

Series: Coverage of the novel coronavirus disease (COVID-19)

The University of Yamanashi battles COVID-19

How quick-acting risk response in late January paved the way for a diagnosis of meningitis associated with SARS-CoV-2

Opinion

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Shinji Shimada, President, University of Yamanashi (photo courtesy of the University of Yamanashi)

1. How the University of Yamanashi discovered the first case of meningitis/encephalitis associated with SARS-CoV-2 in Japan

At 11:30 p.m. on Saturday, March 7, 2020, the University of Yamanashi Hospital held a press conference for the third time in three days. The first briefing, on March 5, was a run-down of how the hospital was admitting and providing care for patients who had contracted the novel coronavirus disease (COVID-19) aboard the *Diamond Princess* cruise ship. The following day's briefing detailed the hospital's acceptance of Yamanashi's first in-prefecture case of COVID-19. At the gathering on March 7, however, the news was of a slightly different type: hospital representatives were there to announce that a cerebrospinal fluid PCR test on a patient who had been rushed to the emergency room with impaired consciousness produced findings suggestive of a SARS-CoV-2 infection. Not only was the case the first report of meningitis/encephalitis associated with COVID-19 to emerge in Japan, but the age of the patient—in his twenties, an apparent aberration from the older-skewing COVID-19 age range—made the news even more startling. The announcement may have come late at night, but the story was making the rounds on the national news and popping up on tabloid TV shows the next day; it was a high-profile story, to say the least. Certain media outlets have also reported that a medical institution in Beijing made a similar finding on March 5,¹⁾ two days before the announcement from Yamanashi, underscoring the need for further investigations in how SARS-CoV-2 affects the central nervous system.

What enabled the University of Yamanashi Hospital to make its groundbreaking discovery and publish its report on meningitis/encephalitis associated with COVID-19 (in the *International Journal of Infectious Diseases*), more than anything, were the people on the ground: the critical-care doctors who made accurate, unerring decisions in assessing the case. Based on the patient's clinical presentation, the doctors on the critical-care team initially suspected meningitis and quickly recognized that the condition might have a viral element. A chest CT scan showed evidence of bilateral pneumonia, which prompted the team to administer a PCR test to check for a SARS-CoV-2 infection. Considering how quickly and decisively they acted, the critical-care doctors were obviously sensitive to the risks in play—and the biggest factor playing into that awareness was the University of Yamanashi Hospital's extensive, institution-wide preparations for a possible COVID-19 situation. Despite not being a designated medical institution for infectious diseases, the University of Yamanashi Hospital has spearheaded Yamanashi Prefecture's response to the COVID-19 crisis. This article takes a look back at what the hospital did to brace itself for the outbreak, how the response is progressing, what lies ahead, and what steps need to be taken.

2. The University of Yamanashi Hospital's COVID-19 response

(1) The WHO slips up

In an emergency briefing on January 23, the World Health Organization (WHO) said that it was too early to declare COVID-19-related pneumonia a “public health emergency of international concern” (PHEIC) (a state of emergency)²⁾—despite the fact that the disease had already spread from its initial epicenter in China to Japan and four other countries. That decision was an obvious misjudgment on the part of the WHO, especially considering the state of the world now. The WHO finally declared COVID-19 a pandemic on March 11,⁸⁾ but by that time, it was all too late.

When the SARS (severe acute respiratory syndrome) epidemic erupted into a pandemic in 2002–2003, I was the professor in the Department of Dermatology at the University of Yamanashi and the chair of the Infection Control Committee at the University of Yamanashi Hospital. SARS had a minimal impact in Japan in terms of scope; while there were suspected cases of the disease, no confirmed cases ever came to light.³⁾ If cases had appeared in Yamanashi, however, the administration would have been sorely unprepared. The University of Yamanashi Hospital would have been able to handle one case at the very most; multiple cases would have been unfeasible.

