PROJECT REPORT TIMOR-LESTE

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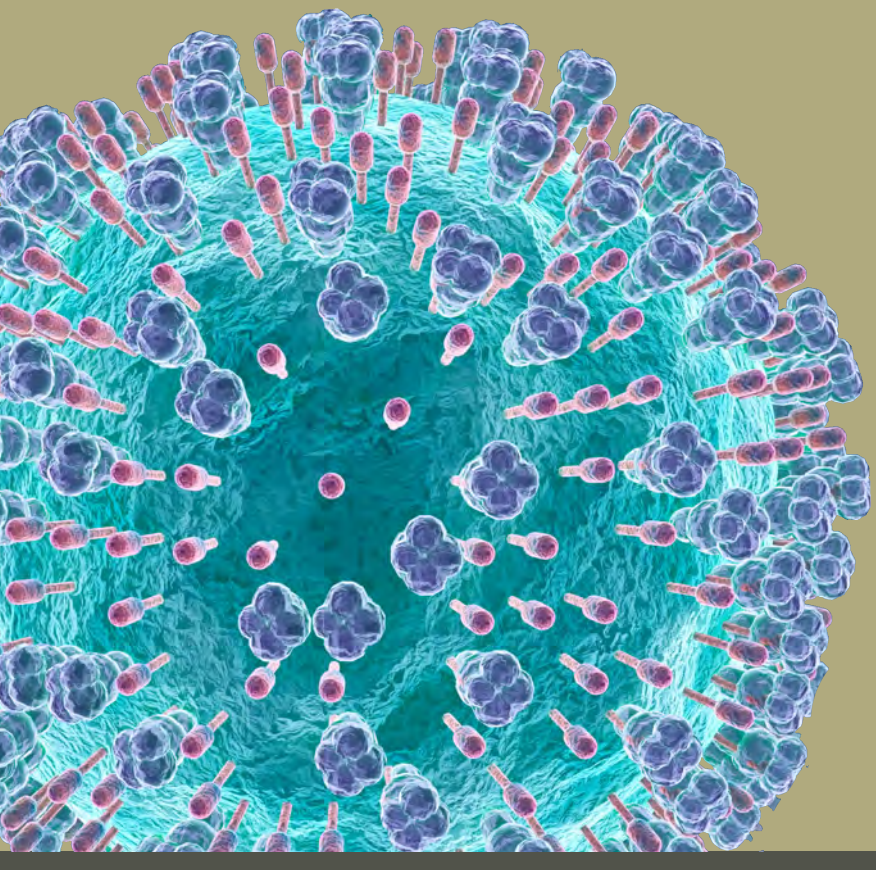
Enhancing multi-agency biological threat preparedness and response in Timor-Leste



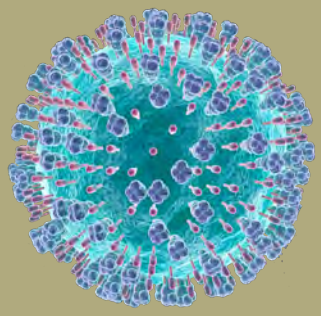


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Table of contents

Executive summary 2

Findings 2

Considerations and recommendations 3

Introduction 4

Background 4

Civilian-military relationship in Timor-Leste 5

Population health and the health system in Timor Leste 5

Civilian-military interface and biological threats 6

Civilian biosecurity and multi-sector collaboration 7

Scope of biological threats in Timor-Leste 8

SECTION ONE: Snapshots of agency and stakeholder engagement, capability and challenges in biological threat preparedness and response in Timor-Leste 9

1.1 The Executive Branch and Parliament of the Government of Timor-Leste 9

1.2 Ministry of Health 9

1.3 Ministry of Agriculture and Fisheries 10

1.4 National Disaster Management Directorate 11

1.5 Polícia Nacional de Timor-Leste 11

1.6 Timor-Leste Defence Force 12

1.7 Civil society and non-government organisations 12

1.8 Bilateral and multilateral partnerships in biological threat preparedness and response in Timor-Leste 12

SECTION TWO: Emerging cross-cutting themes and challenges 13

2.1 Health-security responses in Timor-Leste are characterised by a significant amount of engagement from a large number of actors, particularly in and around Dili, yet the majority of focus is on strengthening human and animal health systems 13

2.2 Human resource constraints are pervasive across the biological threat surveillance, preparedness and response continuum, and biological threat literacy is limited and unevenly distributed beyond key personnel within human health and animal health agencies 13

2.3 The border areas of Timor-Leste are a significant challenge in relation to biological threat risk but provide a great opportunity for locally based initiatives that work across government agencies and communities 14

SECTION THREE: Conclusions, considerations and recommendations 15

3.1 Support a small national workshop that brings together two to three people from each relevant agency after engaging in an ongoing socialisation and awareness-raising exercise concerning the range of biological threats and the implications for each of the agencies and organisations that would have interfacing roles 15

3.2 Support the development and implementation of a training package for police, customs, immigration and defence agencies that accounts for their role in biological threat preparedness as partners to health, agriculture and biosecurity agencies and also accounts for the occupational health and safety needs of personnel 15

3.3 Consider the design, resourcing and implementation of an action-orientated research program that fosters multi-agency engagement and collaboration (including with communities) across two cross-border sites along the Timor-Leste and West Timor border 16

