INFECTIOUS
Disease Intelligence

Preparedness, Prevention, Control

Strengthening Singapore's Preparedness and Resilience

De-Securitising Global Health Security?

Public Health Communications During an Infectious Disease Emergency

⊕ PLUS

An Internship
in Infectious Disease Intelligence

Multisectoral Training
in Urban Epidemiologic Response

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Editor's Note

Our theme for the cover story is
"Preparedness, Prevention, Control"
– terms which describe actions taken
to protect public health in the event of
any public health emergencies, such
as disease outbreaks or pandemics.
Emergency response activities include
strengthening surveillance and early
detection systems, providing rapid
risk assessment and management,
investigating and monitoring threats
in the environment, training public
health personnel, and developing
effective communications. These
actions are intended to mitigate the
effects of health emergencies and to
minimise the risk of disease spread.

In anticipation of the setting up of a
new Communicable Diseases Agency
in Singapore, three lead articles for our
Cover Story bring to light some interesting
perspectives by eminent authors on our
health emergencies response. There are
trade-offs in public health decision
making and we must balance social,
economic and security concerns.
It is also important to have a well-
functioning public health system in
place that is able to quickly identify
and adapt to changing events.

Our April issue has grown to 28 pages.
We have staff contributions which
include a sharing about an overseas
deployment, a report on the PREPARE
research agenda, and a write up on
increasing awareness about the silent
pandemic of antimicrobial resistance. We
have also curated contributions by two
interns from our Junior Field Epidemiology
Training Programme on their experiences
in infectious disease intelligence.

Thank you for the many articles we have
received. Working with the Infectious
Disease Research and Training Office
at NCID, *Infectious Disease Intelligence*
is now available to general audiences,
including community youth groups,
secondary school and junior college
students, as well as those pursuing
careers in medicine, public health and
the biomedical sciences. Cheers!

Steven

Strengthening Singapore's Preparedness and Resilience

By **Dr Marc Ho**, Director, Contact Tracing and Epidemiology Centre, Ministry of Health

The COVID-19 pandemic has revealed many insights about the world today and lessons on how it could have been better prepared for health emergencies.

In his speech on 21 March 2023 during the parliamentary debate on the white paper on Singapore's Response to COVID-19, Minister for Health, Mr Ong Ye Kung announced that the Ministry of Health (MOH) will set up a new Communicable Diseases Agency (CDA). This new agency under MOH will oversee disease preparedness, prevention and control, surveillance, risk assessment and outbreak response. It will consolidate the relevant public health functions that currently reside in MOH, the National Centre for Infectious Diseases (NCID) and Health Promotion Board. In addition, the National Public Health Laboratory under NCID will be transferred to the CDA.

The CDA will maintain oversight of the clinical facilities in NCID.

The virus was first detected in the city of Wuhan, China, before subsequently spreading to other countries. The latter was primarily through points of entry at major cities, spreading rapidly within these urban areas, and then seeding other parts of the country. In July 2020, the United Nations Secretary-General called urban areas 'ground zero', representing 90 per cent of reported cases.[1]

The crisis has revealed globalisation and urbanisation writ large. Cities and urban areas are densely populated with highly mobile populations. As trade and travel hubs, they hold more migrants and tend to be more heterogeneous in composition. Some have communities that are also more vulnerable, such as people living in crowded slums and informal settlements where hygiene remains subpar. At the same time, cities hold opportunities for disease prevention, detection and control. Their local authorities have a rich knowledge of the ground and often a wealth of untapped data and information. They are also centres of commerce, innovation, and have tertiary healthcare and public health services that also support surrounding regions.

As a city state, we now have a lived experience of this. We saw early outbreaks at migrant dormitories and implemented a "circuit breaker". [2] Despite cautiously relaxing measures in August 2021, cases rose quickly, leading to the large Delta variant wave. Thereafter, the speed of local introduction of the Omicron variant and its subsequent derivatives by travellers in 2022 highlighted how connected we

have become to the world, in part no surprise given Singapore's status as a renowned hub.[3] Once in mitigation, a good part of our vaccine differentiated safe management measures centered around protecting unvaccinated persons from crowded public places where they had a higher risk of being infected. Finally, public transport, with volumes rising closer to pre-pandemic levels, remained one of last settings where face masks were still required.[4]

An urbanised world requires a contextually appropriate approach. To address this, Singapore and the World Health Organization held a series of technical working group meetings in 2021 on "Advancing health emergency preparedness in cities and urban settings in COVID-19 and beyond".[5] This brought together member states (including city representatives), partners and international organisations; and culminated in the publication of a framework and guidance for national and local authorities, and a resolution at the World Health Assembly in May 2022.[6,7,8]

What would a prepared city look like? It would have governance and financing frameworks that facilitate local preparedness and response mechanisms. It demands coordination across levels of government from national policymakers to local authorities. It taps on the strengths of multiple sectors, including communities and their leaders, clearly communicating risks and empowering its people. It identifies and protects vulnerable groups at risk of poorer outcomes. It uses evidence, data and information to guide

public health policy. It works with commerce and industry partners to develop local solutions; and organises its health and essential services in an equitable and resilient manner.

The relative success of Singapore through this pandemic reflects some of these elements in action. Admittedly helped by having a flat governance structure, the Homefront Crisis Executive Group and Multi-Ministry Taskforce were stood up to coordinate actions across government agencies and community partners.[9] Public education campaigns encouraged people to take steps to protect themselves and others, including the simplified "Protocols 1-2-3" for the testing and isolation or quarantine of COVID-19 cases and close contacts.[10] An Assurance, Care and Engagement (ACE) Group was created under the Ministry of Manpower to address the needs of migrant workers living in dormitories.[11] Hotels and other businesses leaned in to help house and provide for travellers and close contacts under quarantine and cases requiring isolation.[12] As case ascertainment fell, disease surveillance systems were set up to monitor the force of infection and circulating variants, including collaborations between the Ministry of Health and the National Environment Agency on the testing and sequencing of wastewater samples for COVID-19.[13]

Nevertheless, Singapore is not perfect, and we need to build on the experiences and lessons learnt over the past three years to be better prepared for the next outbreak. As a case in point, even during our multiple COVID-19 waves in 2022, the global outbreak of mpox made its appearance in Singapore too.[14] The next epidemic is thus not a matter of if, but when. As a highly urbanised country, we need to invest in maintaining the public health and clinical capabilities in surveillance and data analytics that have allowed us to be nimble in our policies and in managing surges in healthcare demand. We should regularly review our multisectoral preparedness plans and stress-test them to avoid scrambling in a crisis. We must build strong technical links with global and regional counterparts, especially with countries and cities with higher connectivity to us.

Singapore is now more "resilient" to COVID-19. We need to translate this into becoming a resilient health system, population, city and country in the midst of an increasingly globalised and urbanised world.

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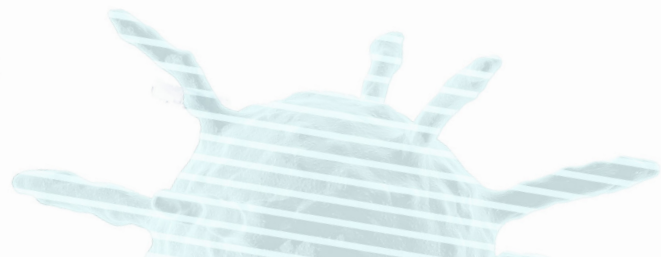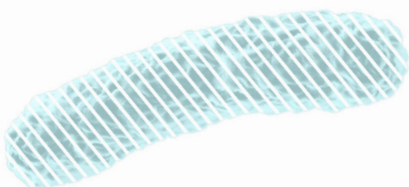
De-Securitising Global Health Security?

By **Asst Prof Khor Swee Kheng**, Saw Swee Hock School of Public Health, National University of Singapore, and Associate Fellow, Chatham House, UK, and **Prof Dale Fisher**, Senior Consultant and Group Chief of Medicine, National University Health System, and Immediate Past Chair of World Health Organization (WHO) Global Outbreak and Response Network (GOARN) Steering Committee

"Health security" is defined by the World Health Organization in terms of "the activities required, both proactive and reactive, to minimise the danger and impact of acute public health events that endanger people's health across geographical regions and international boundaries".[1] These public health events usually involve infectious diseases (ID) and are fast-moving in nature, rather than the slower moving threats of increasing rates of diabetes, obesity or dementia. Therefore, this article will consider health security only in terms of acute infectious diseases with outbreak potential.

Securitised, or Over-Securitised?

In practice, ID health security can often be securitised (or over-securitised) by health and non-health agencies, leading to unintended consequences to public health. The COVID-19 pandemic showed that lockdowns, border closures and movement restrictions are often decided and enforced by domestic security agencies, like Ministries of Home Affairs or Civil Affairs or National Security Councils, or their equivalents. For example, the primacy of security agencies was seen in Australia, China, Japan and Malaysia and indeed most countries to varying degrees.

