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Profile

Yee-Sin Leo: a leader in Singapore's fight against infectious diseases

In January, 2020, Yee-Sin Leo, Executive Director of the National Centre for Infectious Diseases (NCID) in Singapore, and her team followed an unexplained pneumonia outbreak in Wuhan, China, very closely for any evidence of human-to-human transmission. Given population movement in the region, they knew that if they saw that evidence it meant “that Singapore will get hit with COVID-19 cases”, Leo says. So the National Public Health Laboratory at NCID prepared to detect and diagnose cases, drills were done to smooth workflow, and the COVID-19 Research Workgroup was set up. When the first case of COVID-19 was confirmed in Singapore on Jan 23, “all these things were ready” and “we were even able to enrol the first case into our cohort study”, she explains.

Leo has been at the forefront of dealing with other outbreaks of emerging infectious diseases in Singapore. As Head of Infectious Diseases at Tan Tock Seng Hospital's Communicable Disease Centre (CDC, now NCID) from 2002 to 2012, she was the clinical lead for the 2003 outbreak of SARS and the 2009 H1N1 influenza pandemic, establishing the clinical management for the diseases. “The SARS outbreak of 2003 left a deep impression on Singapore”, she says. But she notes that dealing with both helped the country prepare for future disease outbreaks, especially through the establishment of the new NCID facility, which was built to replace the CDC and strengthen management of infectious diseases. NCID houses clinical services, public health, research, training, and education under one overarching structure. “We were fortunate that NCID was ready just in time for COVID-19. The new infrastructure—building and organisational—has strengthened our ability to isolate, treat, and research into COVID-19”, explains Leo.

Encouragement from her biology teacher led Leo to study medicine; she completed her MBBS and trained in internal medicine at the National University of Singapore (NUS). In 1989, she joined the CDC to train in infectious diseases and was among the first group of physicians to be trained by David Allen. Now Associate Professor of Medicine, Yong Loo Lin School of Medicine, and Associate Vice President, Health Innovation and Translation at NUS, Allen describes Leo as “sensitive to the circumstances that her patients come from. She doesn't treat a disease; she sees and treats a human being”. Leo's training involved a clinical fellowship at UCLA Cedars-Sinai Medical Center, Los Angeles, CA, USA, in 1992–93, when HIV was a major challenge.

On returning to Singapore, she decided to specialise in HIV medicine, despite the difficulties in clinical management then. “There was no effective treatment, we struggled a lot with opportunistic infections”, she recalls. “The worst part was that at that point, there was no subsidy provided for HIV patients in Singapore”, making treatment for opportunistic infections

“extremely expensive”, she explains. Leo set up the first HIV programme in Singapore at CDC in 1995. But her work as head of the programme went beyond medical care; she helped raise money for patients and met with policy makers to explain the importance of treatment. In Singapore today antiretrovirals are accessible and subsidised. “Looking back, it's a very rewarding journey from a very challenging start, we managed to lobby, bring in volunteers, and do a lot of things that are outside the regular work of a clinician”, she says.

Her research career developed after a large dengue epidemic in Singapore in 2004 when data on adult dengue were scarce. Leo and her team realised that most adult patients admitted to the CDC could be effectively managed in the community. They identified predictors of disease severity, developed a risk calculator, and educated care givers about the risk factors for severe disease. “We were very successful in reducing the hospitalisation rate from close to 100% to just barely about 20% in today's practice”, she says. Since then, Leo and colleagues' research on dengue has changed clinical practice beyond Singapore by showing the lack of clinical efficacy of platelet transfusion for adult dengue patients with uncomplicated thrombocytopenia. During an outbreak of chikungunya in 2008, Leo set up her first longitudinal outbreak cohort. Realising the importance of outbreak research, in 2012 she recommended the establishment of a pre-outbreak research protocol, PROTECT. It was used to recruit the first case of Zika virus disease in Singapore in 2016 and to establish the COVID-19 cohort last year. Leo became Director of the Institute of Infectious Disease and Epidemiology in 2013, before being appointed as NCID's Executive Director in 2017. Annelise Wilder-Smith, Professor of Emerging Infectious Diseases at the London School of Hygiene & Tropical Medicine, UK, worked with Leo during several disease outbreaks in Singapore. “Leo was the right person at the right time, be it during the HIV epidemic, the SARS outbreak in 2003, the increasing dengue problem, or the current COVID-19 public health emergency: she always rose to the challenge. She balanced the competing needs of public health, clinical care, and outbreak research, took the lead with a steadfast hand, and inspired many through her perseverance and vision”, says Wilder-Smith.

As for the future, Leo is not complacent about the threat of COVID-19. “Singapore cannot overcome COVID-19 alone. We will have to play our part as a global citizen. Recognising time is of the essence to stay ahead of the curve and that COVID-19 is likely to stay, urgency remains to better understand how we can better mitigate the impact and reduce the damage caused by COVID-19 all round”, she says.

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