References and notes 17

Executive summary

Timor-Leste has an increasingly high exposure to biological threats with epidemic potential. Due to its geography, trans-boundary hazards are also a significant epidemic threat. The country is within a major migratory bird pathway between Australia and Asia and is exposed to possible transmission of animal-to-human disease with pandemic potential, notably the highly pathogenic avian influenza (H5N1). Its borders with Indonesia leave it vulnerable to current outbreaks of foot-and-mouth disease and African swine fever. Despite the country's early success in containing COVID-19, in 2021 it spread quickly, mostly due to low rates of vaccination, exacerbated by widespread displacement during the April 2021 flood. In 2022, Timor-Leste continues to grapple with COVID-19 although relatively high first and second dose vaccine rates and a younger population have limited the health impacts.

In 2018, a joint external evaluations team monitoring compliance with the International Health Regulations 2005 wrote that Timor-Leste was assessed as not ready for the next epidemic, with gaps in preparedness, International Health Regulations (IHR) coordination, communication and advocacy, zoonotic disease control, a national laboratory system, and workforce development. Specifically, the evaluation noted the minimal demonstration of linking between public security and public health in the context of biological threat preparedness and response. Despite this assessment, Timor-Leste has actually done remarkably well to limit case numbers and mortality from COVID-19. This has been mainly due to the speed with which the Government of Timor-Leste acted and indeed the strength of its multi-agency coordination.

Yet biological threats in Timor-Leste are of course not limited to human infectious disease outbreaks. In recent years there has been a devastating epidemic of African swine fever, and a range of other animal diseases continue to be of high concern for livestock production in Timor-Leste, such as the threat of lumpy skin disease in bovines; endemic Newcastle disease, which causes high mortality in poultry production; and increasing concern about a foot-and-mouth outbreak. Furthermore, plant pests such as fall army worm and khapra beetle are already present in Timor-Leste. Khapra beetle arrived in Timor-Leste in food aid shipping containers of rice and has now spread to all grain storage facilities in the country. These threats to crops and livestock in Timor-Leste leave the country at grave risk of food insecurity.

In the context of enhancing multi-agency coordination, collaboration and communication in the preparedness for and response to biological threats, this report highlights a range of opportunities. These opportunities include the need to first define a list of cross-cutting biological threats, then deliver training and capacity building for personnel in all sectors to improve baseline knowledge of priority biological threats and the implications for each agency. This report highlights opportunities to also consider a program of awareness raising that would lead to a joined-up early-warning system where biological threats with human, animal and environmental impacts have equal priority, given the implications of all of these threats across health, livelihoods and security.

Findings

1. Human resource constraints are pervasive across all sectors in Timor-Leste involved in biological threat preparedness and response. COVID-19 has drawn resources away from existing programs and as a result we are seeing a resurgence in other infectious disease of concern such as malaria.

2. The senior leadership from across the Government of Timor-Leste has done a remarkable job to manage the multidimensional implications of COVID-19, and there are significant opportunities to develop and embed a multi-agency biological threat preparedness structure based on the experiences of the Integrated Crisis Management Centre.

3. There are ongoing efforts to bring basic training and awareness concerning a range of biological threats to some sectors and then down to community levels with regard to some singular biological threats, and some of these efforts have shown good penetration.

4. Beyond enhanced surveillance capacity for some human health infectious diseases, sustained resources to conduct surveillance for an important range of threats are limited, which, combined with difficult geography, transport infrastructure and global commodity prices (such as for fuel), makes surveillance of plant and animal biological threats very difficult.

5. There are significant, ongoing and multiple partnerships between bilateral and multilateral agencies and a range of ministries and agencies of Timor-Leste, but the degree to which these arrangements are harmonised in response to whole-of-government perspectives on biological threats is hard to gauge and remains complicated to assess without deep knowledge or in-country-experience.

6. The border areas of Timor-Leste are a significant challenge in relation to biological threat risk but provide a great opportunity for locally based initiatives that work across government agencies and communities.

Considerations and recommendations

1. Support a small national workshop that brings together two to three people from each relevant agency after engaging in an ongoing socialisation and awareness-raising exercise concerning the range of biological threats and the implications for each of the agencies and organisations that would have interfacing roles.

2. Support the development and implementation of a training package for police, customs, immigration and defence personnel that accounts for their role in biological threat preparedness as partners to health, agriculture and biosecurity agencies. This should also account for the occupational health and safety needs of personnel.

3. Given the immediacy of the threat of foot-and-mouth disease, consider the design, resourcing and implementation of an action-orientated research program that fosters multi-agency engagement and collaboration (including with communities) across two cross-border sites along the Timor-Leste and West Timor border.

