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Reporter's Notebook: Life and death in a Wuhan coronavirus ICU



Medical staff attending to a patient infected by the coronavirus at a makeshift hospital at Wuhan International Convention and Exhibition Centre, on Feb 5, 2020. PHOTO: EPA-EFE

🕒 PUBLISHED FEB 6, 2020, 4:40 PM SGT

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WUHAN (CAIXIN GLOBAL) - In the coronavirus epidemic, doctors on the front lines take on the greatest risk and best understand the situation. Dr Peng Zhiyong, director of acute medicine at the Wuhan University South Central Hospital, is one of those doctors.

In an interview on Tuesday with Caixin, Dr Peng described his personal experiences in first encountering the disease in early January and quickly grasping its virulent potential and the need for stringent quarantine

measures.

As the contagion spread and flooded his ICU, the doctor observed that three weeks seemed to determine the difference between life and death. Patients with stronger immune systems would start to recover in a couple of weeks, but in the second week, some cases would take a turn for the worse.

In the third week, keeping some of these acute patients alive might require extraordinary intervention. For this group, the death rate seems to be 4 per cent to 5 per cent, Dr Peng said. After working his 12-hour daytime shifts, the doctor spends his evenings researching the disease and has summarised his observations in a thesis.

The doctors and nurses at his hospital are overwhelmed with patients. Once they don protective hazmat suits, they go without food, drink and bathroom breaks for their entire shifts. That's because there aren't enough of the suits for a mid-shift change, he said.

Over the past month on the front lines of the coronavirus battle, Dr Peng has been brought to tears many times when forced to turn away patients for lack of staffing and beds. He said what really got to him, though, was the death of an acutely ill pregnant woman when treatment stopped for lack of money - the day before the government decided to pick up the costs of all coronavirus treatments.

Here's our interview with the ICU doctor:

SCREENING CRITERIA WERE TOO TOUGH IN THE BEGINNING

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Caixin: When did you encounter your first novel coronavirus patient?

Dr Peng Zhiyong: Jan 6, 2020. There was a patient from Huanggang who had been refused by multiple hospitals, who was sent to the South Central Hospital emergency room. I attended the consultation. At the time, the patient's illness was already severe, and he had difficulty breathing. I knew right then that he contracted this disease. We debated at length whether to accept the patient. If we didn't, he had nowhere to go; if we did, there was a high likelihood the disease would infect others. We had to do a very stringent quarantine. We decided to take the patient in the end.

I called the hospital director and told him the story, including the fact that we had to clear the hospital room of other patients and to remodel it after Sars standards by setting up a contamination area, buffer area, cleaning area, and separate the living areas of the hospital staff from the patients'.

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- On Jan 6, with the patient in the emergency room, we did quarantine remodelling in the emergency room and did major renovations to the ICU (intensive care unit). South Central Hospital's ICU has 66 beds in total. We kept a space dedicated

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> to coronavirus patients. I knew the infectiousness of the disease. There were bound to be more people coming in, so we set aside **16 beds**. We did quarantine renovations on the infectious diseases area because respiratory illnesses are transmitted through the air, so **even air has to be quarantined so that inside the rooms the air can't escape**. At the time, some said that the ICU had a limited number of beds and 16 was excessive. I said it wasn't excessive at all.

Caixin: You predicted back in January that there would be person-to-person transmission and even took quarantine measures. Did you report the situation to the higher-ups?

Peng: This disease really did spread very fast. By Jan 10, the 16 beds in our ICU were full. We saw how dire the situation was and told the hospital's leadership that they had to report even higher. Our head felt it was urgent too and reported this to the Wuhan city health committee. On Jan 12, the department sent a team of three specialists to South Central to investigate. The **specialists** said that **clinical symptoms** really **resembled Sars**, but they were still talking about diagnosis criteria, that kind of stuff. We replied that **those standards were too stringent**. Very **few** people would get **diagnosed** based **on those criteria**. The head of our hospital told them this multiple times during this period. I know other hospitals were doing the same.



