

# 100 days target to develop rapid test in an epidemic

## S'pore research programme also aims to quickly learn about pathogen's transmission

Lee Li Ying

The national research programme to tackle future infectious disease outbreaks has set itself the target of one month to understand how a dangerous pathogen is transmitted, and 100 days to develop a rapid test for it.

The Programme for Research in Epidemic Preparedness and Response, or Prepare, was announced in December 2020 during the launch of Singapore's \$25 billion plan to drive

research, innovation and enterprise in the Republic.

Professor Wang Linfa from Duke-NUS Medical School, who leads the programme, stated the targets on the sidelines of the official launch of Prepare on Thursday.

To combat disease outbreaks the next time a novel pathogen causes a serious international epidemic – a threat called Disease X – Prof Wang said Singapore needs the right infrastructure so data can be collected and provided quickly to the authorities to

make science-guided decisions.

Such data can guide recommendations on not just mask policy, but also what kind of detergent or ventilation to use.

He cited the debate at the start of the Covid-19 outbreak in January 2020 around mask-wearing as an example of how a gap in research had made it difficult for decisions to be made.

"Scientists, politicians and policymakers were debating about whether we need a mask or no mask. This was difficult because we didn't have the infrastructure set up to do this type of research when a new virus comes in – (to find out) whether it's airborne, via aerosol transmission or via droplets; or how long a virus will last in a bus or

MRT," said Prof Wang, who is also a zoonotic diseases expert.

One key component in the battle plan is to attract different parties to Singapore, including vaccine and diagnostic companies.

"Many of the biotech companies are looking to move their manufacturing to Singapore," said Prof Wang. "This is a very, very important part. We need to work with them during peacetime so we can deliver the 100-day target for a rapid test for whatever Disease X is."

Professor Tan Chorh Chuan, who co-chairs the Prepare steering committee, said effective solutions are needed in a "very short time". "We need therapeutic, diagnostic

tests, vaccines, and we need them very fast. The research community in Singapore has actually contributed very significantly to our Covid-19 response," said Prof Tan, who is chief health scientist at the Ministry of Health.

"But we are now bringing them all together under Prepare in order for us to organise ourselves to further speed up the ability to make sense of new threats and to help us develop solutions to future pandemics."

During a panel discussion at the launch event, Prof Wang noted that issues like the legal framework for research also need to be sorted out.

He said it took three days to get permission to isolate and sequence the Covid-19 virus after the disease first landed on Singapore's shores on Jan 23, 2020. "We cannot use peacetime ways to do research during (war-time)," said Prof Wang.

Commenting on that, Prof Tan said one gap Singapore would have to plug would be around the use of data.

"We need to strike a balance between speed of research response with protection of data confidentiality, and this is actually best done outside of (a) pandemic. That's one area that Prepare will be focusing on to help us

with... data access rules and protections during a pandemic," said Prof Tan, who added that another area to be looked into is the approval process for handling infectious materials in biosafety level 3 laboratories.

None of the eight biosafety level 3 labs in Singapore are equipped to handle dangerous pathogens in such a way that potential treatments and containment strategies can be tested, and vaccines developed.

DSO National Laboratories will open Singapore's first biosafety level 4 lab by 2025, which would boost local capabilities in dealing with the deadliest diseases.

The National Centre for Infectious Diseases said Prepare hopes to glean early insights from regional partners before an epidemic reaches the region. To build such capabilities, it will strengthen relationships with regional research and clinical partners.

To that end, the programme has supported the training of eight epidemiologists from countries like Malaysia, Indonesia and Vietnam at a workshop held at the Lee Kong Chian School of Medicine in mid-October.

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# Scientists lauded for contributions in Singapore's Covid-19 fight

Lucas Tan

Scientists and researchers played critical roles not just in treating patients amid the Covid-19 outbreak but also in determining policies.

Speaking at the launch of the Programme for Research in Epidemic Preparedness and Response (Prepare), which will pull together pandemic experts from various fields to respond to future infectious disease outbreaks, Minister of Health Ong Ye Kung reflected on the role of research and science.

"Our years of investment in biomedical research, and our cumulation of experts across diverse fields, have paid off during the Covid-19 pandemic crisis. Without that reservoir of capabilities and talent that was built up over the years, we would not have been able to respond to the pandemic as effectively as we have," he said.

He added that the Covid-19 experience has enhanced Singapore's preparedness against disease outbreaks, with Prepare being a spearhead of future initiatives.

At the event on Thursday, Mr Ong praised the achievements of scientists including Professor Wang Linfa from Duke-NUS Medical School. The world-renowned coronavirus expert and his team isolated the Sars-CoV-2 virus within days of the first Covid-19 case.

Mr Ong said Prof Wang, who leads Prepare, laid the foundation for subsequent Covid-19 research, and provided insights to help the Ministry of Health formulate policies. He also led a team of scientists from the National Centre for Infectious Diseases (NCID), Agency for Science, Technology and Research (A\*Star) and global biotech company GenScript to develop the first Sars-CoV-2 serology test, cPass. The portable test can test for antibodies, indicating the pres-



(From left) Professor Wang Linfa, who will lead the Programme for Research in Epidemic Preparedness and Response (Prepare), Health Minister Ong Ye Kung and Professor Tan Chorh Chuan, co-chair of the steering committee of Prepare, at the launch of the programme on Thursday. ST PHOTO: ALPHONSUS CHERN

ence of the virus, without needing special containment facilities.

Several other scientists were commended.

Dr Sidney Yee, from the Diagnostics Development Hub; Dr Masafumi Inoue, from the Experimental Drug Development Centre at A\*Star; Dr Sebastian Maurer-Stroh from A\*Star's Bioinformatics Institute; Dr Timothy Barkham, from Tan Tock Seng Hospital; and Ms

Wong Woei Jiuang and Dr Rama Sethuraman, from the Health Sciences Authority, invented one of the world's first Covid-19 diagnostics tests, Fortitude Kit, in February 2020. To date, more than seven million kits have been produced and shipped to over 45 countries.

Professor Lim Keng Hui, Professor Loh Xian Jun, Dr Kang Chang Wei and Dr Ivan Tan from A\*Star used modelling techniques to understand flight trajectories of droplets spread, aiding public sector agencies and event providers in adopting effective safe management measures.

Professor Alex Cook from the Saw Swee Hock School of Public Health, an expert in infectious disease modelling, worked with MOH to provide projections of Covid-19 disease trajectory. His work was critical in determining the adequacy of healthcare capacity here.

Also lauded were researchers from the National Covid-19 Re-

search Workgroup, and Professor David Lye from NCID. Prof Lye actively engaged the United States' National Institutes of Health to include Singapore as a global Covid-19 clinical trials site, allowing the Republic to have early access to therapeutic drugs.

Mr Ong also credited Professor Barnaby Young from NCID and Professor Lisa Ng from A\*Star. Their study analysing Covid-19 viral load levels showed that a few days after a person showed symptoms, the viral load fell to relatively low levels, and the virus was no longer able to replicate.

This finding was critical, said Mr Ong. "It enabled us to move away from the practice of discharging Covid-19 patients upon a negative test result, which can take many days or weeks, to a policy of discharging a patient after a maximum of seven days."

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