Introduction

Framing this report and providing the rationale for the endeavour was a 2018 World Health Organization (WHO) joint external evaluation of Timor-Leste's compliance with the International Health Regulations 2005. The evaluation highlighted, with regard to its 'Respond' technical area 'Linking public health and security authorities' (Indicator R.3.1), that Timor-Leste had significant room to improve interaction and partnerships across the security and health sector interface. Specifically, the report noted:

- Policy, guidelines and SOPs [standard operating procedures] that link public health and security during suspected or confirmed biological, chemical and radiological events should be developed.
- Capacity should be built through training and simulation exercises.
- Awareness of IHR-related hazards should be increased in the security sector and among policy-makers.[1]

Our report explores biological threat preparedness and response in Timor-Leste and how these threats are considered and acted upon within a multi-agency framework. With an initial focus on the civilian-military interface, we expand 'military' to include a broader range of security sector actors including police, customs, immigration and corrections officials who either have a stated role in biosecurity and biological threat preparedness and response or do not have a stated role but, because of the nature of their work, interface with biological threats in some way. Further, our inquiry into 'civilian' preparedness for and response to biological threats extends beyond the traditional government health sector to include agriculture, biosecurity, water and environmental government and non-government actors. This is done because COVID-19 has shown that biological threat preparedness and response has to be considered as a whole-of-government and indeed whole-of-community endeavour if it is to be both resilient and strengthened to cope with ongoing and future biological threats. Given that Timor-Leste is a relatively new independent country, we are conscious that there are many bilateral and multilateral stakeholders who partner with and resource the Timor-Leste Government in its efforts to strengthen its health systems and indeed its health security.

Background

In August 1999, the people of Timor-Leste voted to secede from Indonesia after two decades of an Indonesian administration never recognised by the United Nations. A predictable spree of violence orchestrated and implemented by the Indonesian military and their aligned local militias left a trail of destruction which ensured that the fledgling nation began on the dreadful foundations of a complex humanitarian disaster. Nowhere was the impact of this destruction more apparent than in the health system of the country. Persistent and chronic intimidation and violence towards both patients and health workers by militias and Indonesian army troops – and the takeover and militarisation of health facilities – left the already fragile health system in severe decline, lacking adequate facilities and surrounded by a needy population too afraid to access what was left of the health system.[2]

With significant support from the international community, the health system of Timor-Leste has been essentially rebuilt from the ground up[3] but it remains extremely fragile and under-resourced, and access to health services is challenged by geography, finance and cultural barriers.[4] This has been made apparent in recent years as it copes with the impacts of dual crises: the COVID-19 pandemic and the

aftermath of Cyclone Seroja, which brought significant flooding, human loss and economic damage in April 2021.[5] In the context of biological threat, Timor-Leste initially did an immense job of preventing community transmission of COVID-19 across the country and initially avoided a major outbreak during the first wave of 2020, but a second wave around September 2021 was a fast-paced epidemic of community transmission which spread across the country. In large part the inability to prevent a second wave has been due to the border area between Indonesia and west Timor-Leste. This area was regarded as the 'red zone' for the transmission of COVID-19 among the local population there, given the inability to actually enforce a border closure and prevent the therefore illegal movement of people and goods across that border. This border area exposed the population of Timor-Leste to uncontrolled outbreaks of COVID from Indonesia.[6]

Yet, despite significant challenges, Timor-Leste has also had significant successes in biological threat management. As of 31 May 2022, Timor-Leste had recorded 22,915 infections and 131 deaths through the COVID-19 pandemic.[7] This is despite only 56% of the population having two doses of vaccine. Timor-Leste has also been working very hard on malaria elimination and had in fact had periods of no recorded cases, but COVID-19 lockdowns and redeployment of the malaria workforce meant ongoing malaria surveillance, prevention and eradication measures dropped off over 2021 and malaria re-emerged as a result of movement across the Indonesia–Timor-Leste borders.[8]

Civilian-military relationship in Timor-Leste

Since Independence, the Government of Timor-Leste has been beset by an inability to overcome existing tensions between 'elites' in different geographical parts of the country. The initial government was largely made up of former 'freedom fighters'; this resulted in a government that was unable to bring in representation from many parts of west Timor-Leste, where support for Indonesia had been much more tangible and where many of the militias that were backed by the Indonesian military remained. As time went on and the government attempted to build a Timor-Leste military, police force and judiciary, these factions remained unreconciled. In 2006 – just after the international peace force left the country, declaring it 'peaceful' – Timor-Leste erupted into violence after 600 military personnel were dismissed.[9] Many in the military ranks believed that systemic bias discriminated against certain personnel, who were passed over for promotion based on their historical links to the Indonesian military. An attempted coup and an assassination attempt on the then Prime Minister Ramos Horta highlighted how fractious society was at the time. It also highlighted ongoing tensions between the military and the police, who completely distrusted each other. This has led to outright armed violence between various groups within both the military and the police, resulting in dozens of deaths on both sides. A new international peacekeeping operation ensued, and multiple international partners have attempted to professionalise and build the capacity of both the military and the police. Yet distrust remains between these agencies, despite community-level trust in both agencies somewhat increasing in recent years.

Population health and the health system in Timor Leste

Timor-Leste's rural and mountainous geography and poor infrastructure are ongoing challenges for the health of the population and for the health system in trying to improve access to health services. Timor-Leste is beset with high rates of infectious/communicable diseases and, while childhood vaccination rates for many preventable illnesses are improving, diseases such as leprosy and filariasis remain endemic in some areas. An outbreak of measles was reported in Timor-Leste during 2011.[10] The delivery of immunisation services in Timor-Leste is challenged by the difficulty of reaching populations living

sparsely in mountainous terrain with poor infrastructure, coupled with human resource shortages. Tuberculosis (TB) and pneumonia remain really significant causes of mortality and morbidity in Timor-Leste. Timor-Leste also faces serious nutritional challenges, with just over 50% of children under five years of age affected by stunting. There are marked seasonal patterns of food availability, with the months preceding maize and rice harvests identified as the 'hungry season'.