Science is often used to explain these lockdown decisions, but science may also be used to justify these decisions. Many such decisions were not recommended by the science but were simply felt as more implementable than community engagement, case isolation, identification and quarantining of contacts and other conventional components of an outbreak response. Domestic security agencies such as police and civil defence have security enforcement as their raison d'être, with uniforms, training, resourcing and legislative powers enabling their activities. And clearly, security professionals have a different relationship with the community compared to health professionals.

The military may also be involved in securitising health, and there are sometimes dramatic links between disease and national security. In 1999, a United States National Intelligence Estimate described a scenario in which an unchecked HIV pandemic causes "catastrophic social and political collapse in affected countries, causing armies to become unmanageable and exacerbates armed conflict".[2,3] In 2002, a follow-up Intelligence Community Assessment described the implications of human immunodeficiency virus (HIV)/acquired immune deficiency (AIDS) in Nigeria, Ethiopia, Russia, India and China to the United States.[4] Such a hard position on infectious diseases may cause political, military and security leaders to be overly-aggressive in deploying traditional security measures against infectious diseases, when infectious diseases should be managed more through science, public health and community engagement principles. (NB: bioterrorism is a separate issue that is a clearer security threat compared to IDs).

The history of pandemic responses illustrates overly-securitisation. For example, the International Sanitary Conferences (ISC) took place 14 times between 1851 to 1938, but only twice outside Europe (Istanbul and Washington DC).[5] ISCs, which evolved into what we now know as the International Health Regulations , focused on four diseases: cholera, plaque, smallpox, yellow fever. These diseases were perceived to be from non-European countries and therefore led to blockades, quarantines and border closures to non-Europeans. Today, the securitisation of health may see immigrants, migrants or refugees as "The Other", who are perceived to bring in infections that threaten local citizens.[6,7] "Fear of the foreigner" almost always involves a security response.

The securitisation of health security is not a set of conscious and deliberate choices, but usually a "path of least resistance". The need for such securitisation is largely related to government perception of community engagement. In many countries (notably in East Asia), there was a greater sense of community responsibility during the pandemic. Mask ambassadors and peer pressure were often enough to encourage adoption of non-pharmaceutical interventions. In other countries, relatively much more aggressive household confinements and other community interventions were seen as needed, with enforcement via traditional security agencies which have more political capital and capacity to ensure compliance.

The Pros and Cons of Securitising Health Security

Security agencies have a different mandate to health agencies. With that comes varying relationships with different parts of the community who may begrudge their involvement in enforcing health security or may even welcome it on the grounds of a lack of belief in their fellow community members.

Security agencies are often the most effective responders to any emergency, and are often the go-to agency for emergencies (like the military during natural disasters).[8] Putting health security on the national security agenda almost guarantees that health security will be prioritised and resourced. Many citizens and civil societies support health security agencies being utilised to protect human health, even if they disagree with other repressive measures against civic freedoms in the name of security.

Counterarguments to securitising health security include the reality that to some degree health professionals and health agencies are ceding control and decision-making privileges to the security agencies. And it is dangerous when security agencies treat health problems as purely or mainly security problems. We can see this danger when examining how the illicit drug use is treated as a legal or security problem where solutions are imprisonment and punishment, rather than rehabilitation and re-integration into society. In the United States, 45% of all federal prisoners are in prison for drug offences (the second highest category is 22% for weapons offences for a country with the most civilian-owned guns in the world),[9] indicating that "if all security agencies have is a hammer, every problem looks like a nail".

Securitising health security can also diminish trust between health professionals and their patients. We are aware of no studies on this, but it is reasonable to argue that more civilians trust their doctors than trust their police officers, worldwide. Trust in the patient-doctor relationship may be eroded if public health decisions are perceived to be made and implemented by security agencies (and not health agencies). That erosion of trust may be amplified if science and doctors are used to justify security decisions, either in reality or in perception. As a
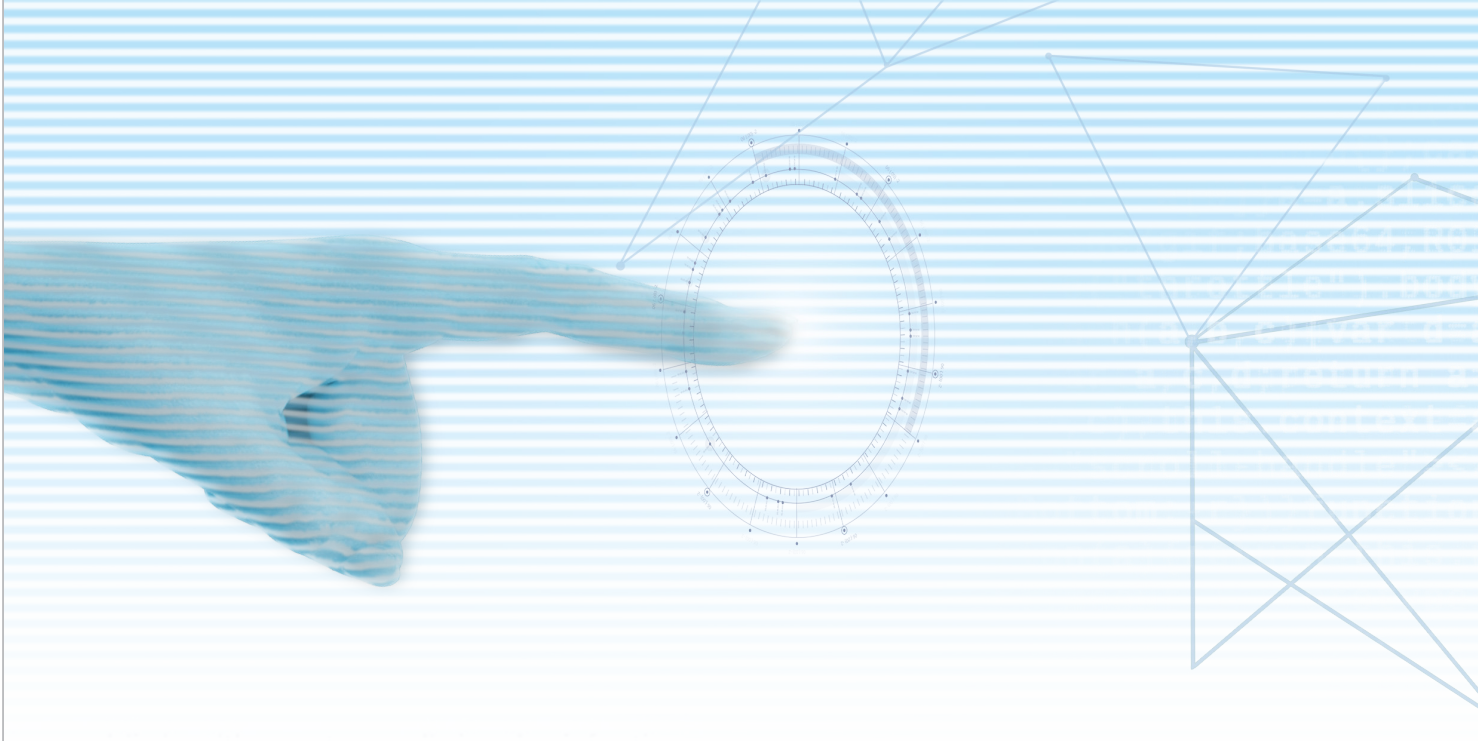
side note, 112 countries declared emergencies for COVID-19, according to the International Centre for Non-for-Profit Law.[10] A separate article is needed to explore if these emergencies were genuinely needed to respond to COVID-19 and what were the implications and health, social and economic outcomes of the emergency declarations.

There is also a reckoning in the wake of a period of securitised health security during COVID-19 as it is not sustainable. Once the health threat recedes, policy attention and specific resourcing may also return to that of prior to the event. Health agencies and health professionals need to reclaim the dialogue and any lost relationships. Health professionals supporting ongoing measures may have little voice as the ramped up systems and visible security implementers are withdrawn and return to their business as usual.

Finally, securitising health security has an impact on trust. Most aspects of a response to a major ID outbreak can be surged, like case management, laboratory support and even risk communications and community engagement (RCCE). However, trust in authorities cannot be surged as easily. Indeed, the nature of the pre-existing relationship will be amplified, either for good or for bad. A government or health system that is not trusted by the community is much more vulnerable in terms of support for any community based measures. This will likely see greater noncompliance, and with that a failing health response with potential unrest and possible violence. Uncontrolled misinformation, an inadequate RCCE strategy and inadequate financial support to those most economically affected will exacerbate any pre-existing government mistrust and arguably create a greater need to securitise (or even militarise) the response. The corollary is that a trusted authority that remains well connected in engaging and supporting the community will be more able to draw on "unsecuritised" community-led support during the outbreak.