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Before this, the specialists already went to Jinyintan Hospital to investigate and made a set of **diagnosis criteria**. **You had to have had exposure to the South China Seafood Market**, you needed to have had a **fever** and **test positive for the virus**. **You had to meet all three criteria** in order to be diagnosed. The third one was especially stringent. In reality, **very few people were able to test for a virus**.

On Jan 18, the high-level **specialists** from the National Health Commission came to Wuhan, to South Central Hospital to inspect. **I told them again that the criteria were too high**. This way it was easy to miss infections. I told them this was infectious; **if you made the criteria too high and let patients go, you're putting society in danger**. After the second national team of specialists came, the **criteria** were **changed**. The **number of diagnosed patients rose quickly**.

Security guards check the temperature of visitors at a seafood market in Guangzhou, Guangdong Province, China, on Feb 6, 2020. PHOTO: EPA-EFE



Caixin: What made you believe that the new coronavirus could be transmitted between people?

Peng: Based on my clinical experience and knowledge, I believed that the disease would be an acutely infectious disease and that we had to do high-level protection. The virus isn't going to change based on man's will. I felt we needed to respect it and act according to science. Under my requirements, South Central Hospital's ICU took strict quarantine measures, and as a result, our department only had two infections. As of Jan 28, of the entire hospital's medical personnel, only 40 have been infected. This is way less compared with other hospitals in terms of percentage of total medical staff.

It pains us to see the coronavirus develop to such a desperate state. But the priority now is to treat people; do everything we can to save people.

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> **FATALITY RATE FOR ACUTE PATIENTS IS 4 PER CENT TO 5 PER CENT; 3 WEEKS DETERMINE LIFE AND DEATH**

Caixin: Based on your clinical experience, what's the disease progression of the new coronavirus?

Peng: Lately I've been spending the daytime seeing patients in the ICU, then doing some research in the evenings. I just wrote a thesis. I drew on data from 138 cases that South Central Hospital had from Jan 7 to Jan 28 and attempted to summarise some patterns of the novel coronavirus.

A lot of viruses will die off on their own after a certain amount of time. We call these self-limited diseases.

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- > I've observed that the breakout period of the novel coronavirus tends to be three weeks, from the onset of symptoms to developing difficulties breathing. Basically going from mild to severe symptoms takes about a week. There are all sorts of mild symptoms: feebleness, shortness of breath, some people have fevers, some don't. Based on studies of our 138 cases, the most common symptoms in the first stage are fever (98.6 per cent of cases), feebleness (69.6 per cent), cough (59.4 per cent), muscle pains (34.8 per cent), difficulties breathing (31.2%),

while less common symptoms include headaches, dizziness, stomach pain, diarrhea, nausea, vomiting.

But some patients who enter the second week will suddenly get worse. At this stage, people should go to the

hospital. The elderly with underlying conditions may develop complications; some may need machine-assisted respiration. When the body's other organs start to fail, that's when it becomes severe, while those with strong immune systems see their symptoms decrease in severity at this stage and gradually recover. So the second week is what determines whether the illness becomes critical.

The third week determines whether critical illness leads to death. Some in critical condition who receive treatment can raise their level of lymphocytes, a type of white blood cell, and see an improvement in their immune systems, and have been brought back, so to speak. But those whose lymphocyte numbers continue to decline, those whose immune systems are destroyed in the end, experience multiple organ failure and die.

For most, the illness is over in two weeks, whereas for those for whom the illness becomes severe, if they can survive three weeks, they're good. Those that can't will die in three weeks.



A patient covered with a bed sheet at an exhibition centre converted into a hospital as it starts to accept patients displaying mild symptoms of the novel coronavirus in Wuhan in China's central Hubei province, on Feb 5, 2020. PHOTO: AFP

Caixin: Will you please give more details on clinical research? What percentage of cases would develop from mild conditions to severe conditions? What percentage of serious cases would develop into life-threatening cases? What is the mortality rate?

Peng: Based on my clinical observations, this disease is highly contagious, but the mortality rate is low. Those that progressed into the life-threatening stage often occurred in the elderly already with chronic diseases.