While initially the influence of international actors was prominent, the number and relevance of national actors, and their resulting influence, increased as aid dependency diminished. However, this created a fragmented institutional landscape with diverging agendas and lack of inter-sectoral coordination, to the detriment of the long-term strategic development of the health workforce and the health sector. The WHO has been a constant in Timor-Leste since 1999 and has supported the Ministry of Health (MoH) in its efforts to build health policies and a health system from the ground up. Timor-Leste's health system is now guided by its National Health Sector Strategic Plan 2011–2030, which attempts to align donors and health sector partners in support of the six core principles and components of its primary healthcare vision:

1) strong leadership and government in human rights for health
2) prioritisation of cost-effective interventions
3) establishing an interactive and integrated culture of community engagement
4) providing an integrated continuum of care at the community level
5) supporting skilled and equipped health workers at all levels of the health system
6) creating a systems cycle of feedback using data to inform health care.

This strategic plan is supported by the government's health sector vision, which is to provide quality comprehensive primary and hospital care services to all Timorese people. The Timor-Leste Government continues to prioritise government funding for health care and encourages the role of the private sector and insurance companies to improve health facilities and programs. Timor-Leste's health system decentralisation policy also poses challenges, especially at municipality level, where management capacity is limited, financial flows are not timely, accountability is diffuse to the point of being non-existent, and citizens' engagement in governance is low. Capacity for routine diagnostic microbiology is improving at the National Health Laboratory in Timor-Leste, with support from the Menzies School of Health Research, the Northern Territory Department of Health and the Indo-Pacific Centre for Health Security. However, routine antimicrobial resistance surveillance is not yet established. Australia is the largest external development partner in Timor-Leste, investing more than AUD97 million this year and AUD1 billion since 1999.

Civilian-military interface and biological threats

Timor-Leste has implemented military and civil cooperation for emergencies since 1999. However, no memorandum of understanding exists with security authorities, because it is the role of the Ministry of the Interior (MoI) to intervene in the event of a public security issue. The security sector is stated to be directed by the MoI to be in charge of monitoring and responding to security issues and to bring in the MoH as needed. 'Security' consists of three 'layers': police intelligence, military intelligence and civilian intelligence. Yet public health emergencies have not necessarily been considered security emergencies;

therefore there has really been limited capacity building across the civilian-military interface in the context of biological threat. So, in the context of the International Health Regulations 2005, policy guidelines and SOPs that link public health and security during suspected or confirmed biological, chemical and radiological events have not been developed.

Various training exercises and simulations have been conducted with health and animal and security authorities around such issues as HIV, quarantine and rabies, yet core capacity is low and until now has not been a priority on the country's public health agenda. The overall risk of deliberate or accidental chemical, biological, radiological or nuclear (CBRN) hazard has been considered very low. No legislation, relationships, protocols, memoranda of understanding or other agreements exist between public health, animal health, radiological safety, chemical safety and security authorities to address all hazards. Stakeholders at the civilian-military interface with biological threat include the armed forces, police, MoI, Ministry of Agriculture and Fisheries (MoAF), Ministry of Social Solidarity and Inclusion, and MoH, as well as bilateral and multilateral partners.

The simultaneous occurrence of the pandemic and floods highlighted and exacerbated underlying weaknesses in Timor-Leste's health system. These include shortages in medical equipment, supplies (e.g., personal protective equipment and other medical consumables) and medicines. Recent flooding has exacerbated the increased transmission of infectious diseases (e.g., dengue and waterborne diseases) and higher incidence of respiratory infections. At the same time, these simultaneous events highlighted the critical need for more attention and capability improvement at the intersection of military and civilian engagement.

Civilian biosecurity and multi-sector collaboration

There are current efforts to improve the government's surveillance capacity by training health personnel and strengthening supervision. This has been evidenced by improvements in the government's household contact screening activities in relation to TB. Two main projects are being implemented in the biological surveillance space: Advancing Surveillance and Training to Enhance Recognition of Infectious Disease (ASTEROID), under which the local non-government organisation (NGO) Maluk Timor is delivering training to improve infection prevention and control in healthcare settings; and Surveillance Training, Research Opportunities and National Guidelines for communicable disease control in Timor-Leste (STRONG TL), under which the Menzies School of Health Research is helping to implement communicable disease surveillance guidelines. Training in surveillance and outbreak investigation for veterinarians and the para-veterinary workforce is being delivered by the University of Sydney and Charles Sturt University.