How to De-Securitise Health Security

The shared intentions of health security are to protect human beings from infectious diseases and public health threats. This does require a security approach in some ways, but not in all ways or even in most ways. Therefore, the guiding principle of how to de-securitise health security is to appropriately securitise it, while making space for non-security elements of health security.

Countries must provide enough political capital for the health agencies so that they have the resources, confidence and stature to work alongside security agencies as equal counterparts. Sometimes this is done through public administration (like re-organising agencies, councils or ministries or giving more stature to health agencies in inter-agency task forces). At other times, this is achieved by sending a senior political leader to the Health Ministry (not the Home Affairs Ministry). Countries that from the beginning restructure their leadership and coordination of a response as a "whole of government" approach will most likely succeed in this aspect.

In the longer term, countries must prioritise Universal Health Coverage, specifically focusing on sustainable governance, systems and financing. A health system that enables citizens to access healthcare without physical, financial or time barriers will do more for health security than enforcement by security agencies.

Countries must also prioritise improving the social determinants of health, specifically living and working conditions for their residents. Migrant health became important in many Asian and middle Eastern countries during COVID-19, as transmission could not be prevented in crowded and sometimes poorly-ventilated dormitories. Countries like Canada, Denmark, France and Singapore had to quickly improve living conditions

for their migrant workers, and this helped citizens and migrants more than imprisoning or deporting them. [11] Reasonable, safe and secure working conditions (like enough paid sick leave and social protections), and culturally appropriate engagement would help ensure that aggressive enforcement is far less likely to be needed.

The importance of primary care is a lesson from the pandemic both in ensuring as healthy a population as possible prior to an event and in enabling an appropriate acute response and appropriate support for a congested hospital system. Health literacy, health-seeking behaviour and health-promoting behaviour can be emphasised via primary care and other non-hospital parts of the health system. Building such health literacy is difficult and long-term, but a positive approach to health will see improved outcomes over fear and coercion of disease, morbidity and death.

Conclusion

This article has discussed the elements surrounding the implementation of health security in ID outbreak or pandemic. Over-securitisation of health security is a risk and should be seen as a last resort. Health professionals must elevate their own significance in public health decision making and implementation as well, by appropriately mobilising for better population health and by appropriately demanding for seats at the security and economic decision-making tables. In short, there are effective ways to achieve health security, without securitising it.

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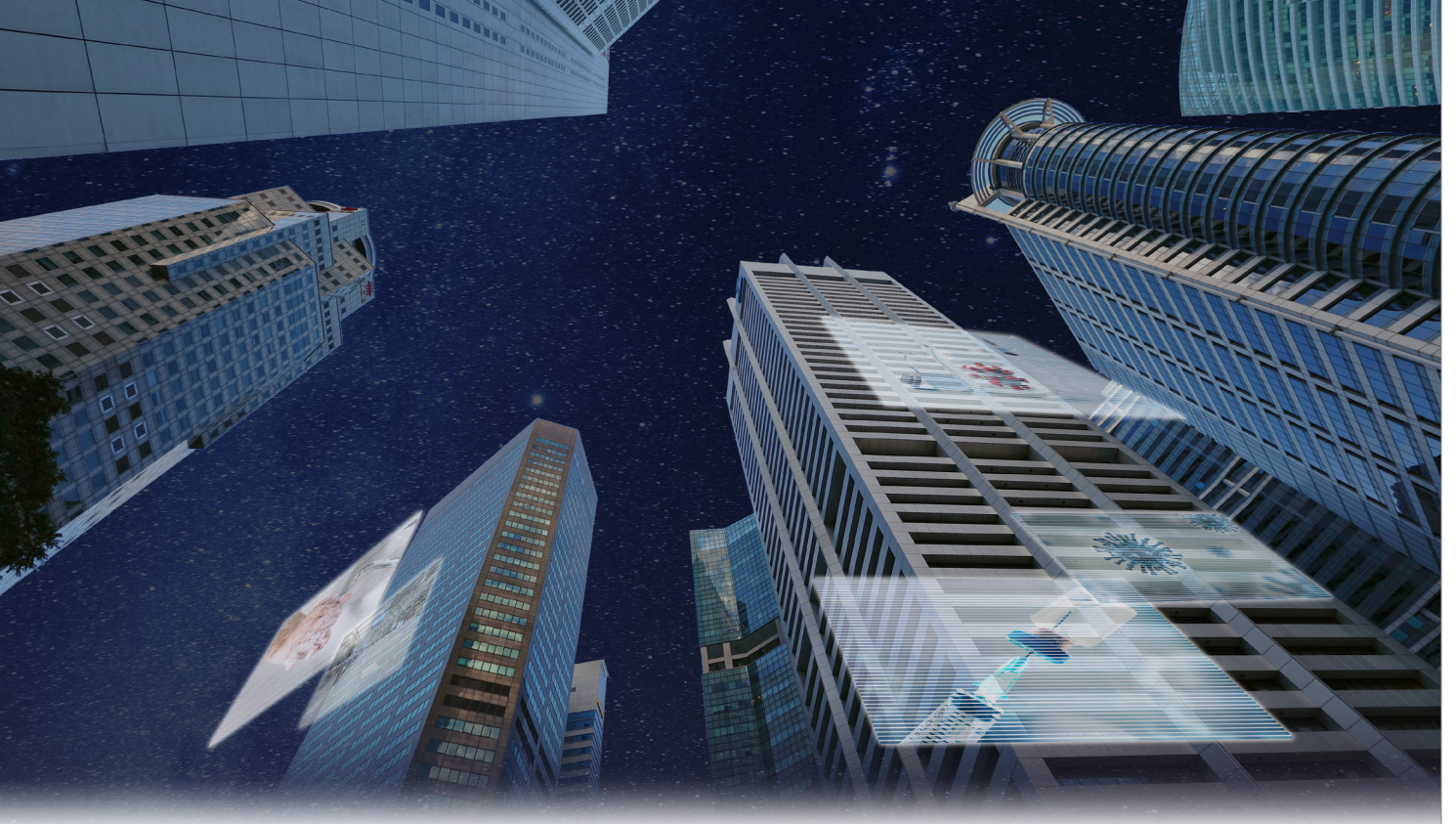
Public Health Communications During an Infectious Disease Emergency

By **Asst Prof Voo Teck Chuan**, Centre for Biomedical Ethics, Yong Loo Lin School of Medicine, National University of Singapore

Communications about risks and recommended measures to manage these risks (henceforth "public health communications") is a critical component of public health response to an infectious disease emergency.

Good public health communications can promote public trust and assist individuals in mitigating risks and to voluntarily comply with public health measures. It is also critical for combating misinformation, which can cause confusion and ill-considered risk-taking behaviours against health.

Public health communications by some governments or health authorities during the COVID-19 pandemic has, however, been criticized for being "untruthful and inconsistent"; at times, they appeared to hype up scientific evidence and consensus to justify public health measures (Oxman et al., 2022). A common ethical advice is that governments and health authorities should be transparent in how they inform and engage the public during an emergency. The World Health Organization Guideline for Emergency Risk Communication Policy and Practice (2017) recommends that communications by health authorities to the public should, as a matter of transparency and trust-building, openly acknowledge "uncertainties associated with risks, events and interventions" (p. 13) and that recommendations might change as new evidence emerges. Unfettered transparency about rapidly changing evidence and uncertainties might, however, lead segments of the public to regard changes in implemented measures as based on 'flawed science' and erode confidence in science as a foundation of rational response to an outbreak involving a novel pathogen (Lowe et al., 2022).

Transparency requires that "the process by which decisions are made must be open to scrutiny, and the basis upon which decisions are made should be publicly accessible" (Smith and Upshur, 2019). Transparency should therefore be 'reasoned': health authorities should offer explicit reasons for their actions, which go beyond "the facts and evidence they base decisions on" (Wiig et al., 2018). Public

health measures – defined here as interventions that seek to influence or modify people's behaviours or their environments to reduce the risk of disease and related harm to themselves or others – are inherently value-based. What this means is that public health measures are undergirded by ethical values and principles. During an emergency, ethical principles may be subsumed, implicitly and obscure to the public, into the broad narrative of protecting public health. Good public health communications should include explicit acknowledgement of ethical values and principles so that relevant experts and members of the public can assess whether there are adequate justifications for recommended or mandated interventions, in view of scientific uncertainty and other considerations.