That explains why I could hardly believe my eyes when I saw coverage of the situation in Wuhan on January 25, during the Chinese New Year. Somehow, they had managed to build two full specialized hospitals—1,000 beds apiece—in just over 10 days.⁴⁾ The news ran footage of medical institutions teeming with patients, medical workers working with full ensembles of personal-protective equipment (PPE). What I saw in those images was a stark contrast to what the WHO had made the situation out to be—and I knew that we would need to start preparing for a major crisis right away. I contacted the infection-control and medical-safety teams at the University of Yamanashi Hospital and told them to get the institution ready to accept patients as soon as possible.

(2) The University of Yamanashi Hospital gets ready to accept patients

The University of Yamanashi Hospital moved quickly. Early the following week, on the morning of Monday, January 27, Hospital Director Masayuki Takeda joined personnel from the infection-control and medical-safety teams for a meeting. The attendees discussed the situation, eventually coming to an agreement that the hospital would make the necessary internal arrangements to help curtail the spread of the disease in the prefecture. While the hospital may not be an officially designated medical institution for infectious diseases, the group recognized that, as a national university hospital, the institution essentially represented the last line of defense against the outbreak in the prefecture. From a logistical standpoint, the hospital was actually in a fortunate position: a sweeping, ongoing redevelopment project had created new ward facilities in 2015 to replace several old wards (with a total of approximately 300 beds, 50 per ward), which remained intact and ready to provide crucial bed capacity. I instructed the group to restart the medical-gas supplies and nurse-call functionality to the old wards.

As the hospital started making steady progress on all the preparations, the Japan Association of National Universities gathered for a general meeting on January 29. There, I tried to convince the other attendees about the potential threat of an outbreak and get everyone to recognize the possibility of an impending crisis. The other university presidents in attendance, however, seemed dismissive; few had any background in medicine, which is most likely why my words failed to hit their mark.

The University of Yamanashi Hospital was planning to do tabletop exercises on January 31 to simulate admitting patients, but it also had to begin shared information with other organizations throughout Yamanashi; that same day, the WHO finally got around to announcing a state of emergency, after which calls from media outlets started pouring in. Meanwhile, groups of Chinese tourists were still in Yamanashi visiting Mt. Fuji and other sightseeing spots in the vicinity. You could almost feel an ominous pall setting in, the threats looming constantly closer, practically knocking at your door—and the sense of danger was mounting day by day.

(3) The *Diamond Princess* pulls into port

The coronavirus crisis essentially blindsided Japan. The big blow came on February 5, when the *Diamond Princess* docked in Yokohama and reports of a mass COVID-19 infection aboard the cruise ship broke. A total of 696 passengers and crew members eventually tested positive for COVID-19,⁵⁾ presenting the medical community with a sudden wave of cases that far exceeded what the designated medical institutions for infectious diseases in Yokohama could handle. The surge prompted medical institutions in the Tokyo metropolitan area and beyond to start opening their doors to COVID-19 patients. Things stayed relatively quiet for a time in Yamanashi, which sits a good distance inland from Yokohama Bay, but that physical separation only provided a temporary buffer. When medical institutions in the prefecture started accepting coronavirus patients on February 11, the crisis was no longer someone else's problem—it was here.

Three days later, Yamanashi Prefecture Governor Kōtarō Nagasaki paid a visit to the University of Yamanashi Hospital, asked that the institution accept COVID-19 patients in the event of a prefectural outbreak, and pledged

the prefectural government's full support along with Director Takeda. At that point, however, the University of Yamanashi Hospital had yet to set into full crisis mode. The framework for accepting patients was gradually taking shape, but the level of overall concern varied considerably from person to person. The in-prefecture infection count was still at zero, after all, and a significant segment of the hospital personnel bristled at the idea of cutting down on general-practice capacity for the sake of combating a threat that was only just beginning to emerge in terms of actual numbers. As president of the university, I knew that I had to do something to rally the hospital personnel behind the effort. I issued a presidential directive on February 18 to provide a special allowance of 1,000 yen per hour to personnel treating COVID-19 patients. Almost as soon as I had made the announcement, things took another unexpected turn.