As of Jan 28, of 138 cases, 36 were in the ICU, 28 recovered, five died. That is to say, the mortality rate of patients with severe conditions was 3.6 per cent. Yesterday (Feb 3), another patient died, bringing the mortality rate to 4.3 per cent. Given patients in the ICU, it is likely to have more deaths. The mortality rate is also likely to edge up but not significantly.

Those hospitalised tend to have severe or life-threatening conditions. Patients with slight symptoms are placed in quarantine at home. **We have not gathered data on the percentage of cases that progress from slight symptoms to serious symptoms.** If a patient goes from serious conditions to life-threatening conditions, the patient will be sent to the ICU. **Among 138 patients, 36 were transferred to the ICU, representing 26 per cent of all patients.**

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- > The percentage of deaths among life-threatening cases is about 15 per cent. The mean period to go from slight conditions to life-threatening conditions is about 10 days. Twenty-eight patients recovered and were discharged. Right now, the recovery rate is 20.3 per cent, while other patients remain hospitalised.

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It is notable that 12 cases were linked to South China Seafood Market; 57 were infected while being hospitalised, including 17 patients already hospitalised in other departments; and 40 medical staff, among 138 cases (as of Jan 28). **That**

demonstrates that a hospital is a high-risk zone and appropriate protection must be taken.

Caixin: What is the highest risk a serious patient faces?

Peng: The biggest assault the **virus launches is on a patient's immune system. It causes a fall in the count of lymphocytes,** the damage in the lungs and shortness of breath. Many serious patients died of choking. Others died of the failure of multiple organs following complications in their organs resulting from a collapse of the immune system.



People lining up to buy face masks in Hong Kong, on Feb 5, 2020. PHOTO: EPA-EFE

Caixin: A 39-year-old patient in Hong Kong suffered from cardiac arrest, and his death ensued quickly. A few patients did not have severe symptoms upon the onslaught of the virus or in early stages, but they died suddenly. Some experts argue that the virus triggers a cytokine storm, which ravages the stronger immune system of young adults. Eventually excessive inflammations caused by cytokine result in the higher mortality rate. Have you seen such a phenomenon in the coronavirus outbreak?

Peng: Based on my observations, a third of patients exhibited inflammation in their whole body. It was not necessarily limited to young adults. The mechanism of a cytokine storm is about whole-body inflammation, which leads to a failure of multiple organs and quickly evolves into the terminal stage. In some fast-progressing cases, it took two to three days to progress from whole-body inflammation to the life-threatening stage.

Caixin: How do you treat serious and life-threatening cases?

Peng: For serious and life-threatening cases, our main approach is to provide oxygen, high-volume oxygen. At first noninvasive machine-pumped oxygen, followed by intubated oxygen if conditions worsen. For life-threatening cases, we use Ecmo (extracorporeal membrane oxygenation, or pumping the patient's blood through an artificial lung machine). In four cases, we applied Ecmo to rescue patients from the verge of death.

Currently there are no special drugs for the coronavirus. The primary purpose of the ICU is to help patients sustain the functions of their body. Different patients have different symptoms. In case of shortness of breath, we provided oxygen; in case of a kidney failure, we gave dialysis; in case of a coma, we deployed Ecmo. We provide support wherever a patient needs it to sustain his life. Once the count of lymphocytes goes up and the immune system improves, the virus will be cleared. However, if the count of lymphocytes continues to fall, it is dangerous because the virus continues to replicate. Once a patient's immune system is demolished, it is hard to save a patient.



Scientists working in the Virology laboratory, classified as "P3" level of safety, on Feb 5, 2020 as they try to find an effective treatment against the new Sars-like coronavirus. PHOTO: AFP

Caixin: There is news of some drugs that work. People are hopeful of the effect of US-made **remdesivir**, which cured the first case in the United States. What do you think of the drugs?

Peng: There are no 2019 novel coronavirus-targeted drugs so far. Some patients may recover after taking some drugs along with supportive treatment. But such individual cases do not indicate the universal effect of the drugs. The effect is also related to how serious each case is and their individual health conditions. People want a cure urgently, and that is understandable. But we need to be cautious.

Caixin: Do you have any advice for coronavirus-infected patients?