Consider the case of masking advice during the early months of the COVID-19 pandemic. Universal face mask use by the public (unless one was unwell) was actively discouraged by health authorities in countries such as US, Canada and Singapore from February to March 2020 (Lowe et al., 2022; Zhang et al., 2021). This was because of uncertainty on airborne transmission of SARS-CoV-2, although there was emerging evidence on the possibility of such transmission (including by asymptomatic individuals) which lent support for universal masking to prevent infection and control spread. Besides the uncertain science, other reasons such as resource scarcity influenced such a position; policymakers were concerned that any endorsement of masking in community settings would induce public panic buying of medical grade masks and respirators, and undermine the conservation of this resource, then in shortage, for use by healthcare workers. Due to increasing evidence on airborne transmission and on the benefits of face masks in reducing transmission, and the rising rate of community transmission, the dissuasion of the

general public from masking in these countries were reversed in April 2020. The policy change was perceived by many people to be inconsistent or contradictory, and undermined trust in health authorities in subsequent phases of the pandemic (Lowe et al., 2022; Zhang et al., 2021).

Communications about the basis for the change in masking advice could be enhanced by promoting public understanding of ethical principles for managing public health risks. The Precautionary Principle (PP) states that when significant risks to individuals and communities arise, but uncertainty about the risk remains, prudent steps should be taken to mitigate risks, even as the evidence evolves (Lowe et al., 2022). PP urges taking protective actions but does not, in itself, consider issues as acceptability and feasibility; shortage in medical grade masks, as mentioned, was a reason why policymakers discouraged universal masking. A key turning point for the policy change (Zhang et al., 2021) is that the US CDC and subsequently other health authorities started to support use of reusable face masks made from readily available materials (e.g., cloth) by the public despite lack of evidence on their effectiveness, to address concerns about the depletion of medical grade masks for use in healthcare settings. This approach – as well as supporting reuse of N95 respirators (tested and approved for single-use only) by healthcare workers– is justifiable by the principle of harm reduction (HR), which focuses on providing less risky or safer options when the safest option is not feasible (Lowe et al., 2022). Arguably, PP and HR could impel earlier policy consideration of universal masking if these principles, as reasons for public health advice or mandates, were open for scrutiny by all relevant stakeholders, including the public.

The COVID-19 pandemic illustrates the challenges of public health communications under conditions of uncertainty and issues such as resource scarcity. Transparency remains a central value, but optimizing transparency requires explicit recognition of ethical principles to guide good risk communication strategies.

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Dr Darius Beh and Dr Margaret Soon, with representatives from the International Organization for Migration (IOM) and United Nations Children's Fund

A Personal Recount of an **Overseas Mission** to Share Public Health and Infectious Disease Expertise

By **Dr Darius Beh**, Associate Consultant, and
Dr Margaret Soon, Director of Nursing, National Centre for Infectious Diseases

The COVID-19 pandemic has highlighted the importance of international partnership and collaboration in responding to health emergencies. In November 2020, the National Centre for Infectious Diseases became a partner of the World Health Organization's (WHO) Global Outbreak and Response Network (GOARN) to support public health emergency response on a global platform.

In response to the request for assistance through GOARN, we were deployed to the Republic of Marshall Islands (RMI) and the Federated States of Micronesia (FSM) from 20 September to 17 October 2022. These are relatively secluded islands in the Pacific Ocean, and as a result of extended border closures through most part of the pandemic, RMI and FSM managed to remain free of COVID-19. Facing their first outbreak of COVID-19 and with a sharp rise in cases due to widespread community transmission, they requested for assistance to support their COVID-19 response.

We were grateful to have the support from NCID's leadership when we were selected for this month-long field deployment. During this deployment, we worked closely with government officials, hospital management and healthcare professionals. Our work consisted of reviewing workflows, providing infection prevention and control (IPC) expertise and guidance to strengthen IPC practices in their hospitals and health centres. Some of the tasks carried out included facility IPC assessments, hand hygiene audits, indoor ventilation assessments, an audit of antibiotic use, drafting therapeutic guidelines, and a review of recent mortalities.

Part of the challenge in any outbreak is adapting to an ever-changing situation and dynamic needs on the ground, more so in an unfamiliar environment with limited resources. With the remote support from

Professor Dale Fisher from the National University Health System and who is an experienced deployee and member of the GOARN steering committee for 10 years, we were able to work through some of the challenges we were facing on the ground and glean valuable insights from his past deployments in order to develop effective solutions.

Both RMI and FSM had responded swiftly in their COVID-19 response, thereby altering the trajectory of the outbreak and cushioning the impact to their healthcare resources. Our work during deployment was made more enjoyable with the strong community spirit and teamwork that we have experienced in both countries, and hence, we were able to put forth many recommendations to follow through.

This deployment gave us the opportunity to put to test all that we had learned so far about COVID-19 and widen our experience as healthcare professionals. One of the key takeaways is about going back to the basics and how to implement IPC practices when supplies and resources are limited, especially in an outbreak situation. In order to achieve the mission objectives within the short time, it was important to trust one another and also gain the trust of the local team that we worked with. We learned to overcome our personal fears, stay adaptable and calm in spite of the unexpected challenges and the importance of self-care when we were in a foreign land. We were also fortunate to have the support from the WHO Country Office - Federated States of Micronesia, WHO Regional Office for the Western Pacific, and the GOARN Operational Support Team at WHO Headquarters. Lastly, we will always cherish the moments shared, the lessons learned and the friendships we have made.

Official launch of PREPARE by Prof Wang Linfa, PREPARE Executive Director, Mr Ong Ye Kung, Minister for Health, and Prof Tan Chorh Chuan, Co-Chair of PREPARE Steering Committee

Bringing the Singapore Research Ecosystem Together to **PREPARE for Disease X**

By **Dr Ramona A Gutierrez**, Asst Director, and
Hermi Rizal Bin Sumatoh, Executive, PREPARE Programme Office,
National Centre for Infectious Diseases

The Programme for Research in Epidemic Preparedness and REsponse (PREPARE) was officially launched on 3 November 2022 by Minister for Health Mr Ong Ye Kung, together with PREPARE Executive Director Prof Wang Linfa, and PREPARE Steering Committee Co-chair and Chief Health Scientist Prof Tan Chorh Chuan. The inaugural ceremony was held at the Ministry of Health (MOH) College of Medicine Building Auditorium, and attended by distinguished guests from supporting institutions. In his opening address, Minister Ong stated that PREPARE would be one of the key initiatives to further enhance the nation's preparedness against future infectious disease outbreaks following its experience with the COVID-19 pandemic.

PREPARE aims to make the necessary preparations during periods of normalcy that will enable R&D to proceed rapidly during an epidemic. It strives to develop strong and synergistic partnerships between teams in different disciplines and across sectors. Regionally, PREPARE will strengthen research partnerships, share information and knowledge, and collaborate in clinical trials with various institutions. PREPARE will also be Singapore's connection into international pandemic research forums and platforms, such as the Coalition for Epidemic Preparedness Innovations (CEPI).

PREPARE Deputy Executive Director Prof David Lye presenting a poster on "Preparing for the Next Epidemic" during Minister Ong's walkabout session

Prof Wang commented, "PREPARE as a translational programme will contribute towards the robust growth of Singapore's capability in research and production. It also aims to strengthen our ability to work with researchers in the region to carry out clinical research on infectious diseases of public health interest. All in all, PREPARE will facilitate the development of expertise that could further strengthen early detection, diagnostics, therapeutics, and vaccine development in Singapore."

In their pre-recorded congratulatory remarks, International Advisors Sir Jeremy Farrar, Chairperson of the Human Health & Potential International Advisory Council, and Sir Baron Peter Piot, Chair of PREPARE International Advisory Panel, echoed similar aspirations for PREPARE.

A panel discussion on "R&D Agenda for Epidemic Preparedness and Response – Challenges and Opportunities" was held during the launch. Members of the panel included Prof Wang Linfa, Prof Tan Chorh Chuan, Executive Director of the National Centre for Infectious Diseases Prof Leo Yee Sin, and Director of the Biological Defence Programme at DSO National Laboratories Assoc Prof Gladys Tan. In her remarks, Assoc Prof Tan likened PREPARE to the military, which continually works towards being ready for a threat that hopefully will never come.

Prof Kenneth Mak, PREPARE Steering Committee Chair and MOH's Director of Medical Services said, "Pandemic preparedness requires sustained vigilance and continuous efforts.

The Panel Discussion was moderated by Dr Lisa Ooi, VP (Strategy), Hummingbird Biosciences (far left). Panelists included Prof Leo Yee Sin, Prof Tan Chorh Chuan, Assoc Prof Gladys Tan and Prof Wang Linfa

Building on the experience and momentum from COVID-19, PREPARE will create enablers and bring researchers from different institutions and disciplines together in its co-operative programmes, to work together to contribute to epidemic preparedness so as to guide public health decisions and support the needs of the MOH and the public health agencies in epidemic control."

About PREPARE

PREPARE is a national programme set up by the Ministry of Health (MOH) to support and strengthen Singapore's key research capabilities, translational platforms, and expertise to develop tools, methods and products that can be tapped on to detect, respond to, and contain future infectious disease threats. The National Centre for Infectious Diseases serves as the administrative host of PREPARE. PREPARE is supported by the MOH's National Medical Research Council under its National Epidemic Preparedness and Response R&D Funding Initiative (MOH-001041).