Multi-sector collaboration in the context of biological threat is under-resourced. While the MoH and the MoAF have limited budgets that can be used in certain situations, including for surveillance and response, it is difficult to ascertain how this resourcing may be used. However, the government does promote and support multi-sectoral coordination to implement the National Action Plan on Antimicrobial Resistance (AMR), including antimicrobial stewardship in human and animal health and agriculture.[11] Although the concept of One Health has been embraced by the government, it is hard to ascertain what this means for multi-agency biological threat cooperation. A national One Health strategic framework has been drafted and was endorsed by the MoAF and the MoH during World Rabies Day in October 2018. However, the fact that a recent One Health workshop conducted in Timor-Leste had no representation from civilian security sector stakeholders (immigration, customs, police) or the

military highlights that One Health as a concept remains very much a human and animal health platform.[12]

In the context of avian flu, One Health efforts are evidenced by projects such as the Village Poultry Health and Biosecurity Program, implemented by the MoAF and the Australian Government's Department of Agriculture, Fisheries and Forestry, which is also supported technically by the University of Sydney. This project aims to improve village poultry production through increasing functionality of the national cold chain, allowing the delivery of potent vaccines to rural regions; improving poultry husbandry practices to decrease attrition rates; and enhancing biosecurity practices from the level of Timor island to within individual households, to decrease the introduction and spread of infectious agents.[13]

Scope of biological threats in Timor-Leste

Timor-Leste continues to face a range of current and future biological threats. These can be classified into human, animal, plant and invasive species threats. Human threats include ongoing challenges of dengue, TB, malaria and filariasis. While Timor-Leste does not have a list of agreed priority zoonotic diseases, the following are considered as important zoonoses: avian influenza, rabies, anthrax, TB, and brucellosis. Timor-Leste is already managing plant pests such as fall army worm and khapra beetle. Invasive species such as Siam weed are already endemic across Timor-Leste, causing significant issues for pastures and crops and for agriculture more broadly.

In 2020, Timor-Leste faced another dengue epidemic that coincided with the COVID-19 pandemic. In June 2020 the country recorded 1,000 dengue cases and eight deaths. The spike in dengue cases was connected with the longer rainy season, which increased the number of breeding spots for the mosquito that carries the dengue virus. This highlighted the implications of changing climate variability. In January 2022, Timor-Leste was again reporting a high incidence of dengue.

The border between Timor-Leste and West Timor is a constant potential high-risk area for biological threats, given the formal and informal movement of people and animals. Although there is legislation to prevent the movement of livestock with signs of disease (Decree-Law No. 21/2003 of 31 December 2003 – Quarantine and Sanitary Control on Goods Imported and Exported) the ability to regulate this movement across the entirety of the border is very limited.[14] Timor-Leste's sea borders are also high-risk environments for biological threats, due to the influx of legal and illegal fishing boats or cargo boats bringing in foreign workers. These boats and their crew have historically brought their own dogs, for example, which once they reach land pose a rabies threat.

The transboundary implications of Timor-Leste's geographical location also mean that bats are another source of potential threat. The bat species *Pteropus vampyrus* has been observed to move between Timor-Leste and Indonesia (West Timor). These findings expand upon the current literature on the potential for transfer of zoonotic viruses by flying foxes between countries and have implications for disease risk management.[15]

SECTION ONE: Snapshots of agency and stakeholder engagement, capability and challenges in biological threat preparedness and response in Timor-Leste

1.1 The Executive Branch and Parliament of the Government of Timor-Leste

The Executive Branch and the Government of Timor-Leste, including the Office of the President and the Council of Ministers, have been extremely active in the context of COVID-19. Despite a range of legislation supporting public health actions – such as the Health System Law No. 10/2004 of 24 Novembe, permitting the declaration of a state of sanitary emergency, the use of special powers by the health minister does not appear to have been used for COVID-19. There has been a reliance on the use of presidential decrees to bring in the State of Emergency from which other actions are then initiated. The President issued Decree 29/2020 on 27 March 2020, declaring the first State of Emergency from 28 March until 26 April 2020.

The Prime Minister's Ministerial Diploma 14/2020 established the Integrated Crisis Management Center (CIGC), working as a situation room under article 31 of the National Security Law. On 22 April, the President asked the National Parliament to extend the State of Emergency by 30 days until 26 May, and then again he asked them to extend the State of Emergency until 26 June.[16] By order of the Prime Minister, the Government of Timor-Leste activated the CIGC to respond to the rising severity of the COVID-19 pandemic in the country. The entire COVID-19 response was then coordinated through the CIGC and remains an active example of multi-agency biological threat response. The CIGC is located in the Dili Convention Center and has three territorial units in Oecussi, Bobonaro and Covalima. It is co-chaired by experienced senior people – one with a background in defence and the other with a background in health.

> *The CIGC has been the epicenter of the country's COVID-19 response. It has representatives from all the major ministries and has been the central point of coordination. The CIGC's work across the COVID pandemic has given us an example of what a future biological threat preparedness whole-of-government structure could look like. The CIGC has been response focused, not prevention focused, so that is a key difference we would want to consider to prevent future biological threats becoming major problems for the country.*

1.2 Ministry of Health

The MoH in Timor-Leste has stated its strong vision for infectious disease preparedness and response. The current national health strategy highlights key objectives in infectious disease control, including:

- strengthening health systems capacity to reduce the burden of communicable diseases including vaccine-preventable diseases, TB, malaria, HIV and dengue
- strengthening health systems capacity to reduce the burden of neglected tropical diseases including lymphatic filariasis, yaws, soil-transmitted helminth infections and leprosy
- strengthening health systems capacity in early detection and to reduce the burden of emerging infectious diseases and zoonotic diseases. The MoH is supported in these efforts by its long-term partnership with the WHO, which lists one of its joint strategic priorities as 'Emergency

preparedness, surveillance, and response including implementing the provisions of the International Health Regulations'.[17]

Despite significant human resource limitation, the MoH has managed to significantly build capabilities in a range of areas relevant to biological threats. Significant work has been done to counter antimicrobial resistance. This includes a policy and guidelines for antibiotic use in human and animal health requiring a doctor's or veterinarian's prescription, although enforcing this regulation is a challenge. The development of the National Action Plan on AMR (2016–2020) has reinforced the government's commitment to five strategic objectives, including establishing a National Multi-sectoral Coordination Committee, increasing capacity to conduct human AMR surveillance and test samples through the National Health Laboratory, and a nationwide AMR awareness campaign since 2016. In addition, the MoH has established sentinel surveillance for influenza and is able to detect and subtype influenza viruses.