(4) The University of Yamanashi Hospital grapples with patient transfers

That same day, February 18, the University of Yamanashi Hospital received a request to accept incoming patient transfers from another medical institution in the prefecture—and the call came under no ordinary circumstances. The institution had accepted 10 *Diamond Princess* patients, with reports indicating that several had no observable symptoms. What the hospital officials quickly learned, however, was that some of the patients that they had heard were “asymptomatic” actually had pneumonia—even severe pneumonia, in a few cases. The existing structure for sharing medical information on a prefecture-wide basis was profoundly inadequate at that stage; not even we at the University of Yamanashi Hospital had any way of knowing just how many patients had been admitted to institutions in the prefecture. The University of Yamanashi Hospital had been gearing up to accept COVID-19 patients, but that whole process was rooted in the premise that the institution would only be admitting people who contracted the infection *in* Yamanashi—not accommodating patients from elsewhere. Despite objections from some personnel about expanding the scope of patient admission, the University of Yamanashi decided to accept its first patient in hopes of alleviating some of the growing strain on Yamanashi's medical infrastructure. That decision came on February 19.

(5) Setting up an information-sharing structure for medical institutions across the prefecture

With Yamanashi Prefecture confronting an urgent need for better information sharing, Director Takeda proposed that the designated medical institutions for infectious diseases meet to sort out the situation. The first gathering, which took place on February 21, provided the first complete, organized picture of patient-admission conditions on a prefecture-wide basis and reached a resolution to establish a prefecture-led panel of experts, including University of Yamanashi Hospital Division of Infection Control and Prevention member Osamu Inoue (also a specially appointed professor at the University of Yamanashi). Coming on the heels of that development was yet another jolting challenge for the University of Yamanashi Hospital to reckon with.

(6) A call from the Ministry of Health, Labour and Welfare

At that point, passengers had started to disembark the *Diamond Princess*. The general consensus at the time was that the plans for accommodating the alighting passengers were basically set, with all the logistical hurdles apparently in the rear-view mirror. Then, at around 6 p.m. on February 21, I got a phone call during a meeting at

the Yamanashi Prefecture government building. On the other end of the line was Nobuhiko Horioka, Senior Coordinator of Medical Policy in the General Affairs Division at the Ministry of Health, Labour and Welfare's Health Policy Bureau. It was a call that, to me, would alter the whole landscape of our COVID-19 response. I had known Horioka since he was in charge of the Medical Affairs Section for Yamanashi Prefecture's Public Health and Welfare Department. Although we occupied different standpoints—he a prefectural official at the time, I the president of the Japanese Dermatological Association and director of the University of Yamanashi Hospital—we had had frequent discussions in the process of establishing the Japanese Medical Specialty Board. This time, though, he was reaching out for help.

On the phone, he told me that the medical institutions that the national government had tabbed to accommodate *Diamond Princess* patients in Kanagawa Prefecture, Tokyo, and neighboring prefectures were on the brink of reaching capacity—and he was hoping the University of Yamanashi might be willing to take some of the caseload. There was more. Horioka told me that he and several of the other government officials who had been boarding the *Diamond Princess* with crew members to monitor the facilities and transport patients, including State Minister of Health, Labour and Welfare Gaku Hashimoto and Parliamentary Vice-Minister of Health, Labour and Welfare Hanako Jimi, had nowhere to go for care in the event that they were to contract the virus. There was a growing list of hospitals that were already full with passengers whose PCR tests had come back positive—many had no more room for new admissions. How could we leave the *Diamond Princess* crew, after all that they had done to keep so many passengers as safe as possible, high and dry? How could we just abandon the politicians and administration officials who were still giving their all to protect the country? This, I knew, was the time to stand up and do what I could within my capacity as a university president.