Peacetime preparations served Singapore well by allowing a rapid R&D response to the COVID-19 pandemic. Nevertheless, an overarching national epidemic R&D plan will allow a faster and more decisive response, such as prioritisation of research during a pandemic and working seamlessly with government agencies to provide scientific insights to inform public policies.

To accomplish its overarching objective, **PREPARE** will set out to:

- **Draw up a national R&D plan** that sets out the key R&D goals and strategies that support epidemic preparedness and response.

- **Develop strong and synergistic partnerships between teams in different disciplines, across sectors**, and bridge research with commercialisation and product development.

- Make the **necessary preparations and keep capabilities warm during periods of normalcy** that will enable R&D to proceed rapidly during an epidemic in support of public health interventions.

- **Actively facilitate and expedite the process by which research discoveries can be developed** into deployable products and solutions, e.g. approved diagnostic kits and therapeutic agents, and manufactured at scale.

There are five co-operative programmes established under PREPARE – Analytics, Disease and Behaviour Modelling; Environmental Transmission and Mitigation; Diagnostics; Vaccines and Therapeutics; and Regional Networks. These co-operatives are supported by two cores capabilities, namely a national biorepository for clinical samples, tissues and associated data, and infectious diseases clinical and research databases.

Commemorating
World AIDS Day

By **Lavinia Lin**, Senior Executive, and **Sally Low**, Senior Executive, National HIV Programme, National Centre for Infectious Diseases

World AIDS Day (WAD) takes place on 1 December each year. The National HIV Programme (NHIVP), under the National Centre for Infectious Diseases, joins the world every year in commemorating WAD, to fight against the human immunodeficiency virus (HIV) and to show support for people living with HIV (PLHIV). For WAD 2022, the NHIVP continued its efforts to raise HIV awareness across Singapore and in the community about the issues surrounding HIV through various initiatives.

The NHIVP collaborated with the Health Promotion Board to launch a national HIV campaign on WAD 2022, which ran until the end of March 2023. In line with the NHIVP's HIV Testing Recommendation, the campaign was themed "Know Your Status" to promote HIV testing as a form of prevention. The NHIVP took the lead in public education efforts under the awareness and education pillar of the campaign, to emphasise the importance of HIV

testing, screening recommendations, and knowing one's own HIV status. As part of the national HIV campaign, the NHIVP contributed towards an advertorial published by ChannelNewsAsia and two content pieces by online publishers, to address knowledge gaps about the disease and highlight the work in eliminating HIV-related stigma. In addition, the NHIVP also provided expert opinion to articles published by *The Straits Times*, *Berita Harian* and *Her World* in conjunction with WAD.

Together with the NHIVP, the Enhanced HIV Programme (EHIVP) which is operationalised by the respective Clinical HIV Programmes under NCID, National University Hospital (NUH), Singapore General Hospital (SGH) and Changi General Hospital (CGH) commemorated WAD 2022 by organising educational events to demonstrate solidarity in the face of HIV. The NCID Clinical HIV Programme hosted a webinar titled, 'Following Jason's Journey:

Employment' to discuss employment challenges faced by PLHIV and ways to create an inclusive workplace. NUH partnered with the National University of Singapore to co-organise an in-person talk about 'Ending HIV stigma and discrimination' with a pledge wall for people to show their support in stopping HIV stigmatisation. SGH set up an educational booth on the importance of WAD and an art wall to share supportive messages for PLHIV, while CGH hosted a webinar and game booth to debunk myths and misconceptions about HIV. All events had good turnout and were well received.

I Have HIV, Will You Employ Me?

Daniel Chee
Medical Social Worker, TTSH/NCID

Jerry Seah,
Senior Director, Singapore National Employers
Federation (SNEF)

Chen Jing
Senior Nurse Manager, NCID

Dr Wong Chen Seong
Senior Consultant, NCID

Webinar titled, 'Following Jason's Journey: Employment' hosted by NCID's Clinical HIV Programme

ASEAN Health Cluster 2 - Equalize and Address Inequalities to end the HIV and AIDS Pandemic

2022 marks the first year that Singapore is appointed as the Chair of ASEAN Health Cluster 2 (AHC2) for the period of July 2022 to June 2024. The AHC2 focuses on prevention and control of communicable diseases, emerging infectious diseases and neglected tropical diseases, including HIV and AIDS. In assistance to the Ministry of Health, the NHIVP was honoured to write the World AIDS Day 2022 Message, which was published on the ASEAN website on 1 December 2022. This year's message, "Equalize," emphasised the need for all to address inequalities and help put an end to the HIV and AIDS pandemic. To read the full message, please visit **https://asean.org/world-aids-day/**

NCID staff wearing blue in support of World Antimicrobial Awareness Week

Increasing Awareness About the Silent Pandemic – Antimicrobial Resistance

By **Astrid Khoo**, Asst Director, and
Marina Wee, Executive, Antimicrobial Resistance Coordinating Office,
National Centre for Infectious Diseases

Antimicrobial resistance (AMR) is a growing concern around the world. The World Health Organization (WHO) declared AMR a top 10 global public health threat facing humanity in 2019. AMR occurs when bacteria, viruses, fungi, or parasites no longer respond to antimicrobials agents such as antivirals and antibiotics. As a result, antimicrobial agents become ineffective and infections become difficult or impossible to treat.

The spread and development of AMR globally is greatly accelerated with the misuse and overuse of antimicrobial agents in humans, animals and plants. In a recent publication in *The Lancet*[1] an estimated 1.3 million deaths each year were found to be directly due to bacterial AMR. Resistance to last-line antimicrobials are also emerging in Singapore and other parts of the world.

AMR poses enormous health and economic challenges globally, increasing treatment complexities, healthcare costs, risk of disease spread, illness severity and deaths. Singapore is particularly vulnerable to the risk of AMR because of its role as an international travel hub and the importation of over 90% of its food.

World Antimicrobial Awareness Week 2022

World Antimicrobial Awareness Week (WAAW) held each year from the 18 to 24 November aims to improve awareness and understanding of AMR, and encourage best practices to reduce the further emergence and spread of AMR. The theme for 2022, "Preventing antimicrobial resistance together" recognises that tackling AMR is a shared responsibility. The Quadripartite on AMR which comprises of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the World Health Organization (WHO) and World Organisation of Animal Health (WOAH), has called on the human, food, animal, and environment sectors to work collaboratively through a One Health approach to encourage the prudent use of antimicrobials and to strengthen preventive measures addressing AMR.

In conjunction with WAAW 2022, the Antimicrobial Resistance Coordinating Office (AMRCO) under the National Centre for Infectious Diseases (NCID) rolled out a series of initiatives aimed at increasing the awareness of AMR.

Joint Activities to Raise Awareness Amongst the General Public and Healthcare Professionals

To improve awareness and understanding of AMR and tackle the common misconceptions on AMR among the general public, NCID contributed articles in Q&A format which were published in *The Straits Times* and *Berita Harian* on 21 November and 19 December 2022 respectively. The articles highlighted the misconceptions that are associated with poor AMR knowledge and inappropriate antimicrobial use. This included addressing the belief that humans can become resistant to antibiotics; antibiotics can treat viral infections; antibiotic resistance is only a problem for people who take antibiotics regularly; resistant bacteria cannot spread from person to person; and infections by antibiotic-resistant bacteria can be easily cured.[2] The articles also included details on Singapore's National Strategic Action Plan on AMR and the One Health approach to combating AMR across the different sectors in Singapore.

A social media posts on antimicrobial resistance

In a recent article[2] studying the knowledge, attitudes and practices related to AMR and antibiotic use among Singaporeans, adults aged 21 to 49 years old were found to have the poorest knowledge of antibiotic use and highest incidence in inappropriate use of antibiotics compared with the general population. Hence, AMR activities surrounding engagement of the general public in 2022 focused on those aged 21 to 49 years old. An online article was published on *Youthopia* website on 21 November 2022 to raise awareness of AMR in youth and young adults. Information was packaged into bite-size pieces to make the information relatable and easy to understand.

AMRCO expanded its AMR social media campaign in 2022 to include a series of AMR graphics and key messages that were featured on the social media platforms of NCID, Tan Tock Seng Hospital (TTSH), and the National Healthcare Group (NHG), the re-sharing of the AMR posts by the Health Promotion Board (HPB), as well as sharing of the Q&A article published in *The Straits Times* and

HPB's campaign video. In the week of WAAW, the general public were also encouraged to "Go Blue" for AMR as part of the global effort to increase visibility and awareness of AMR, and staff from NCID's public health units also wore blue in support.