In the context of workforce development, the MoH has established a Vector Control and Entomology Unit, which has allowed malaria officers to widen the application of their skills to other vector-borne disease control interventions. This unit sits under the Communicable Disease Control directorate of the Department of Disease Control. Yet surveillance of some infectious diseases remains hampered. For example, limited access to HIV prevention, testing, treatment and care services, and low testing rates have resulted in an incomplete picture of HIV and STIs in Timor-Leste. The MoH has been able to deliver good training to personnel in field epidemiology, as well as clinical and operational training updates on infectious diseases to its health service providers at sub-national and community levels. It has also prioritised the protection of healthcare workers in Timor.[18] Expanding its capacities and understanding across biological threats beyond human health threats will remain an ongoing challenge.

> *One of the key challenges for our health system is the ongoing need to improve surveillance of infectious diseases. We have been improving our capacity to do field-based surveillance right across the country and our laboratory capability is also improving. It is difficult for us to take on more at the moment.*

1.3 Ministry of Agriculture and Fisheries

The MoAF is a significant ministry which oversees key departments with responsibilities in biological threat preparedness and response. These include the departments of veterinary and animal health, plant health, livestock, and biosecurity and quarantine. The Asia-Pacific Consortium on Veterinary Epidemiology trains veterinarians and para-veterinarians, using the field epidemiology training program (FETP) model, in Timor-Leste. The program is led by the University of Sydney and Charles Sturt University and has contributions from the majority of vet schools in Australia as well as schools in New Zealand and the US. The focus on disease surveillance and outbreak investigation for veterinarians and the para-veterinary workforce has made for significant capacity-building efforts in Timor-Leste, yet great challenges remain. The challenges of geography and transport infrastructure make efforts to improve surveillance more difficult. There is also significant pressure on limited human resources within the country, which means significant workloads are carried by a handful of skilled individuals. Highlighting both the skills and the pressures is the fact that many people working in the veterinary and animal health department were seconded to the MoH's COVID-19 vaccination program to assist with disease surveillance and vaccinations. This clearly has implications for core animal health responsibilities.

Key to disease surveillance among animals in Timor-Leste is the ability to detect disease at international border crossings.[19] Participants interviewed for this report suggested that the biosecurity personnel in the MoAF have limited capacity to enforce animal health and biosecurity arrangements at borders and would need much greater assistance from other agencies such as customs and immigration. This sentiment is supported by a recent evaluation of Timor-Leste's biological threat preparedness which recommended the need to develop and implement a biosafety and biosecurity legal framework with strong enforcement mechanisms. Furthermore, it suggested that Timor-Leste develop a national plan of action for biosafety and biosecurity for the human, animal and agriculture sectors.[20]

> *Enforcing biosecurity regulations to guard against importing animals or animal products that are diseased is virtually impossible at the moment given the lack of engagement in the enforcement from other agencies such as customs authorities. We don't have enough personnel within the MOAF to actually have enough presence along the borders, so we have to rely on other agencies to support biosecurity arrangements and unfortunately this does not happen to the level we need it to happen. For that reason our borders remain hot zones for infectious disease.*

1.4 National Disaster Management Directorate

Timor Leste's government, recognising the need for disaster preparedness, established the National Disaster Management Directorate (NDMD) to manage risks from floods, landslides, tropical cyclones, droughts, earthquakes, tsunamis and epidemics. Floods are the most frequently occurring disaster and have had the most severe impact on lives, livelihoods and the economy. Operational responsibility for disaster response had been held jointly by the Ministry of Social Solidarity and Inclusion and the MoI, but has now been transferred fully to the MoI's Secretary of State for Civil Protection.

The leadership of the NDMD divisions, including the Department of Disaster Preparation, Prevention, and Mitigation, acknowledged gaps in the early-warning system for disasters, which at this point in time do not necessarily or specifically include biological threats. Given the implications of climate change for increasing susceptibility to biological threat, it will be important that the NDMD seek to enhance its understanding and consideration of biological threats.

> *There is a lot of work to be done to improve our capabilities in preventing and responding to disasters. Understanding how to place biological threats within our disaster management framework is a key area to look at. At the moment the NDMD can certainly work with other ministries but seeing how we do this with biological threats is something for us to explore further.*

1.5 Polícia Nacional de Timor-Leste

Despite a significant role in the COVID-19 response, frontline workers such as police did not organise or receive any initial training. This meant enforcement of COVID-19 measures was challenging at the start, due to the lack of equipment and knowledge among police about how to enforce the advised measures.[21] Yet police were very active across the country in the COVID-19 response, including the substantial use of police cars and personnel to deliver COVID-19 information to communities (especially remote ones) and a significant police presence to enforce the State of Emergency. The role of police throughout COVID-19 has, however, been seen by the general population as very positive, with an increase of 36% in how favourably the community has viewed the performance of the police. Police

have historically received HIV awareness training, as they have been considered a population at risk of HIV. It is unclear whether this awareness has included occupational health and safety risk training. This training has not been expanded to consider other biological threats.

