Foreign Medical Graduates. Available at: <http://www.ecfmg.org/about/initiatives-accreditation-requirement.html>. Accessed November 17, 2014
17. Ohmori T. External pressure to the medical education and psychiatry clinical practice [in Japanese]. *Seishin Shinkeigaku Zasshi*. 2013;115(2):125.