Recognising the need to make AMR a relatable topic and to create mass awareness, HPB collaborated with NCID on a media interview with an infectious diseases (ID) expert. Dr Lee Tau Hong, Head of AMRCO, NCID was featured on The Daily Ketchup, an online commentary podcast on 22 December 2022. Besides hearing from Dr Lee about his experience as an ID physician in Singapore, listeners also learnt about antibiotic resistance, the ways in which antibiotics can be misused and the consequences, and how they can prevent antibiotic resistance. These include not sharing antibiotics with others, not saving them for future illnesses, not adjusting antibiotic dose and not taking antibiotics for viral infections.

> **"We are actually seeing the effects of antibiotic resistance currently. It's not so much in the future. We are seeing it right now in our patients."**
>
> *Dr Lee Tau Hong, Interview on*
> *The Daily Ketchup, 22 December 2022*

The AMR section of the NCID website underwent an update to include details on the One Health approach to AMR and the agencies involved, and additional resources and links to AMR material and publications on AMR such as the National Strategic Action Plan (NSAP) Progress Report (2018-2020), One Health Report on Antimicrobial Utilisation and Resistance, 2019 and National Surgical Antibiotic Prophylaxis Guideline (Singapore). AMR content for the general public and healthcare professionals (HCPs) were further strengthened to utilise the website as a platform to raise awareness about AMR.

Strengthening AMR Knowledge Through AMR Webinars and Resources

Building on last year's pilot to create tailored messages for HCPs, AMR pushed out a series of infographics to urge HCPs to adopt good hygiene habits, use antimicrobial drugs with care and educate their patients on the correct use of antimicrobial drugs. The AMR screensavers and posters catered to all HCPs, pharmacists and prescribers respectively, which is aligned with the target audiences identified by the Quadripartite on AMR. The dissemination of the AMR resources was extended to healthcare workers in primary care institutions which included polyclinics under two healthcare clusters, participating private hospitals, community hospitals and intermediate

and long-term care facilities. In addition, AMR resources have been included within a multidrug-resistant organism module on the NHG eLearn platform that is targeted at clinicians.

AMRCO continues to support WAAW activities conducted by the public and private hospitals in Singapore and provided over 10,000 pieces of collaterals such as foldable eco-bags, pens, tissue packets, hand sanitisers and sticky notepads that were printed with AMR messages. AMRCO also facilitated activities within the hospitals to commemorate WAAW. These activities included AMR quizzes and screening of AMR webinars for HCPs, activity booths which displayed AMR posters and distributed goodie bags, AMR social media posts, electronic direct mailers and articles, and awards for clinicians and specialties which demonstrated appropriate antimicrobial use.

The WAAW Inter-Hospital Webinar Series 2022 is held annually to increase AMR awareness and encourage appropriate antimicrobial prescribing practices amongst HCPs. Entering its third year, AMRCO partnered with nine public and private hospitals - Changi General Hospital, KK Women's and Children's Hospital, Khoo Teck Puat Hospital, IHH Healthcare, National University Hospital, Sengkang General Hospital, Singapore General Hospital, TTSH, and Woodlands Health, to organise a series of webinars which was well received. A total of nine webinars and three cross-sectoral panel discussions were held throughout the month of November and were attended by over 3,600 private and public sector HCPs, from the acute and community hospitals, primary care, institutes of higher learning, research organisations, Ministry of Health (MOH) and pharmaceutical companies.

World Antimicrobial Awareness Week Inter-Hospital Webinar Series is held annually to increase AMR awareness and encourage appropriate antimicrobial prescribing practices amongst healthcare professionals

Other AMR Activities Conducted in 2022

The National Surgical Antibiotic Prophylaxis (SAP) Guideline (Singapore) developed by the National Antimicrobial Stewardship Expert Panel provides evidence-based recommendations for the rational use of antibiotic prophylaxis, including recommended agent(s), dose, timing and duration for adult patients undergoing clean or clean-contaminated surgeries. Published on 1 September 2022, it aims to align best practices nationally by providing the framework for audit and surveillance. An article on the guidelines

was also published in the *Annals, Academy of Medicine, Singapore* in November 2022.

The second edition of the *One Health Report on Antimicrobial Utilisation and Resistance, 2019* was published in 2022. The report provides an overview of national surveillance programmes and updates on key findings on antimicrobial utilisation and resistant organisms in the human, animal, food and environmental sectors in Singapore up to the end of 2019. It demonstrates the expansion of national AMR surveillance programmes across sectors since the launch of Singapore's National Strategic Action Plan in 2017. It also highlights the efforts to collect data on antimicrobial consumption, in particular antibiotic consumption, which has been expanding in recent years with the aim of obtaining reliable estimates of national consumption in the human and animal sectors.

The One Health Antimicrobial Resistance Research Programme (OHARP) was set up in 2019 to steer the national One Health AMR research agenda and produce AMR research that can be translated into policy and practise. The second OHARP grant call was launched on 14 February 2022. Jointly funded by MOH, National Environment Agency, National Parks Board, PUB, Singapore's National Water Agency, and Singapore Food Agency, it supports One Health AMR research across the human, animal, food, and environment sectors in Singapore. In June 2022, funding was awarded to a commissioned study on the socioeconomic impact of AMR, together with research studies on the transmission pathways of AMR.

AMRCO supports global efforts to minimise occurrence and spread of AMR, through regional and international partnerships and collaborations. Singapore continues to work closely with ASEAN member states on AMR. Following the development of the ASEAN Strategic Framework to Combat Antimicrobial Resistance through One Health Approach (2019-2030), Singapore and Thailand currently drive the development of an ASEAN AMR Monitoring and Evaluation (M&E) plan to monitor the implementation and effectiveness of the ASEAN Strategic Framework, in close collaboration with other ASEAN member states and Secretariat. At the international level, AMRCO and the One Health agencies provide technical support to the Minister for Sustainability and the Environment, Ms Grace Fu, in her capacity as a member of the Global Leaders' Group (GLG) on AMR which consists of world leaders and experts working together to accelerate political action on AMR. As part of her technical team, AMRCO has participated in several discussions and working groups to develop the GLG advocacy tools over the past two years and is currently involved in a task force to develop a GLG Information Note on Integrated Surveillance.

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Review of the **Antimicrobial Research Landscape** in Singapore

By **Dr Selina Poon**, Manager, and
Goh Dai Mei, Executive, Antimicrobial Resistance Coordinating Office,
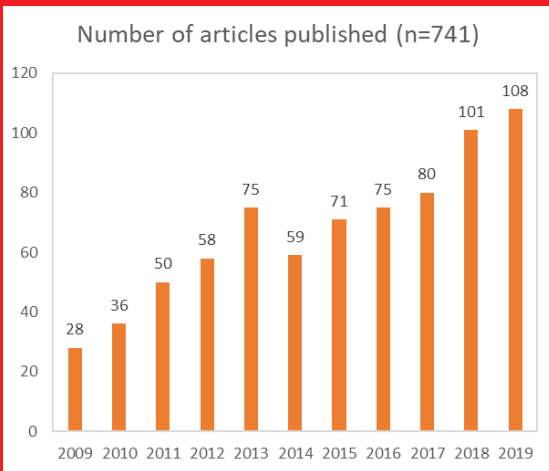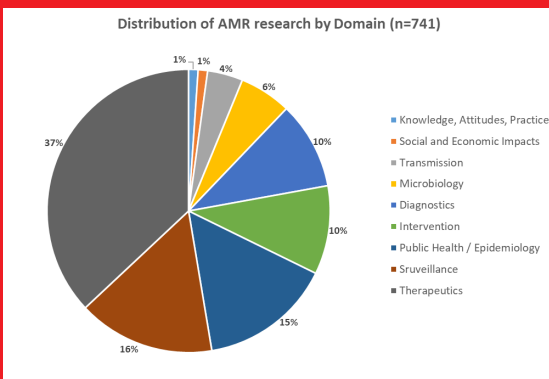National Centre for Infectious Diseases
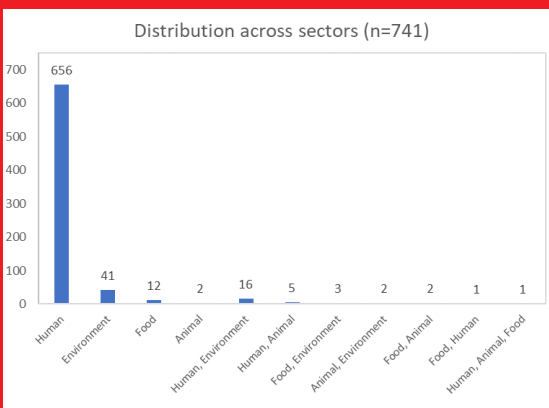
Figure 1

Figure 2

Figure 3

Antimicrobial resistance (AMR) is a globally recognised threat to human health, animals and the environment. In response to the growing threat, Singapore launched the National Strategic Action Plan (NSAP) on AMR in November 2017, which sets the framework for a national response to AMR. The plan aims to reduce the emergence and prevent the spread of drug resistant organisms through five core strategies: education, surveillance and risk assessment, research, prevention and control of infection, and optimisation of antimicrobial use.