1.6 Timor-Leste Defence Force

Discussions with the Timor-Leste Defence Force remain ongoing at this point in time and will be discussed with the ACMC at a later date.

1.7 Civil society and non-government organisations

A large number of civil society organisations are working across the biological threat preparedness and response sector. Local organisations, often supported by and partnered with larger bilateral bodies, have been critical components of increased public health infectious disease awareness and surveillance across Timor-Leste. There is an equal effort between bilateral partnerships, NGOs and communities to improve animal health surveillance and safe farming and livestock practices. There are also concentrated efforts by several organisations in community engagement and awareness of the need to boost COVID-19 vaccine uptake – particularly third dose uptake.

1.8 Bilateral and multilateral partnerships in biological threat preparedness and response in Timor-Leste

A huge number of bilateral and multilateral partnerships and NGOs are engaged in various components of biological threat preparedness and response. The range of activities and programs is vast and the coordination of them all is complex. We have spoken with multiple agencies in seeking to inform this report, and the consistent message from these agencies is that it is a very complicated and busy space. Furthermore, agencies advise the authors to seek areas where little attention to biological threat is being paid, such as within civilian security sector agencies. The authors of this report heed this advice and will continue to be informed by and benefit from the deep understanding of the many agencies that have had long-term engagements in Timor-Leste since Independence.

SECTION TWO: Emerging cross-cutting themes and challenges

This section describes specific areas that all stakeholders appeared to converge around in some way. While perspectives might have differed, the majority of stakeholders held views which broadly aligned with these cross-cutting themes and challenges. The themes and challenges are described below and are used to frame key considerations and implications in Section Three.

2.1 Health-security responses in Timor-Leste are characterised by a significant amount of engagement from a large number of actors, particularly in and around Dili, yet the majority of focus is on strengthening human and animal health systems

It is clear that a really significant number of national, bilateral and multilateral bodies and NGOs are working on current COVID-19 efforts, as well as building more long-term technical capacity in animal and human health. Participants spoke of the sheer number of programs, policies and strategic engagements that ultimately rely on well-established relationships and the senior leadership of Timor-Leste's technical, political and subject matter experts. This was particularly acute in Dili, where it was suggested that personal and long-term relationships were the platforms from which the majority of initiatives were derived and led. In the context of future-facing and multi-agency efforts in the pandemic prevention and surveillance space, the majority of efforts were centred around the MoH and MoAF.

The ongoing experience of COVID-19 and the coordinating mechanism led out of the Integrated Crisis Management Centre had heightened operational awareness and experience in multi-agency engagement. Beyond COVID-19, participants described the need for a much deeper awareness that would need to be created around the broader suite of biological threats facing Timor-Leste. There was also a growing recognition of the connectedness of these threats to drivers such as climate change and the critical implications for livelihoods and specifically food security.

Participants suggested an audit of what these threats are and the role of line agencies in responding to different threats in a prevention, surveillance and response mechanism. Participants suggested this work would need to be done over the next several months and presented to senior political and departmental people across a range of agencies in terms of what kind of future early-warning surveillance might be required and how it would work. It was felt that this work should initially focus on orientating police, customs, immigration and defence to their possible roles as partners to the MoH and MoAF.

2.2 Human resource constraints are pervasive across the biological threat surveillance, preparedness and response continuum, and biological threat literacy is limited and unevenly distributed beyond key personnel within human health and animal health agencies

The human capacity to engage in scaled-up and nationally reaching multi-agency biological threat preparedness is limited. While recognising the ongoing and significant increase in human and animal health workforce and capability, we note that significant challenges remain. This is particularly apparent in agencies other than the MoH and the MoAF, with particularly limited biological threat awareness in key partners including immigration, customs, police and military. The investment in public health and animal health infectious disease surveillance – including surveillance of AMR in livestock – has been vast. It has been a critical and ongoing human and animal health system strengthening exercise, yet there has not been a complementary investment in building basic biological threat awareness in agencies that are

in critical positions to encounter biological threat or lend support to prevention and mitigation efforts. This is largely because investments are made in basic core capabilities.

Although biosecurity training has been widely available, it does not appear to have been part of core training requirements across key civil security agencies. Despite these human resource constraints, there has been very effective multi-agency coordination in response to COVID-19. The key is how to embed this across a full suite of biological threats.

2.3 The border areas of Timor-Leste are a significant challenge in relation to biological threat risk but provide a great opportunity for locally based initiatives that work across government agencies and communities

Along the 228 km border that Timor-Leste shares with West Timor there are only a small number of formal border posts. Yet, as with many other border areas in South-East Asia, the border is extremely porous and cross-border trade – both formal and informal – is a consistent reality that is supported by rural communities with often shared culture and family links. Given the grave risk of both livestock and human infectious disease, there have been ongoing efforts to enhance border protection.

