

# Long-term effects of Covid-19 infection being studied here

Effort helmed by NCID will monitor some 500 patients for up to two years

Clara Chong

More than 500 Covid-19 patients here who have recovered are part of an ongoing study to monitor the long-term effects of infection.

The effort, which will continue for up to two years, is helmed by the National Centre for Infectious Diseases (NCID).

Numerous studies worldwide have found that the disease can wreak havoc on almost every organ, including the kidneys, liver, heart and brain. Patients have died not only from lung failure, but also from kidney failure, blood clots, liver abnormalities and neurological manifestations.

In Singapore, for example, a 41-year-old Covid-19 patient died of a massive pulmonary thromboembolism – when a blood clot gets lodged in the lungs, more than two weeks after he was discharged.

But most patients here do not suffer the long-term complications seen overseas, as many are young and do not develop severe infections, said Associate Professor David Lye, a senior consultant and director of the Infectious Disease Research and Training Office in NCID. He noted that a small number of them do suffer persistent lung issues and were referred to lung specialists. The death rate in Singapore from the virus is also among the world's lowest.

Agreeing, Associate Professor Sophia Archuleta, head and senior consultant of the division of infectious diseases at the National University Hospital, said that the recovery process has been predictable for the vast majority of patients here.

"It is unlikely that a year from now, someone will have a complication that wasn't on our radar earlier."

Doctors and scientists say, however, that the disease needs to be studied further.

"This is still a very new disease with only around six months of history, more research is needed," Prof Archuleta stressed.

This is where the NCID's study plays a crucial role.

For one, doctors are keen to find out if there is a link between Covid-19 and heart inflammation, amid mounting evidence that while the virus initially affects the airways and lungs, the inflammatory response of the body can affect the heart too.

Professor Tan Huay Cheem, a senior consultant and director at the National University Heart Centre, Singapore, explained that troponin, a blood cardiac marker, is found at elevated levels in up to 30 per cent of Covid-19 patients, a sign of heart injury possibly from heart inflammation or myocarditis.

Patients with myocarditis can go on to develop permanent enlargement and weakening of the heart, a result of a persistently overactive immune system, he said.

Explaining that the heart damage is caused by an immune response due to the infection rather than an



Lab technicians testing for respiratory pathogens at the National Public Health laboratory at the National Centre for Infectious Diseases. NCID's study on the long-term effects of Covid-19 is part of a broader effort which began in 2012 and aims to put novel pathogens under the microscope. ST PHOTO: DESMOND FOO

attack by the virus itself, Harvard Medical School cardiologist Michael Gibson said: "To date, no virus particles have been found inside the heart muscle cells, although there have been numerous inflammatory cells seen surrounding the heart muscle cells."

NCID's latest study is part of a broader effort called Protect – A Multi-centred Prospective Study To Detect Novel Pathogens And Characterise Emerging Infections, which began in 2012 and aims to put novel pathogens under the microscope.

Under the scheme, information and biological samples are collected from all public hospitals here. NCID collaborates with public hospitals, Duke-NUS Medical School, the Agency for Science, Technology and Research, and DSO National Laboratories – Singapore's defence research and development organisation.

Hospitals abroad are also tracking their patients. For instance, Johns Hopkins Hospital in the United States has a clinic exclusively dedicated to following up on Covid-19 patients from the intensive care unit or medical ward, and has seen more than 125 patients so far.

For most mildly symptomatic patients, they tend to experience fever, cough and fatigue. Some might have shortness of breath, muscle and joint pain and loss of smell and taste.

For those hit hard by the virus, however, the story is different.

For patients with severe symptoms and have to be placed under in-

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tensive care or need a ventilator to breathe, the side effects can come not just from the body's reaction to the virus, but also from being bed-bound for long periods.

Some, for instance, might suffer blood clots and might need blood thinners for several months. It is hypothesised that the virus enters the blood vessel lining, causing inflammation which results in clots.

Dr Dale Needham, a critical care physician at Johns Hopkins School of Medicine and a leader in the field of intensive care recovery, told *The Straits Times* that prolonged muscle weakness, lasting for months or longer, is not just limited to the limbs, but also extends to breathing muscles, since Covid-19 is a respiratory illness that attacks the lungs.

Post-Covid-19 care is needed not just for the body, but also for the mind.

Recovered patients can experience psychological effects ranging from mild adjustment to severe depression and anxiety disorders, said Dr Michael Yong, group chief in Psychological Medicine at the National University Health System.

"The causes range from the trauma of having the illness to being isolated from others; lack of contact with friends and family for some people like foreign workers; worries about finances and employment; to the guilt of being infected," said Dr Yong, who is also the head of the Department of Psychiatry at Ng Teng Fong General Hospital.

## Nerve, organ damage among health woes after recovery

As seriously ill Covid-19 patients leave hospitals and intensive care wards, some face new challenges in recovery. These include:

- Severe damage or inflammation of organs such as the lungs, heart, kidneys and liver.
- Signs of kidney problems, including high levels of protein in the urine. The kidney damage is sometimes severe enough to require dialysis. It is not clear exactly how Covid-19 damages the kidneys, but it could be because the virus targets kidney cells, or too little oxygen reaches the kidneys.
- Increased levels of liver enzymes that indicate at least temporary damage to the liver.
- Nerve damage or weakness, as well as neurological problems such as confusion and mental foginess.
- For those who needed machine support for breathing, most would need a period of rehabilitation and would require continued monitoring for residual lung damage, said Dr See Kay Choong, head of respiratory and critical care medicine at the National University Hospital.
- For patients who were put on ventilators or used breathing tubes, such equipment could cause them to have initial problems with swallowing, eating and speaking. These should improve over time, though they would often have to be given soft foods first.
- Those who were bed-bound for months might develop muscle weakness and might have lost much weight, making it difficult for them to move around. They might require walking aids and would need physiotherapy to build their strength and stamina.

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