The third core strategy, research, aims to provide evidence to support the actions undertaken in the other core strategies to address AMR. To identify where gaps in evidence lie and whether any research had been conducted to address them, AMRCO conducted a review of research published in Singapore between 2009 and 2019. A total of 741 AMR research publications were identified, which included publications by researchers from Singapore, publications with data or samples from Singapore, and joint studies with overseas collaborators. The publications were assigned to the relevant research domains and sectors.

The number of AMR research articles published between 2009 and 2019 showed an increasing trend (Figure 1). Analyses performed showed that most of the research was conducted in the domains of Therapeutics, Surveillance and Public Health/ Epidemiology, while more research in Knowledge, Attitudes, Practices, Social and Economic Impacts and Transmission was needed (Figure 2). Research in the human sector also dominated the research on AMR conducted in the last decade (Figure 3).

Furthermore, through this review, opportunities for future research and areas of need were identified, such as the development of a national AMR research agenda in One Health while ensuring relevance of future AMR research to the NSAP. In line with the national AMR research agenda, research topics of significance to Singapore to address AMR should also be prioritised to ensure that findings from these studies can impact AMR policy and practice locally.

An Internship in
Infectious Disease Intelligence

By **Cheryl Lee** and **Chin Jung Ee**, Interns, Junior Field Epidemiology Training Programme of the National Centre for Infectious Diseases and National University of Singapore

Introduction

Since the World Health Organization's first declared COVID-19 as a pandemic in 2020,[1] many of us became "novice epidemiologists" – superficially familiar with scientific terminology.[2] But have you ever wondered how pandemics spread? This question was aptly captured under "Pandemic Health", the theme of our inaugural Disease Detective Camp held from 13 to 15 June 2022 challenged us to develop our deductive reasoning as interns-in-training under the Junior Field Epidemiology Training Programme (FETP), a training partnership between the National Centre for Infectious Diseases (NCID) and National University of Singapore Saw Swee Hock School of Public Health.

## Understanding the Origins of Epidemiology and How Diseases Spread

Through a series of five monthly webinars leading up to the Camp, we were introduced to the origins and development of epidemiology.[3] It was Wade Hampton Frost's establishment of the epidemiological triad[4] in the 1970s, that recognised the multifactorial nature of disease causation and spread, that catalysed epidemiology's evolution. We realised the relevance and potency of this model as a starting point in uncovering and treating emerging infectious diseases, such as COVID-19.[5]

Assoc Prof Steven Ooi discusses how the environment, as one of the three factors in the epidemiological triad, plays a key role in disease causation

Applying the One Health Approach to Outbreak Control

We had the opportunity to apply our newfound understanding of how diseases arise and spread, and in true epidemiological fashion, our trainers prompted us to think about possible outbreak control and mitigation measures. As we bounced off ideas in the room, it was not long before our group
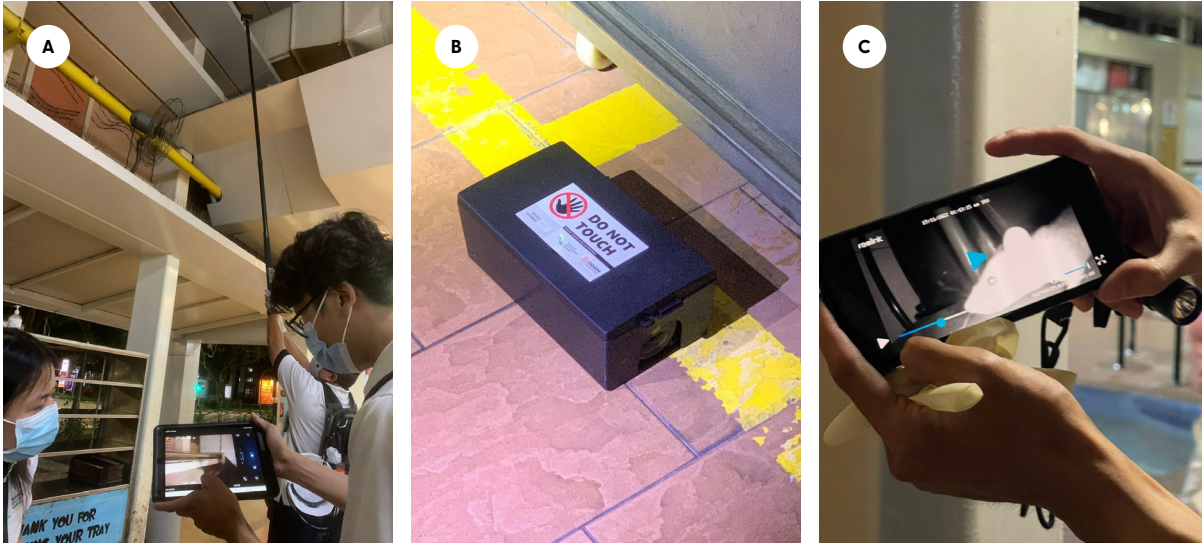
(A) *Use of real-time rat-surveillance technology to observe grease marks during surveillance exercise.*
(B) *Sample deployment box containing surveillance camera that reports detection of rats to NEA's cloud surveillance platform on an algorithmic basis*
(C) *Video recording of a positive rat incident on the cloud surveillance platform*

of more than 30 youth participants recognised that establishing strong public health defences required a whole-of-society, multisectoral effort. In Singapore, this takes the form of the 2012 One Health framework,[6] which promotes an integrated and collaborative approach to understand, prevent, prepare and respond to cross-sectoral public health threats. We learned the evolution of Singapore's public health response through cases old and new – the 1999 Nipah Virus[7] outbreak, the Dengue epidemic[8] and Norovirus[9] – as the One Health framework materialised.

Undertaking Field Epidemiologic Surveillance

At the highly anticipated Camp, we had our foretaste of epidemiologic surveillance – a critical pillar of Singapore's defence – as we put our observational epidemiology skills to the test, spotting possible sources of a norovirus outbreak[9] in a neighbourhood hawker centre.

Later in our internship, we also learnt from National Environment Agency (NEA) officers that Norway rats, the most common in Singapore, are a vector for *Leptospira*.[10] We were exposed to NEA's technology-assisted algorithmic reporting to predict the incidence and location of rat encounters, and recognised the real-life application of multisectoral collaboration in public health. During a surveillance exercise late at night, when it was just us and the rats, we realised this quiet work is important in safeguarding public health for Singaporeans.

Seeing Infectious Diseases Management in Singapore

Besides undergoing the Camp, we were able to visit the NCID on several occasions where we gained insights into the history of Singapore's infectious diseases from NCID's Executive Director Prof Leo Yee Sin. As we went through the historical timeline, it was strikingly apparent that emerging infectious diseases are becoming increasingly regular. At this juncture, Prof Leo

strategically and candidly shared the imminent need to prepare for Disease X[11] of tomorrow, even as we are still dealing with COVID-19 today.


Prof Leo Yee Sin, Executive Director, NCID giving a walk-through of The NCID Gallery

Capturing our attention was the photo exhibition documenting NCID's response to the COVID-19 pandemic at The NCID Gallery. The heartfelt and personal recollections of NCID staff were made more poignant as we networked with the frontline staff – healthcare administrators, pharmacists, scientists and doctors – who dealt with COVID-19 since its arrival in Singapore.

We got to view the High Level Isolation Unit (HLIU), a set of fully self-sufficient wards equipped to isolate, contain, and manage high consequence pathogens and novel pathogens. We heard from Mr Joel Quek, Assistant Nurse Clinician, on how he and his colleagues are trained to function as a team to provide the best care possible for patients in the HLIU.

Students seeing how "contaminated" they were with the use of glo-gel which is invisible in normal lighting but fluorescent under UV and showed where germs reside
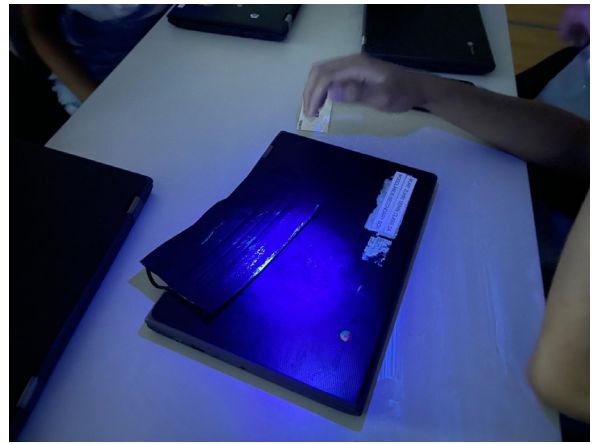
To top off the visit, we got to experience donning full personal protective equipment (PPE). Enclosed by a helmet and respirator, and wearing dual layers of gowns and gloves, we personally experienced the discomfort that healthcare workers had to endure to ensure the safety of themselves and others. We came away with a deeper appreciation for the good work of healthcare professionals.