Discussions at the University of Yamanashi Hospital started promptly and continued well into the night. While challenges were undoubtedly looming on the horizon, a logistical labyrinth waiting ahead, everyone agreed that it was time to embody the hospital's long-standing motto: one hospital, one team. In the end, we agreed to repurpose one of our eleven general wards (a total of 47 beds) into a COVID-19 facility, starting the following Monday, so that we could take on a substantial number of patients at a given time.

(7) The “one hospital, one team” project

We anticipated some resistance from the clinical departments that would need to relocate in the process of converting a full ward into a dedicated crisis-response facility, but every last department gave us its full support—they all understood the implications of the situation. The Department of Nursing faced the most daunting task, at least in terms of coordination; a specialized task force would need to be ready and operational as soon as the first patient came in. Under the leadership of Department of Nursing Director Shiomi Furuya, however, the nurses knew where to be and what to do—the team handled every challenge that came its way with remarkable agility, with every member working both independently and cooperatively to solve problems. Thanks to that concerted effort across the entire hospital organization, preparations progressed through the weekend and wrapped up in three days' time. The hospital was ready to admit COVID-19 patients. It turned out to be over-prepared, if

anything. In the end, the hospital only had to admit six patients from the *Diamond Princess* from February 19 onward. The team continued to take a cautious approach, which included setting up a special outpatient service for patients with fever symptoms, always mindful of potential spikes in the outbreak. When Yamanashi's first in-prefecture case emerged, it was the University of Yamanashi Hospital that provided the care. The next COVID-19 case from Yamanashi, who also came to the University of Yamanashi Hospital, was the patient I wrote about earlier: the young patient, in his twenties, whom the critical-care team eventually diagnosed as having meningitis/encephalitis associated with COVID-19.

3. Current issues and future outlook

Above all, what made the University of Yamanashi Hospital's efforts to prepare for a COVID-19 outbreak was its ability to perceive the situation as a crisis right away and band together in the "one hospital, one team" spirit. People around the world have leveled criticism at numerous targets, including the *Diamond Princess* response, but there is no doubt in my mind that all the politicians, administration officials, and other parties involved did everything in their power to navigate and mitigate what must have been a maelstrom of unpredictable confusion and murky uncertainty aboard the vessel. While further investigations will need to take a closer look at what went right and what could have gone better, we first owe all the people who poured their energies into tackling the crisis our gratitude. Look at everything that went into bracing the University of Yamanashi Hospital for the response—and even our coordinated planning efforts in a relatively stable environment, far removed from the front lines, took considerable time to put together. I took all the decisive action I could as university president to spur the process, too, but our framework still only came together after several days of activity. That puts the *Diamond Princess's* experience into perspective. There is no conceivable way that the process of establishing a full-scale infection-control protocol with a complex system of rules and restrictions—for a massive group of passengers and crew members from every corner of the world, no less—could ever go exactly by the book. To me, that basic truth is something we need to take to heart.

The government has taken myriad measures in hopes of halting the spread of the infection. Regardless of whether those steps prove effective or not, this is a national crisis for every one of us. We all need to think hard about what we do and act accordingly, and it all hinges on sharing information.

That was one of the biggest challenges for the University of Yamanashi Hospital in formulating its response. No matter how well we understood the basic principles of communicating accurate, reliable information on a timely basis without leaving any details out, we quickly learned how putting those principles into practice is easier said than done. One thing that we gained from the experience is an understanding of how formal meetings can only do so much. From mailing lists to intranet-based sharing, there are so many more platforms for sharing information than just meetings—and we are now using those resources to streamline the process. Meeting face to face for real-life, personal discussions is still a vital piece of the process, of course. I take whatever opportunity I can get to address the hospital personnel in person, engage in meaningful dialogue, and send the messages I want to convey.

Yamanashi, however, is behind the curve when it comes to information disclosure. Not having access to the necessary information can exacerbate anxieties and fuel mistrust. The University of Yamanashi Hospital is the only organization in Yamanashi keeping its website up to date with information on the admission and release of COVID-19 patients (nine admissions and five discharges thus far). I want to keep urging the prefectural government to take that kind of initiative in making information public—a crucial part of allaying residents' fears.