Yet the balance between the need to foster a formal cross-border trade and movement of people with the need for communities to engage in livelihood activities means that a grey zone of trade in almost any commodity continues unregulated. Recognising the implications of the movement of cattle, chickens and pigs for brucellosis, African swine fever, foot-and-mouth disease and avian flu respectively has led to an ongoing bilateral effort to improve health protection measures between Indonesia and Timor-Leste.

While this work remains ongoing, it is again the role of customs and immigration that appears to be particularly underdeveloped. Participants commented that engaging in efforts to build whole of cross-border community awareness and capability in biological threat surveillance and mitigation measures is required. While the biosecurity department within MoAF has regulatory authority for biosecurity, it is essentially powerless to implement biosecurity measures in many of the formal and informal border crossings. Furthermore, what happens to livestock once it crosses the border into Timor-Leste is of equal concern. As one moves from the border to communities anywhere from 5 km to 50 km away, the integrity of surveillance of biological threats falls right away.

There are growing efforts to put in place cross-border agreements, protocols and memoranda of understanding with West Timor through a partnership technical assistance program between the Asian Development Bank, Indonesia and Timor-Leste, yet the penetration of these efforts to extend biological threat preparedness into a broader range of agencies is underdeveloped.[22] Increasing concern about transnational crime organisations targeting this border in two-way criminal activities provides potential considerations for engaging in biological threat preparedness efforts across agencies, given that many of these crimes involve movement of people.

SECTION THREE: Conclusions, considerations and recommendations

In Timor-Leste, the ongoing response to COVID-19, as well as ongoing efforts to rebuild after the damage from the floods, does not leave much bandwidth among senior people across agencies to entertain future-facing and whole-of-government biological threat surveillance, preparedness and response. The COVID-19 response saw existing efforts to control malaria and other infectious diseases hampered. The human and animal health workforce has been stretched. While there is broad recognition of the increasing biological threat risk posed by a range of drivers (climate change, border movement, migratory birds, plant and animal pests), there has been limited ability to take the time to think through whole-of-government future capability needs. There has also been limited consideration of how these threats inform ongoing development of a national security strategy in the context of existential and non-traditional security threats (aside from the widespread recognition of implications for food insecurity). For these reasons, this report makes only a limited set of recommendations, in the hope that they may be seen as manageable next steps that could be taken without significant implications for the bandwidth of senior people working across Timor-Leste.

3.1 Support a small national workshop that brings together two to three people from each relevant agency after engaging in an ongoing socialisation and awareness-raising exercise concerning the range of biological threats and the implications for each of the agencies and organisations that would have interfacing roles

While there is sound recognition in the MoH and the MoAF of the interconnectedness of drivers of biological risk and the suite of biological threats, this recognition does not penetrate into the training or strategic planning of many of the relevant agencies, including police, defence, customs and immigration. This project has allowed for some initial discussion with key people across these agencies but all participants have said they need to receive further briefings to better understand what it might mean for their agencies. Engaging in another round of discussions – ideally face to face – will solidify opportunities to support this broader thinking. Participants suggested that once this was done, bringing everyone together for a national dialogue would be a tangible and meaningful next step. Further considerations to drive this effort may include:

- Support in-country and face-to-face discussions over the coming months between people involved in this report and key people across all key agencies to further socialise the potential considerations and roles of a raft of stakeholders.
- After each line agency has engaged in further discussions, host a national workshop to bring stakeholders together, jointly hosted by the MoH, MoI and MoAF, to agree on the way forward.

3.2 Support the development and implementation of a training package for police, customs, immigration and defence agencies that accounts for their role in biological threat preparedness as partners to health, agriculture and biosecurity agencies and also accounts for the occupational health and safety needs of personnel

Awareness of IHR-related hazards should be increased in the security sector and among policymakers. As has been recently demonstrated in other countries in South-East Asia, the baseline knowledge around biological threats, mitigation and occupational health and safety for frontline security sector personnel is negligible. Without these personnel understanding their potential exposure risks, and their potential role in a multi-agency approach, biological threat preparedness will not become a core capability. Further considerations to advance root-and-branch core capabilities, awareness, knowledge and practices may include:

- Explore training materials that are likely to be developed in the coming months for their application to Timor-Leste.
- Seek to understand how these materials can be part of both recruit-level and existing personnel training and development.

3.3 Consider the design, resourcing and implementation of an action-orientated research program that fosters multi-agency engagement and collaboration (including with communities) across two cross-border sites along the Timor-Leste and West Timor border

While there are ongoing research efforts, particularly to improve human and animal health surveillance of infectious disease, these research efforts are concentrated among human and animal health sector personnel. There is no current research effort that seeks to build a community of practice among key civil security sector personnel at the border, then to foster, nurture and facilitate their engagement with the human and animal health sector and the community at large. Working at two border sites would allow efforts to enhance cross-border threat surveillance to account for the roles of key civil security sector actors and build evidence as to how these actors can contribute in complex geographies and dynamics. Further considerations may include:

- Embed agreement for this type of research within the MoI, MoH and MoAF.
- Design an action-orientated methodology that accounts for real-time engagement of personnel in a complex setting.
- Foster multi-agency cooperation with technical assistance and facilitation efforts to enhance collaboration.

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