Donning full PPE

Facilitating an Outbreak Scene Investigations Exercise

As FETP interns, we engaged secondary and junior college students from the northern school cluster during the Ministry of Education-NCID Outbreak Scene Investigations exercise which was held in October 2022. Through an exciting round of experimentation with Glo Germ™, we introduced the participants to the concept of contamination which culminated in an interactive lecture about different pathogens and the diseases they cause.

Conclusion

Over the course of this internship, we had the privilege to be exposed to the world of public health and epidemiology, beyond our initial medical aspirations. We learnt much more about the whole-of-society approach that is demanded to safeguard and uphold public health in Singapore, and we have grown more determined to further explore this ever-pertinent field.

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Dengue Viruses

Who Should Notify

**Medical Practitioners
Laboratories**

How to Notify

**Submit MD131 Notification
Form via CDLENS
(http://www.cdlens.moh.
gov.sg) or fax
(6221 5528/38/67)**

NOTIFIABLE DISEASE

YES

When to Notify

**On clinical suspicion
Upon laboratory confirmation**

Notification Time Line

Within 24 hours

Causative Agent

**Dengue virus, a member of the
Flaviviridae family. There are 4 serotypes
(DEN-1, DEN-2, DEN-3, and DEN-4).**

INCUBATION PERIOD
Typically, 4-7 days; range is 3 to 14 days.

INFECTIOUS PERIOD
Infectious to mosquitoes from 2 days before
to 5 days after illness onset
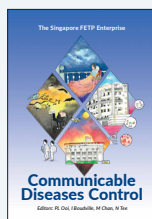(when the patient is viraemic).

TRANSMISSION
Transmitted by the bite of infected
Aedes aegypti and *Aedes albopictus*
mosquitoes.

EPIDEMIOLOGY
Dengue is widely distributed in tropical and
sub-tropical areas of the world, and is
endemic in over 100 countries. Notification
of dengue cases has increased over the
past decade, with more than 200,000 annual
cases being consistently reported in the
Western Pacific region since 2007.

Dengue is endemic in Singapore, with year-
round transmission observed. Despite
sustained vector control efforts, dengue
outbreaks occur periodically, with the largest
epidemics in the past decade occurring
in 2020 and 2022. Cases typically
increase during the hotter months of
the year likely due to a reduction in
the time needed for the mosquito and
virus to replicate. All four dengue virus
serotypes co-circulate in Singapore.

The Singapore FETP Enterprise

**Communicable
Diseases Control**
Editors: PL Ooi, I Boudville, M Chan, N Tee

SCAN ME!

Editor's Note:

Excerpt taken from
Communicable Diseases
Control, a practical
handbook on infectious
diseases of public
health importance in
Singapore. The PDF copy
of this 372-page book is
downloadable from the
NCID website via this
QR code.

Multisectoral Training in
Urban Epidemiologic Response

By **Assoc Prof Steven Ooi**, Senior Consultant, Infectious Disease Research and Training Office, National Centre for Infectious Diseases, and Programme Director, Singapore Field Epidemiology Training Programme

Understanding Urban Epidemiology

Multisectoral urban epidemiologic response training introduces the use of an all-hazards field epidemiologic approach to risk assessment and mitigation. It deals with unexpected events, the distribution and determinants of disease, and the control of outbreaks. Field epidemiologists investigate health incidents, analyse the associated risk factors, and develop strategies to control epidemic spread, including community health advocacy. They study ecosystem changes, patterns of cause and effect, and various conditions in vulnerable populations.

The key to effective multisectoral response lies in activities that transcend sectors, such as community development, health, education, agriculture, and infrastructure. Understanding urban epidemiology is essential for effective public health and One Health initiatives, and involves collaboration between government departments and other stakeholders from a variety of sectors such as civil society organisations, the private sector, and community groups. By working together, these parties can create healthier and more sustainable solutions to development challenges.

Since 2020, the Singapore Field Epidemiology Training Programme has conducted eight runs of its flagship foundational course, benefitting over 200 participants comprising field investigators, staff from One Health agencies, and frontliners from ten public agencies. They have gained insights and built up their knowledge on how to apply an evidence-based holistic approach in public health practice and outbreak management, and how to explain transmission dynamics in the emergence of unusual events and pandemics.

Our programme tailors its curriculum to specific domains and instructional goals that constitute competencies for continuing professional development. Case studies on outbreaks, contact tracing, surveillance, communications, public health policy, healthcare infection prevention and control, wildlife and veterinary public health, environmental disease vectors, food safety and health security are set out clearly and stacked to achieve comprehensive and practical proficiencies. In addition, we are strengthening public health through training for NCID and preventive medicine residents in the epidemic intelligence service.

FEYP

Calling all applicants

Master Classes 2023-2024, facilitated by experienced trainers from NCID and the National University of Singapore (NUS) Saw Swee Hock School of Public Health, are now open for applicants. The courses are stackable to achieve comprehensive and practical multisectoral outbreak management proficiencies. Participants who successfully complete tiers 1 and 2 competency certifications will be awarded with the NUS professional certificate in outbreak alert and response. They can then proceed to tier 3 for advanced training in the epidemic intelligence service.

Tier 1 -
Basic Outbreak Rapid Response
Dates: 8 July - 5 August 2023
[run on five Saturdays, 9 - 5pm]

This is a foundational course which provides training on the fundamentals of applied epidemiology and public health practice:

1. Rapid epidemiologic response and contact tracing
2. Outbreak investigation and management
3. Public health and bio-risk surveillance

Eligibility to apply. Recommended for all medical, nursing, veterinary, scientific, operations or public health officers who are keen to serve in the field as rapid response team members. You must have some public health experience, assess your aptitude and suitability for the course, and obtain clearance from your supervisors and human resource (HR). Candidates who complete the course satisfactorily will be awarded with the NUS-NCID certificate of competence in outbreak epidemiology and rapid response.

Tier 2 -
Fundamental Field Epidemiology
Dates: 15 - 19 May 2023
[run on five consecutive days, 9 - 5pm]

This course complements the basic course and provides training on elementary methods in field epidemiology and risk analysis:

1. Eco-epidemiology of environmental threats and emergencies
2. Quantifying urban health (field and lab analytics)
3. Community, culture and socio-behavioural determinants

Eligibility to apply. Recommended for officers who have obtained the certificate of competence in outbreak epidemiology and rapid response and are keen to develop more proficiency with outbreak alert and response operations in the field, and have support from your supervisors and HR. Candidates who complete the course satisfactorily will be awarded with the NUS-NCID certificate of competence in fundamental field epidemiology.

Tier 3 -
Urban Outbreak Management
Dates: 19 January - 19 April 2024
[run on NUS Semester 2, Fridays, 6 - 9pm]

An effective outbreak management system is core to safeguarding public health and reducing morbidity and mortality. Outbreak investigation, when properly managed, fosters cooperation between stakeholders in rapid mobilisation, community engagement, communications, and business continuity. By introducing a combination of hard and soft skills, as well as knowledge and tools related to field epidemiology, environmental health, microbiology, communication and social sciences, it is designed for the application of knowledge and skills to manage, foresee and solve outbreak problems efficiently and effectively.

Eligibility to apply. Recommended for public health practitioners who have obtained their professional certificate in outbreak alert and response, as well as residents training in preventive medicine, and graduate students undergoing their Masters/PhD programme at NUS.

For enquiries, please contact Assoc Prof Steven Ooi at steven_pl_ooi@ncid.sg

ANTIMICROBIAL RESISTANCE (AMR)
Competition 2023

Raise awareness about the global public health threat of AMR and the importance of appropriate antimicrobial use!
Competition is open to all Singaporeans and residents of Singapore

Tagline

Create a tagline on AMR in English

Age categories: 7-12, 13-16, 17-25 years old

GIF

Create a GIF based on one of the following topics:

- AMR is a global public health issue
- The One Health approach to AMR
- Antimicrobials are a precious resource

Age categories: 13-16, 17-25 years old

TikTok Video

Create a 30-60 seconds TikTok video to educate viewers about AMR. The content should include one of the following:

- What is AMR and its impact
- Ways to prevent the spread of AMR

Age category: 17-25 years old

Eco-Bag Design

Design graphics to be printed on a foldable eco-bag to promote awareness of AMR and include the following tagline:
Handle Antimicrobials With Care

Age Categories: 17-25, above 25 years old

Please scan QR codes for more details:

Competition Details and Terms & Conditions

Registration and Submission of Entry

Gift vouchers to be won for the top three entries of each creative category and age category!
CLOSING DATE: 30 JUNE 2023, 18:00 HOURS

INFECTIOUS
Disease Intelligence

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