The COVID-19 outbreak is growing in Japan. We will have to wait until around March 19 to know if the government's array of countermeasures will have managed to flatten the infection curve,⁷⁾ but the chances of completely containing the spread of virus by mid-March are slim to none. The same goes for the chances of holding the Tokyo Olympics on schedule; a 2021 or even 2022 Games is looking more and more like an inevitability. To me, the best approach at this stage would be to stop, be rational, and start thinking about how to make the Tokyo Olympics—whenever the event does happen—even better. Given that effective COVID-19 treatments and vaccines will likely take a considerable amount of time to develop, medical institutions will need to commit themselves to safeguarding against in-hospital infections and also establishing robust structures for providing necessary care. With schools now closed, meanwhile, hospitals are also staring down a potential human-resource shortage as some personnel need to stay home with their children. The logistical challenges to providing medical care could soon be extremely imposing. These types of challenges, however, bring out the best in people. If medical professionals can think of themselves as members of one big, united team, all working together to protect themselves, their loved ones, and the people of the country, I know that they can help steer Japan through the crisis.

I want the outbreak to bring out the best in the government, too—but for that to happen, the government needs to be more aware. Right now, medical institutions across the country are fighting tooth and nail against the COVID-19 pandemic. The University of Yamanashi Hospital has converted an entire ward into a dedicated COVID-19 care facility. The medical community is under incredible strain, and the toll of that pressure—both physical and mental—is enormous. Not only are hospitals grappling with the challenges of actually providing care, but plummeting hospital revenues are creating crippling economic losses. I hope the government uses its powers to secure the necessary human resources, compensate for losses, and make sure that facilities have the masks, PPE kits, and other equipment they so desperately lack at the moment. Making information available on a nationwide level is another must: to get the right medical resources to the right destinations, the people involved need to know how many patients are at each medical institution and what those patients' severity levels are. The current framework for information sharing has its priorities backward. The government can take the lead in making the vital improvements on that front. Finally, Japan's woefully inadequate framework for PCR testing is a national embarrassment. The government needs to act quickly to address the testing situation, which has not only been a detriment to managing the outbreak but also lost Japan some of its credibility on the international stage.

4. Acknowledgements

As president of the University of Yamanashi, I would like to extend my heartfelt gratitude to all the clinical departments and the Department of Nursing at the University of Yamanashi Hospital, especially the personnel providing care and nursing support for COVID-19 patients despite all the confusion surrounding the crisis; the Division of Infection Control and Prevention, Department of Quality and Patient Safety, Clinical Laboratory Department, Pharmaceutical Department, Radiology Department, and other central clinical divisions; the administrative divisions; and everyone else at the hospital. My thanks also go to Yamanashi Prefecture Governor Kōtarō Nagasaki, who continues to provide the hospital with valuable support, along with other prefectural officials, everyone at the Ministry of Health, Labour and Welfare and other relevant ministries, and all those now contributing to the fight against the COVID-19 pandemic.

References

- 1) *People's Daily Online*, Japanese edition (last accessed on March 11, 2020)
 - 2) Ministry of Health, Labour and Welfare website (last accessed on March 11, 2020)
 - 3) National Institute of Infectious Diseases website (last accessed on March 11, 2020)
 - 4) AFP BB NEWS (last accessed on March 11, 2020)
 - 5) Current status of the novel coronavirus disease and the response by the Ministry of Health, Labour and Welfare (March 6, 2020) (last accessed on March 11, 2020)
 - 6) *Tokyo Shimbun* (last accessed on March 11, 2020)
 - 7) Panel of experts on countermeasures to the novel coronavirus disease outbreak discusses response efforts (March 9, 2020)
 - 8) World Health Organization, Coronavirus disease (COVID-19) outbreak (last accessed on March 12, 2020)
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