Peng: The most effective approach to the virus epidemic is to control the source of the virus, stem the spread of the virus and prevent human-to-human transmission. My advice for a patient is going to a special ward for infectious diseases, early detection, early diagnosis, early quarantine and early treatment. Once it has developed into a severe case, hospitalisation is a must. It is better to contain the disease at an early stage. Once it reaches the life-threatening stage, it is way more difficult to treat it and requires more medical resources. With regard to life-threatening cases, try to save them with ICU measures to reduce the mortality rate.

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Caixin: How many patients with life-threatening conditions have you treated? How many have recovered?

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Peng: As of Feb 4, six patients in the ICU of South Central Hospital died. Eighty per cent of them have been improving, a quarter are approaching their discharge and the remainder are still recovering in segregated wards.

The patient who impressed me most came from Huanggang. He was the first to be saved with the assistance of Ecmo. He had contact with South China Seafood Market and was in very serious conditions. He was transferred to the ICU and we saved him with Ecmo. He was discharged from the hospital Jan 28.



Medical workers in protective suits receive a patient at the Wuhan International Conference and Exhibition Center, which has been converted into a makeshift hospital to receive patients with mild symptoms caused by the novel coronavirus, in Wuhan, Hubei province, China, on Feb 5, 2020. PHOTO: GETTY IMAGES



Caixin: What are your work load and pace like?

Peng: The work in the ICU is overloaded. There are three patient wards with 66 beds in South Central Hospital, housing 150 patients. **Since Jan 7, when we received the first patient, no one took any leave.** We took turns to work in the ICU. Even pregnant medical staff did not take leave. **After the epidemic got worse, none of the medical staff ever went home. We rest in a hotel near the hospital or in the hospital.**

In the segregated ward, **we wear level-3 protective gear.** One shift is 12 hours for a doctor and eight hours for a nurse. Since protective gear is in a shortage, there is only one set for a medical staff member a day. **We refrain from eating or drinking during our shift because the gear is no longer protective once we go to the washroom. The gear is thick, airtight and tough on our body. It felt uncomfortable at the beginning, but we are used to it now.**

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> **Caixin: Did you experience a very dangerous moment? For example, in case of intubation, what do you do to prevent yourselves from being infected?**

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> Peng: It is a new coronavirus. We are not sure of its nature and its path of spread. It is not true if we say we are not afraid. Medical staff members do fear to some extent. But patients need us. When a patient is out of breath and non-invasive oxygen provision fails, **we must apply intubation. The procedure is dangerous** as the patient may vomit or spit.

Medical staff are likely to be exposed to the danger of infection. **We strictly require doctors and nurses to apply the highest-level protection.** The biggest problem we face now is the **shortage of protective gear.** The protective stock for ICU staff is running low, although the hospital prioritises the supply to us.

Caixin: Is there anything that moved you in particular? Did you cry?

Peng: I often cried because so many patients could not be admitted to the hospital. They waited in front of the hospital. Some patients even knelt down to beg me to accept him into the hospital. But there was nothing I could do since all beds were occupied. I shed tears while I turned them down. I ran out of tears now. I have no other thoughts but to try my best to save more lives.

The most regretful thing to me was a pregnant woman from Huanggang. **She was in very serious condition. Nearly 200,000 yuan (\$39,505) was spent after more than a week in the ICU.** She was from the countryside, and the **money for hospitalisation was borrowed from her relatives and friends.** Her condition was **improving** after the use of Ecmo, and she was likely to survive. **But her husband decided to give up. He cried for his decision. I wept too because I felt there was hope for her to be saved. The woman died after we gave up. And**

exactly the next day, the government announced a new policy that offers free treatment for all coronavirus-infected patients. I feel so sorry for that pregnant woman.

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- > The deputy director of our department told me one thing, and he cried too. Wuhan 7th Hospital is in a partnership with our hospital, South Central Hospital. The deputy director went there to help in their ICU. He found that two-thirds of the medical staff in the ICU were already infected. Doctors there

were running "naked" as they knew they were set to be infected given the shortage of protective gear. They still worked there nonetheless. That was why ICU medical staff were almost all sickened. It is too tough for our doctors and nurses.

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